Networking for Research
Canada – Germany – USA
18 October 2022

Conference Catalogue

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PREFACE

The DFG initiative UDIF-HAW

The DFG initiative *Unterstützung der Internationalisierung von Forschung an Hochschulen für angewandte Wissenschaften (UDIF-HAW)* (Networking for Research - German Universities of Applied Sciences and Researchers Worldwide) specifically targets universities of applied sciences (UAS) that are interested in international research collaborations. This DFG initiative provides networking opportunities: researchers of German UAS and universities / research institutions from other countries meet virtually or live at topic-specific Matchmaking Events, such as virtual fairs or delegation trips. All topic areas are identified together with UAS representatives, are continuously expanded or updated according to demand, and are deliberately interdisciplinary. Potential cooperation partners get to know each other at these thematic meetings, identify common research priorities, and develop joint project ideas. The goal is to turn these project ideas into funding proposals to the DFG.

Further information on this DFG initiative can be found at DFG, German Research Foundation - **Networking for Research – German Universities of Applied Sciences and Researchers Worldwide**. The UDIF-HAW initiative is part of an overall package of measures undertaken by the DFG to support the research potential at German UAS.

If you would like to be kept up to date on the activities of the UDIF-HAW initiative, please send us an email and request to be added to our mailing list. We regularly send out a newsletter to inform you about upcoming events and activities.

Your contact person at the DFG:
Dr. Jennifer Gronau
udif-haw@dfg.de

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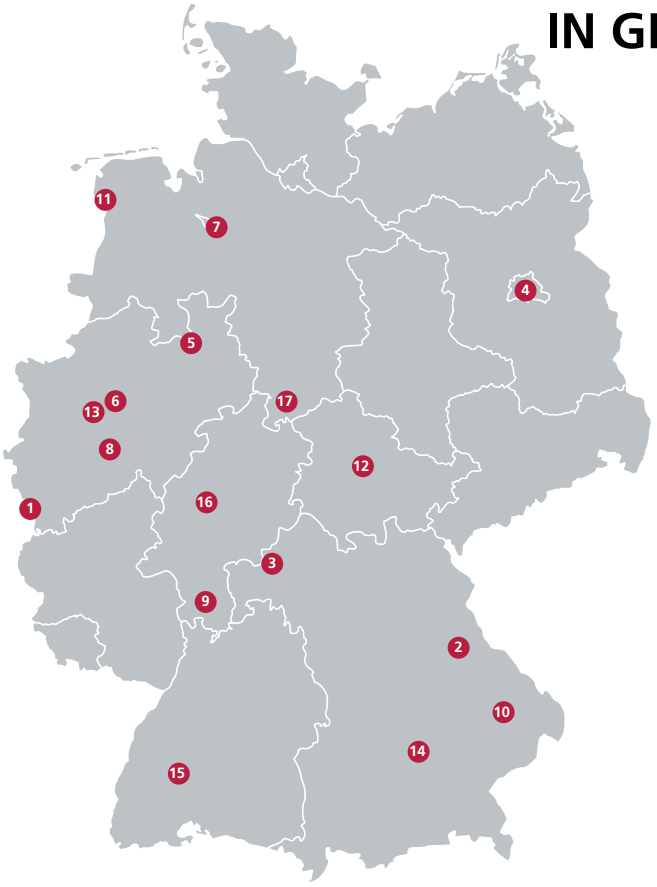

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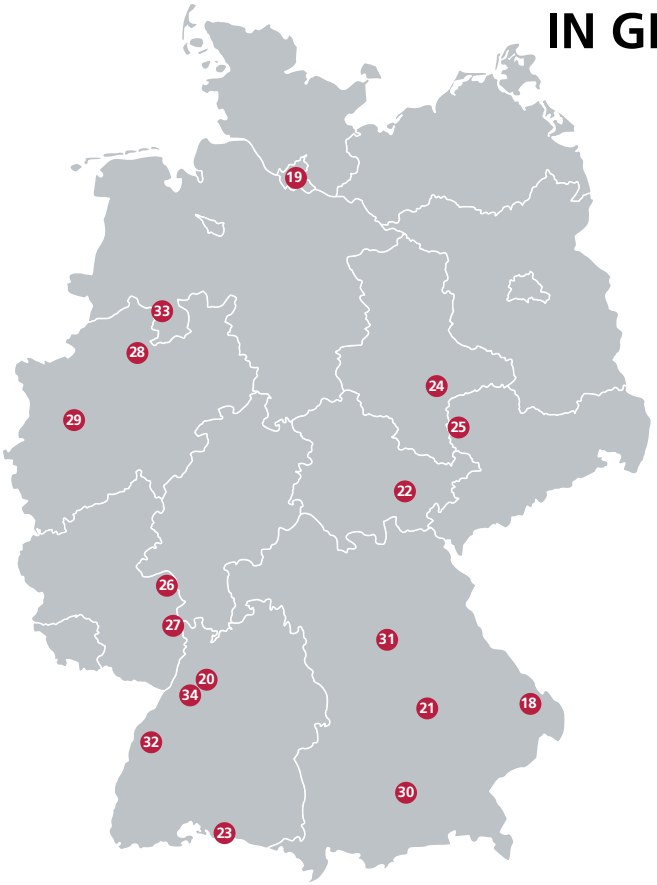

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Matchmaking Event
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HEALTH CARE AND SOCIAL MEDICINE THROUGHOUT THE LIFE COURSE

Matchmaking Part I

CEST	Room 1.1	Room 1.2	Room 1.3
16:30 – 16:45	**Prof. Dr. Marlene Haupt**	**Asst. Prof. Gaurav Nanda**	**M.Sc. Eugenia Rykova**
16:45 – 17:00	**Dr. Ingo Kolodziej**	**Prof. Zahra Moussavi**	**Dr. Craig Kuziemsky**
17:00 – 17:15	**Assoc. Prof. Hanadi Hamadi**	**Prof. Dr. Sven Karstens**	**Prof. Dr. Ralf Seepold**
17:15 – 17:30	**Assoc. Prof. Richard Wamai**	**Asst. Prof. Cynthia Williams**	**Prof. Suranjan Panigrahi**
17:30 – 17:45	**Prof. Ansgar Wübker**	**Prof. Dr. Sabine Schäper**	**Prof. Dr. Dr. Stefanie Steinhauser**
17:45 – 18:00		**Prof. Dr. Vivian Carstensen**	

HEALTH CARE AND SOCIAL MEDICINE THROUGHOUT THE LIFE COURSE

Matchmaking Part II

CEST	Room 2.1	Room 2.2	
18:15 – 18:30	**Prof. Dr. Christoph Rußmann**	**Assoc. Prof. Christina Wright**	
18:30 – 18:45	**Prof. Tony Szturm**	**Dr. Stefan Kupper**	
18:45 – 19:00	**Dr. Alexander Glassmann**	**Asst. Prof. Chun-An Chou**	
19:00 – 19:15	**Assoc. Prof. Carolyn Lee-Parsons**	**Prof. Jutta Lindert**	
19:15 – 19:30	**Prof. Dr. Jörn Oliver Sass**	**Asst. Prof. Natalie Riediger**	
19:30 – 19:45	**Prof. Gary Young**	**Prof. Tilo Mentler**	

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Matchmaking Event
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INNOVATIVE MATERIALS – FROM SYNTHESIS TO APPLICATION

Matchmaking Part I

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16:30 – 16:45	**Prof. Lothar Berger**	**Assoc. Prof. Klaus Doelle**	**Dr. Jelena Barbir**
16:45 – 17:00	**Prof. Behraad Bahreyni**	**Prof. Dr. rer. nat. Uta Helbig**	**Prof. Sami Khan**
17:00 – 17:15	**Prof. Dr.-Ing. Johannes Bader**	**Prof. Dr. Evgeny Gurevich**	**Michael Kucher**
17:15 – 17:30	**Prof. Nian Sun**	**Assoc. Prof. Gerd Grau**	**Asst. Prof. Mahshid Ahmadi**
17:30 – 17:45	**M. Eng. Natalie Jüngling**	**Prof. Dr. Thomas Kordisch**	**Prof. Dr. Danka Katrakova-Krüger**
17:45 – 18:00	**Assoc. Prof. Sanjiv Dhingra**	**Dr. Hossein Kazemian**	**Prof. Dr. Ingela Tietze**
18:00 – 18:15	**Prof. Dr. Klaus Peter Koch**	**Prof. Dr. Barbara Hintz**	

INNOVATIVE MATERIALS – FROM SYNTHESIS TO APPLICATION

Matchmaking Part II

CEST	Room 2.1	Room 2.2	
18:15 – 18:30	**Prof. Jinfeng Liu**	**Dr.-Ing. Ali Zahedi**	
18:30 – 18:45	**Prof. Woo Soo Kim**	**Assoc. Prof. Oleg Rubel**	
18:45 – 19:00	**Prof. Dr. Carola Pickhardt**	**Prof. Dr. habil. Margit Schulze**	
19:00 – 19:15	**Dr. Jens Helbig**	**Assoc. Prof. Jeffrey Horn**	
19:15 – 19:30	**Prof. Dr.-Ing. Petra Maier**	**M.Sc. Maciej Wylezek**	
19:30 – 19:45	**Prof. Dr. Bert Stegemann**	**Prof. Dr. Jörg Töpfer**	

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Matchmaking Event
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SECURE DIGITALISATION OF INDUSTRIAL ENGINEERING

Matchmaking Part I

CEST	Room 1.1	Room 1.2	
16:30 – 16:45	**Prof. Dr. Dennis-Kenji Kipker**	**Prof. Dr. habil. Steffen Wendzel**	
16:45 – 17:00	**Asst. Prof. Deveeshree Nayak**	**Prof. Dr.-Ing. habil. Natasa Zivic**	
17:00 – 17:15	**Prof. Dr.-Ing. Thomas Leich**	**Dr. Baijian Yang**	
17:15 – 17:30	**Prof. Dr. Ronald Petrlic**	**Anand Kumar Ashutosh**	
17:30 – 17:45	**Prof. Dr. Christoph Reich**	**M.Sc. Nils Freyer**	
17:45 – 18:00	**Prof. Dr. Helmut Wittenzellner**	**M.Eng. Willi Zschiebsch**	

SECURE DIGITALISATION OF INDUSTRIAL ENGINEERING

Matchmaking Part II

CEST	Room 2.1	Room 2.2	
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18:30 – 18:45	**Prof. Dr. Christian Becker-Asano**	**Prof. Dr. Axel Busboom**	
18:45 – 19:00	**Prof. Dr.-Ing. Dipl.-Ing. Dipl. Wirt.-Ing. Axel Sikora**	**Prof. Dr. Sebastian Doehler**	
19:00 – 19:15	**M.Sc. Laura Bittel**	**Prof. Dr. Alexander Schiendorfer**	
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Matchmaking Event
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SMART CITIES
Matchmaking Part I

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16:30 – 16:45	**Prof. Dr.-Ing. Michael Buehler**	**Dr. Ramla Qureshi**	
16:45 – 17:00	**Prof. Mauricio Soto Rubio**	**Prof. Berthold Best**	
17:00 – 17:15	**Anna Buerklen**	**Prof. Dr. Edwin Kamau**	
17:15 – 17:30	**Asst. Prof. Hongyu Zhou**	**M.Sc. Florian Rupp**	
17:30 – 17:45	**Prof. Dr. Anne Stockem Novo**	**M.Sc. Christian Danowski-Buhren**	
17:45 – 18:00	**Prof. Patrick Planing**	**Prof. Raymond Fu**	

SMART CITIES
Matchmaking Part II

CEST	Room 2.1	Room 2.2	
18:15 – 18:30	**Prof. Dr. Hossein Arefi**	**Alisa Lorenz**	
18:30 – 18:45	**Prof. Dr. Thomas Clemen**	**Asst. Prof. Chang Soowon**	
18:45 – 19:00	**Prof. Dr. Olaf Schroth**	**Frank Edenharter**	
19:00 – 19:15	**Prof. Dr.-Ing. Heiko Thimm**	**Prof. Dr. Björn Machalett**	
19:15 – 19:30	**Prof. Jinfeng Liu**	**Myriam Guedey**	
19:30 – 19:45	**Prof. Dr.-Ing. Michael Buehler**	**Rushikesh Padsala**	

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TRANSFORMATION OF THE ENERGY SECTOR IN THE WAKE OF CLIMATE CHANGE Matchmaking Part I

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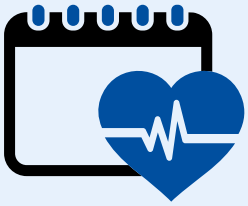
16:45 – 17:00	**Prof. Erik Kjeang**	**Assoc. Prof. Connie Van der Byl**	
17:00 – 17:15	**Prof. Dr. Jan Lohbreier**	**Dr. Christoph Gimmler**	
17:15 – 17:30	**Assoc. Prof. Walter Leon-Salas**	**Prof. Dr. Henrik te Heesen**	
17:30 – 17:45	**Prof. Dr.-Ing. Jennifer Niessner**	**Assoc. Prof. Klaus Doelle**	
17:45 – 18:00	**M.Sc. Davood Peyrow Hedayati**	**Prof. Dr.-Ing. Ralph Lindken**	

TRANSFORMATION OF THE ENERGY SECTOR IN THE WAKE OF CLIMATE CHANGE Matchmaking Part II

CEST	Room 2.1	Room 2.2	
18:15 – 18:30	**Prof. Dr. Norbert Bernhard**	**Asst. Prof. Wenbo Zheng**	
18:30 – 18:45	**Prof. Simon Foo**	**Prof. Dr. Michael Eley**	
18:45 – 19:00	**Prof. Dr. Andreas Bartelt**	**Dr. Steffen Hundt**	
19:00 – 19:15	**Sebastian Dittmann**	**Prof. Mary Johnson**	
19:15 – 19:30	**Dr. Oliver Iorhemen**	**Prof. Dr. Volker Paul Schulz**	
19:30 – 19:45	**Dr.-Ing. Florian Wallburg**	**Prof. Dr. Daniel Piazolo**	



Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

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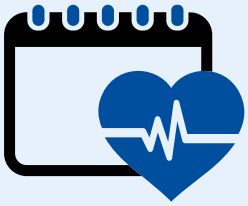
Matchmaking Part I



Matchmaking Part I

Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Marlene Haupt

As dean of the Master's Degree Program "Applied Health Sciences" at RWU, my research focuses on three areas: 1) Behavioral Economics and Public Policy, 2) Health Literacy and Health Services Research, 3) Economics of Gender with a Focus on Gender Medicine. I often conduct joint research with students (systematic reviews, applied research projects with industry partners). From September 2021 to February 2022, I was a visiting researcher at the University of Georgia, College of Family and Consumer Sciences, Department of Financial Planning, Housing and Consumer Economics. There, we worked on comparative health care and health economics issues.

Field of Research
Health Economics, Behavioral Economics

Topics of Interests
Health Literacy, Health Services Research, Applied Behavioral Economics

I am looking for …
a research cooperation (exchange, joint projects, applied research)

CONTACT
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marlene.haupt.18@gmail.com

RWU - Ravensburg-Weingarten University of Applied Sciences, Germany
www.rwu.de/hochschule/personen/hauptm

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Assistant Professor Gaurav Nanda

I work on research problems involving Applied Machine Learning, Text Mining, and Intelligent Decision Support Systems with applications in Safety, Industry 4.0, Healthcare, Learning Technologies, and other areas.

Field of Research

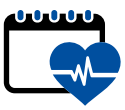
Applications of Artificial Intelligence in Safety and Injury Surveillance

Topics of Interests

AI applications in safety, healthcare, education

I am looking for …

Collaboration and funding opportunities to work on research problems involving applications of AI in Safety



CONTACT

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

M.Sc. Eugenia Rykova

AphaDigital project focuses on developing an SLT application for German-speaking patients with aphasia. In distinction from the existing German apps, in aphaDigital app an avatar-based SLT helper provides AI-based detailed feedback. Thus, speech recognition with further text processing are used for multilevel feedback: phonemic/phonetic, semantic and grammatic. At the current stage of the project, the main goal is assessment of existing speech recognition solutions and semantic networks. Furthermore, different avatar-helpers are evaluated in a pilot study.

More than 36 open-source speech recognition solutions and four commercial systems are evaluated with the help of different corpora, including recordings of German speakers with aphasia. First, a solution that provides a phone/phoneme-level granularity, in other words, is to a certain extent independent from existing vocabulary of the language, is necessary to track phonetic and phonological mistakes of the speaker. Since the phone-based models performed with low accuracy (min CER = 0.7), other models are assessed for further selection, which is based on CER. WER and WIL metrics serve to assess the models in the other case, when precise language-dependent (sort of forced-aligned) speech recognition is useful for the analysis of semantic errors. The latter is carried out with the help of a semantic network (e.g., GermaNET): in a naming task, a word pronounced by the speaker is recognised and compared to the target word in terms of their semantic relations and distance. This analysis allows a differentiated feedback upon an error. For example, when a patient with aphasia names apple a fruit, which is a hypernym of the word apple, she gets a prompt to be more specific. If she names apple a pear, it will be mentioned in the feedback that the two words are from the same category "Fruit". Semantic networks are assessed with the help of artificially constructed examples, which represent, however, typical errors made by patients with aphasia in a picture-naming task.

Field of Research

Speech Technology for Health Care

Topics of Interests

Clinical and Applied Linguistics
Speech and Language Technologies
Digitalization of Health Care

I am looking for …

project partners in the field of ASR and Speech Synthesis, Machine Learning for Speech Research, Face Image and Handwriting Recognition.

click on poster to see full size

CONTACT

M.Sc. Eugenia Rykova
eugeniia.rykova@th-wildau.de

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www.th-wildau.de/

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Dr. Ingo Kolodziej

In my research of applied empirical health economics, I am concentrating on topics at the intersection of health services research and demographic ageing. In addition to examining formal long-term care settings, I focus on informal long-term care and the implications on labor force participation and mental health of caregivers in Europe. I also worked on this topic with US data during a research stay at Duke University (North Carolina). I further investigate the demand for skilled workers in the health and social care sector, the work of care experts in rural regions and how retirement affects mental health. I also work on the evaluation of rehabilitation measures. I have published in international journals which comprise Health Services Research, Social Science & Medicine and Journals of Gerontology Series B: Psychological Sciences and Social Sciences. I am working at RWI – Leibniz Institute for Economic Research and I am affiliated with the Hochschule Fresenius – University of Applied Sciences.

Field of Research
Health Economics

Topics of Interests
ageing research, long-term care, demand for skilled workers in the health care sector, health services research, mental health, applied microeconometrics

I am looking for …
Research cooperations

CONTACT
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Hochschule Fresenius University of Applied Sciences, Germany
www.rwi-essen.de/; www.hs-fresenius.com/

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Professor Zahra Moussavi

Memory and cognitive declines are associated with normal brain aging but can also be precursors to dementia, in particular the so called the global crises of the century, Alzheimer's disease. While currently there is no cure or „"vaccine"" against dementia, there are hopes to delay the onset of the disease by living a brain-healthy life style. The proposed research offers a novel technology to combat dementia and age-related cognitive disorders.

I have developed and tested a series of cognitive exercises for the aging population. Due to our very promising results, I propose to enhance and develop its market prototype, called „"Dementia Buster"", with Flutter language for any platform. The current pilot app, called "MindTriggers", is available on iPads.

I designed the MindTriggers based on the premise of brain plasticity; it targets the brain functions that are declining with normal aging and dementia. In our pilot study, we have shown that it can provide significant cognitive enhancement on people 65+ years when used regularly in a regimen program. Leveraging on our tested design, I aim to develop its end-user product for well-being of aging population. This app will also have an additional feature for monitoring and analyzing a user's performance if the users agree to data-sharing option.

The Dementia Buster App will not only enhance the cognitive status of older adults when used regularly, but can also detect sudden cognitive declines. It will be able to warn the user and/or a designated family member if a decline in ability should be brought to the attention of their doctor.

Field of Research
Biomedical Engineering, Health

Topics of Interests
Aging well being, Alzheimer's detection and treatment

I am looking for …
collaborators

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Dementia Buster Program for aging with a healthy brain

❖My pilot studies on >50 older adults using the current MindTriggers app in a regimen program show:

❖ All individuals with mild cognitive impairments improved significantly after a month of using the app regularly in our labs with a tutor.

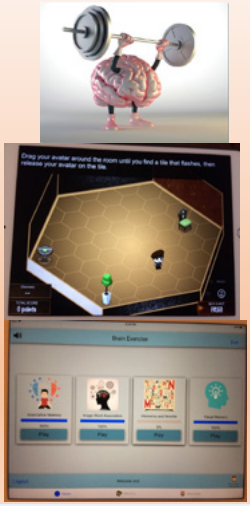
❖All healthy older adults using the app on their own at home with no supervision, improved significantly after a month.

❖ >90% of individuals with Alzheimer's also improved after a month of practicing the cognitive exercises. No one decline.

❖All the assessments were completely intendent of the practiced exercises (showing the far-effect)

❖The app can monitor and analyze the performance of a user if they agree to data sharing.

❖ I propose to enhance the app and investigate its long-term effect on older adults in two groups: 1) those use it on their own, and 2) those with dementia use it in a virtual assisted program.



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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Dr. Craig Kuziemsky

Dr. Craig Kuziemsky, PhD, is Associate Vice President Research and Interim Dean of the School of Business at MacEwan University in Edmonton, Alberta. Dr. Kuziemsky's research focuses on developing innovative approaches for modeling collaborative healthcare delivery so we can better design information and communication technology (ICT) to support different contexts of collaborative healthcare delivery. His work has defined the structural aspects necessary to support collaboration as well as the behavioral and social processes that shape how the structural components work. His studies of collaboration have used concepts such as complexity theory to understand the nature of collaborative interactions in different healthcare settings (clinical healthcare and public health for disaster management).

Field of Research
Health systems

Topics of Interests
Health systems and collaborative care delivery, health information systems

I am looking for …
Collaborators on health systems research projects

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Associate Professor Hanadi Hamadi

My general research interests span the areas of health services research, policy and management, health promotion and education, and occupational health and safety. The research agenda I have been pursuing throughout my graduate studies until now is organized around the following main axes: (1) the impact of organizational factors on processes and health outcomes; (2) the evaluation of health-outcome initiatives (HOIs), with an emphasis on the cost-effectiveness and policy impact of social-determinants-focused HOIs; (3) the relationship between HOIs and population health, (4) the evaluation of state and federal policies and their impact on reimbursement, physician behavior, and cost-containment efforts; (5) the generation of new knowledge through the development of statistical methodology to support evidence-based practices in health care; (6) the evaluation of the relationship between cost and health outcomes; (7) the association between risk factors both on an individual and organizational level as well as on worker safety and health; and (8) the evaluation of the impact of workforce-education competency and training on hospital outcome, performance, and profitability. The unifying theme and goal of my research agenda is to produce original and methodologically rigorous studies that are respected by, and relevant to, both practitioners and academics. A team approach is required to successfully carry out this type of research, from optioning data to conceptualizing and evaluating the theories and findings, to submitting results for presentation and publication.

Field of Research
Health Services Research

Topics of Interests
Health Policy, patient outcomes, population health, Insurance, and care delivery

I am looking for …
Collaborations

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Sven Karstens

My research interests lie in the areas of health services research/implementation science, stratified care, evidence-based care and manual therapy, particularly for patients with musculoskeletal complaints. I apply a wide range of methods including qualitative and quantitative study designs. Moreover, I have experience adapting and developing PROM for the named areas.

Field of Research

Health Services Research, Physiotherapy

Topics of Interests

Health Services Research, Physiotherapy, Manual Therapy, musculoskeletal care, back pain, osteoarthritis, Implementation Science,Stratified Care, PROM, Cross-cultural adaptation, Evidence based practice

I am looking for …

Health Services Research, Physiotherapy, musculoskeletal care, Implementation Science

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Ralf Seepold

MORPHEUS: Non-invasive system for measuring parameters relevant to sleep quality

Abstract

The project MORPHEUS aims to continuously monitor vital signs during sleep in a patient's home environment over long periods of time by using non-invasive technologies. The system offers an opportunity to enhance the quality of life of an aging society by transferring the collection of sleep data to the center of analysis and enabling the data to be made available for medical evaluations.

As a result, a system for automatically collecting sleep-related data will be developed, providing both the software and the hardware. The system will make recommendations (e.g., for apnea or cognitive behavioral therapy for insomnia - CBT-I based) and verify compliance.

The research questions are

1. How does the sleep quality of older people differ from average assumptions, and how can machine learning improve the ability to personalize scoring?
2. How can non-invasive sleep quality measurement support sleep therapy?
3. Is there a reduced set of vital signs that can be used to determine sleep stages, and how well can these parameters be captured?
4. Are there significant differences in vital signs between older women and men?

The result of the project will be the Morpheus (MoBo) Box. Conceptually, the development can be divided into five components: The MoBo Core, as core component provides the basic functionality of an embedded computer and implements the interfaces to the other components. The MoBo-HW is a non-invasive network of sensors that collects vital patient data, pre-processes it, and passes it to a downstream learning algorithm. The MoBo Algorithm receives a signal data stream from the MoBo HW and processes it by specific evaluation algorithms. Different intelligent techniques are used to personalize the processing of sleep quality and relevant vital data (e.g., respiration or apnea events). The MoBo API provides an open interface of the system to external platforms so it can be connected to hospital or practice information systems. The MoBo App will provide and visualize the data correctly for the target groups (patient, physician, etc.), e.g., via a smartphone.

Field of Research

Health, e-Health, Sleep medicine, Ubiquitous Computing, IoT

Topics of Interests

biomedical engineering, sleep medicine, telemedicine, physiological measurement, stress detection, ambient assisted living

I am looking for …

Cooperation for my research group in the domain of our expertise.

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Associate Professor Richard Wamai

I work in global health research, training, implementation and policy focusing on HIV/AIDS, neglected tropical diseases, non-communicable diseases, and health systems and policy in multiple countries across sub-Saharan Africa. My continuing scholarly interests are in evidence-based strategies for evaluating, preventing and responding to diseases and health systems challenges particularly in Africa in the context of epidemiological and eco-demographic transitions. I am driven in my work by a passion for ending the neglect, for disease- and- poverty-free communities and in one outcome, I established the African Centre for Community Investment in Health based in Chemolingot, northern Baringo, Kenya. Here is a link to my academic profile (https://pubmed.ncbi.nlm.nih.gov/?term=wamai+r)

Field of Research
Global Health

Topics of Interests
Infectious diseases; non-communicable diseases; training

I am looking for …
Funding to support projects in above areas. I have collaborators at University of Cologne on another DFG grant proposal on infectology

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Assist Prof. Cynthia Williams

Dr. Williams has an interdisciplinary background as a physical therapist and business owner that enhances her ability to comprehensively address healthcare challenges. S Her research include mental health and chronic disease management of Adults employing innovative technology such as telemedicine and wearable technology. She is also contributes to research in healthcare utilization, patient outcomes and health equity.

Field of Research
Social Science

Topics of Interests
Telemedicine, Health Equity, Applied Aging studies

I am looking for …
Collaborations on similar topics

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Professor Suranjan Panigrahi

use of information technology , mobile computing, AI, sensors, and analytics to enable citizens as well as health care providers for making better decisions to enhance health and wellness

Field of Research

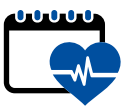
sensors, AI, sensing systems, Information technology

Topics of Interests

Smart materials, sensors, digital heath, predictive analytics

I am looking for …

collaborators to share



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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Ansgar Wübker

My research focuses on applied empirical health economics, health services research and health economic evaluation. Especially through my work at RWI - Leibniz Institute for Economic Research and at Hochschule Harz, I have comprehensive knowledge of the German health care system as well as extensive project experience in the areas of demographic aging, regional care and prevention. The RWI - Leibniz Institute for Economic Research is a leading centre for economic research and evidence-based policy advice in Germany. The Hochschule Harz is an University of applied sciences in Germany that participates in the Doctoral Center for Social, Health and Economic Sciences (see https://www.h2.de/no_cache/en/research/obtaining-a-doctorate/doctoral-center-for-social-health-and-economic-sciences.html).

I am convinced that methodologically carefully conducted empirical studies in connection with an comprehensive data set can contribute to the solution of important societal questions. For example, I was responsible for the cost evaluation of dementia care in a large EU Horizon 2020 project in cooperation with international colleagues from the field of nursing sciences and was able to contribute to the scientific debate on this important challenge. In a current research project, I am analyzing the challenges of health care in demographic and regional change. This is also the focus of the Leibniz Science Campus Ruhr (for more information seee www.LSCR.de) a research project funded by the Leibniz Association. The LSCR is a cooperation between RWI and the Universities of Duisburg-Essen, Paderborn and Tilburg (Netherlands) as well as other industrial partners such as the biggest German sickness funds who support the campus for example with access to large administrative data sets. From 2016 - 2020, I was speaker of the Leibniz Science Campus Ruhr. The research projects have resulted in scientific publications in prestigious international journals, such as the Journal of Health Economics, Health Economics or the the European Journal of Health Economics.

Field of Research

Health Economics, micro econometrics, policy evaluation

Topics of Interests

My research focuses on the analysis of hospital markets, individual health behavior, health care disparities, regional variation in health care and econometric evaluation of policies. I published my research in international journals such as the Journal of Health Economics, Journal of Economic Behavior & Organziation, and Health Economics.

I am looking for …

Research cooperation with partners from the uSA and Canada with compatible research interests.

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Sabine Schäper

Residential services for people with intellectual disabilities in Germany face challenges in end-of-life care increasingly.
A study in three German regions (2017-2023) analysed concept papers and collected data on mortality rates and the experience of frontline-managers and staff members in end-of-life care. Semi-structured interviews revealed a wide range of competences and attitudes towards palliative care within residential settings. The quality of end-of-life care is - among other factors - determined by aspects of organizational culture. In the second phase of the project, the organisational culture is focused by using an adapted version of the „"Group Home Culture Scale"" (GHCS), developed by Bigby and Humphreys in Australia. In addition, qualitative workshops and interviews deepen the insight into aspects of organisational culture in selected group home. The results show, that the aim to ensure a high quality of end-of-life care has to focus on organisational development. Participation as an organisational principle has a crucial role for creating an end-of-life-sensitive organisational culture. This orientation is highly compatible with legal reforms in Germany, claiming for a stronger person-centredness instead of institution-based policy and practice.
I am interested to meet other researchers in the field of palliative care research or disability-related research to exchange ideas and knowledge.

Field of Research

Inclusive Education/ Palliative Care

Topics of Interests

Health care/ palliative care for people with disabilities
People with intellectual disabilities and psychiatric diagnosis
Support for decision-making for people with intellectual and profound disabilities
Impact of the COVID-19 pandemic on the everyday life of people with disabilities
Organisational culture in reisdential homes for people with disabilities

I am looking for …

International collaboration in research
Comparative studies in disability policy and practice

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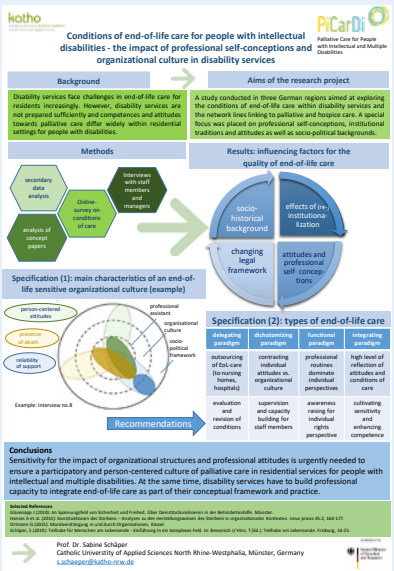

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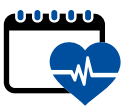
Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Dr. Stefanie Steinhauser

I am interested in various areas of digital health (telemedicine, AI, electronic health records, chat bots, etc.). I have a particular interest in human-computer interaction in the context of AI in healthcare.

Field of Research
Digital Health



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Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Prof. Dr. Vivian Carstensen

I am an applied labor economist with a specific focus on occupation, compensation and job satisfaction in healthcare. Since 2021, I serve as head of worker panel studies at the Center for Health, Social Affairs and Technology (CareTech OWL), where we are investigating the impact of increasing digitalization in the health sector on care workers' jobs, satisfaction and turnover. We also put forward transdisciplinary research to develop innovative employee-employer panel data resources. My past research stays include the Management Centre (Bradford) and London Business School in the UK, Modena and Brescia University in Italy, and CREST/INSEE in France. My further research interests comprise labor market dynamics, immigration economics, diversity, and education economics. I have published on topics such as impact of profit sharing and employee participation in decision-making, wage curves, strategies of jobs safeguarding, HRM systems through the lens of supermodularity, working time accounts as mutual insurance devices, university entrance of second-generation immigrants, equal opportunities in the European Higher Education Area (EHEA), job family development. The German Academic Exchange Service (DAAD) appointed me as an expert panel member in one of its international programs.

Field of Research
Applied Labor Economics

Topics of Interests
Industrial & workplace relations, workplace transformation & changing hours of work, job and labor turnover in the health sector, job satisfaction

I am looking for …
Collaboration in setting up/using panel data for analyzing the topics of interest: health sector, employer-employee data, inter- & transdisciplinary approach

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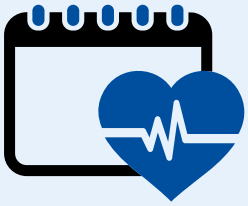
Health Care and Social Medicine throughout the Life Course
Matchmaking Part II



Matchmaking Part II

Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Prof. Dr. Christoph Rußmann

Reprogramming of Macrophages by Two-Photon-Release of mRNA in the Eye

Macrophage sub-types have recently emerged as key contributors to morbidity in cancer, neuro-degeneration, metabolic and inflammatory diseases. Consequently, the modulation of macrophages has the potential to revolutionize medicine. Previously, we introduced a novel pathway in macrophage polarization and established its contribution to pathologic angiogenesis.
Here, we introduce a novel strategy for light-based programming of macrophage phenotype. Our strategy combines broad interdisciplinary expertise from synthetic chemistry, photonics, nano-medicine, and immunology.
Specifically, we chemically conjugate modulators of macrophage phenotype to an opto-chemical linker and encapsulate them in biocompatible polymers. The resulting nano-probes are then functionalized to target and be taken up by the predecessor of macrophages, the peripheral blood monocytes. The latter circulates throughout the body and accumulates at sites of pathology. We showed that peritoneal macrophages engulf our nano-probes in their cytosol and transport them to regions of pathologic angiogenesis in the back of the eye. This property of macrophages provides a unique opportunity to address three significant challenges of modern medicine at once. Firstly diagnosis: accumulation of macrophages allows us to identify active sights of pathology. Secondly, delivery: the macrophage's capability to transport nano-probes turns them into 'trojan' carriers, which deliver the desired payloads to regions of interest. Thirdly therapy: through image-guided liberation of the payload in macrophages, a desired therapeutic outcome will be pursued.
The image-guided liberation of the payload will be achieved through wavelength-specific immolation of the opto-chemical linkers. A technical challenge is that ultraviolet photons are needed to immolate the light-sensitive linker, which lacks the depth of penetration and is unsafe. To overcome this challenge, we will build a two-photon therapeutic imager, which accomplishes immolation at near-infrared wavelengths that are safe and have higher penetration depth.

Field of Research
medical technology, laser medicine, molecular biology, drug delivery

Topics of Interests
medical technology, laser medicine, molecular biology, drug delivery

I am looking for …
international funding opportunity of a specific project of HAWK and Brigham and Women's Hospital/Harvard Medical School.

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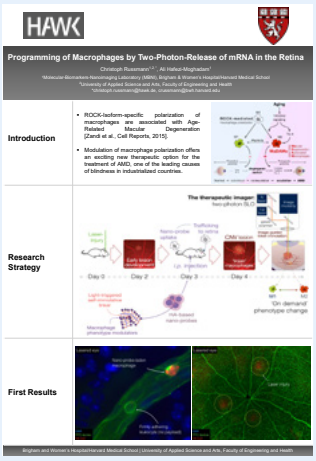

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Assistant Professor Christina Wright

I am interested in learning about personality traits of resilient nurses- who do not experience burnout. I am also interested in learning about mental health services for incarcerated adults/ prisoners outside of the United States

Field of Research

Nursing / Mental Health/ psychiatry

Topics of Interests

Mental Health services utilization throughout the life course, mental health services in prison, rates of mental health disability over time, personality traits of nurses who do not experience burnout

I am looking for …

other nurses working in mental health, physicians/ therapists working in mental health, other nursing faculty, people with access to prisons/ prisoners/ incarcerated individuals

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Professor Tony Szturm

Current research using our game-based rehabilitation - tele rehabilitation platform. Applications include
1 in-home rehab for upper extremity function with a focus on manual dexterity , Studies in preparation use of a MRI compatible robotic manipulandum for task-based fMRi analysis of manual dexterity.
Patient populations include, adults with stroke, spinal cord injured, and Children with neurodevelopmental disabilities,

2. Community-based screening and treatment of mobility limitations and high falls risk. Further development and validation
Of our game-based dual-task treadmill platform
For an integrated approach to address the decline in mobility (balance, gait) and cognition Populations include; Parkinson disease, older adults with mobility limitation & dementia and children with cerebral palsy and acquired brain injuries

Field of Research

Nursing / Mental Health/ psychiatry

Topics of Interests

Main research area is the design, development and validation of affordable Technologies; digital media, wireless-plug-n-play computer input devices, smart mechatronic devices and force)COP) pressure mapping systems for use in rehabilitation and importantly tele rehabilitation, i.e. transition of rehab programs to home or community centers, and rural/remote communities). My research contributions include:
1. Development and validation of a Computer game-based rehabilitation - tele rehabilitation platform with a focus on manual dexterity. This includes a MRI compatible robotic manipulandum for task-based fMRi analysis of manual dexterity. Patient populations include, stroke, spinal cord injured, traumatic brain injury), and Children with neurodevelopmental disabilities,

2. Community-based screening and treatment of mobility limitations and high falls risk. Developed and validated an engaging, game-based dual-task treadmill platform
for an integrated approach to address the decline in mobility (balance, gait) and cognition Populations include; a) Aging (mobility limitation & dementia), b)Parkinson's, c) traumatic brain injury and stroke, and d) Young children with cerebral palsy and acquired brain injuries
Another main research focus is the study of brain-behavior relationships and neuroplasticity mechanisms in Parkinson's disease. Behavioral PET brain imaging methods are being used to identify functional brain metabolic network re-organization of gait/cognitive impairment. Of people with Parkinson.

I am looking for …

interested collaborators and funding

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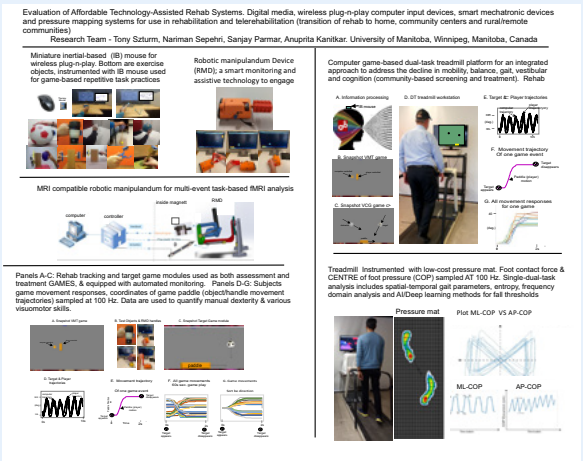

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Dr. Stefan Kupper

Essentially our Research Focus lies on applying methods both of direct and indirect nature to the Analysis of biomedical Data or Social Data in specific setting. As an Example we have been currently working on the Analysis of Fluorescence optical Imaging Data from Patients suffering from diseases of the rheumatic Spectrum. In our Approaches we have used - and continue to use - both direct model-driven and statistical Analysis as well as applied Artficial Intelligence Models. The ultimate Goal is the optimization of the Analysis of patient data especially towards diagnostic assistance to medical professionals working with these patients. Past Work has been used to design systems to be able to perform some level of automatical crowd-excitation analysis. The ultimate Goal in this context has been the improvement of an eraly-warning analysis. Similarly, some of our Work also focuses on the assistance of persons who may or may not be impaired in terms of their capability to perform everyday tasks. In particular we aim at improving high-level perfomance tasks (such as working in a factory) as well as low-level everyday tasks (for people whose health is impaired to some extent).

Field of Research
Biomedical Analysis

Topics of Interests
Novel and existing Applications of Fluorescence Optical Imaging, Computer Vision in biomedical applications, statistical analysis in biomedical Applications, Model-driven approaches to Biomedical problems, Control and Assistance Systems to elderly or otherwise impaired people

I am looking for …
potential Collaborations and contacts in existing exciting and newly emerging research areas

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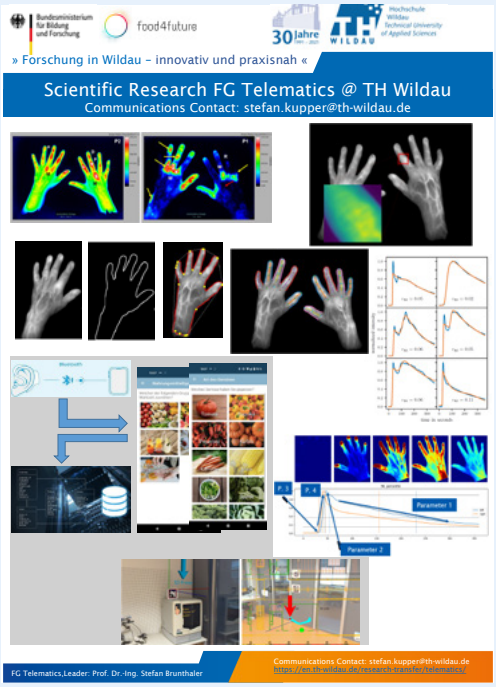

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Dr. Alexander Glassmann

New therapeutic opportunities for treatment of cancer and genetic disorders

Since the end of the 1990ies, siRNA and mRNA offer unique new opportunities for cancer treatment and treatment of genetic disorders: siRNAs reduce the expression of oncogenes to treat cancer.
mRNAs reconstitute the expression of diseased genes without the side effects of DNA.
RNA molecules enable to deliberately switch on and off proteins in cells. Onpattro™ (Partirisan, Alnylam), a liposomal formulated siRNA, for treatment of the hereditary liver disease amyloidosis was approved by FDA and EMA in August 2018 as the first therapeutic in this drug class. The second siRNA drug, Givlaari™ (Givosiran, Alnylam), a GalNac modified siRNA, to treat acute hepatic porphyria was approved by FDA in 2019 and EMA in 2020. Major European and US biotech companies like BioNTech, CureVac, Alnylam, Moderna, etc. currently investigate numerous RNA compounds in clinical development studies with the trouble of an efficient delivery strategy.
The most challenging problem of RNA therapeutics is the shielded transport of the instable active RNA com-pounds after parenteral application and the targeted specific uptake in the diseased tissue. A solution for this problem is provided by ProNaCell with its patented, innovative EPN Drug Delivery Technology.
Unique ProNaCell Engineered Protein Nanoparticle (EPN) technology platform
The Engineered Protein Nanoparticle (EPN) is an innovative, proprietary drug delivery platform based on optimized Polyomavirus capsid proteins developed at the Life Science Inkubator (LSI, Bonn). EPN provide a completely new, 'First-in-Class' opportunity to use RNA/DNA based therapeutics for treatment of oncological indications and orphan diseases.

EPN demonstrate several advantages in comparison to other drug delivery systems:
EPN: Virus –Based Nanoparticles
Evolutionary adapted to the human system
Highly biocompatible
Protection of nucleic acid biopharmaceuticals
Polyoma VNP: no viral genomic structure, in vitro encapsulation process, target orientated particle de-sign (IP protected)
Lipid-based Nanocarriers:
Mainly hydrophobic and amphiphilic drugs can be encapsulated
Particles are leaky
Charged liposomes are rapidly cleared from circulation
Polymeric nanoparticle:
Cationic polymers are commonly employed for gene delivery
Degradation products possibly toxic
Drug conjugates:
Drug not efficiently protected
Drug needs to be covalently linked
Antibodies are limited to two affinity regions
Several in vitro and in vivo EPN studies underline the efficacy of the EPN technology. The ProNaCell platform is patent protected: US patent (15/533.377) for EPN Targeting has been granted in 2019; the equivalent EU pa-tent is pending. GMP production of protein nanoparticles (VP1) has been validated. The EPN technology plat-form offers additional options for specific and targeted treatment and promises the opportunity to transfer the CRISPR/Cas9 technology into successful clinical trials. The ProNaCell library of 30 different target specific capsid proteins is evaluated; a collection of six different payload specific particles is designed and validated.

Field of Research

Targeted Drug Delivery with Virus-like Particles as Transport Vehicle

Topics of Interests

Drug Delivery of nucleic acid based drugs in a specific way into the diseased cells or tissue to cure the pathophysiological processes.

I am looking for …

Collaborations which are interested in a side specific transport of nucleic acid-based drugs in cancer and/or oprhan diseases.

CONTACT

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Health Care and Social Medicine throughout the Life Course

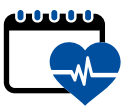
Matchmaking Part II

Assistant Professor Chun-An Chou

My research is focused on the development of data-driven decision-making tools using optimization modeling and machine learning techniques. Applications includes personalized health, medical diagnosis, healthcare operations and pattern recognition in complex systems such as human body network, brain, transportation, and environmental systems.

Field of Research

Sustainable construction / Digital Platforms / Urban Climate Resilience



CONTACT

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Associate Professor Carolyn Lee-Parsons

Overall vision of our research: Plants produce a wide array of valuable, biologically active natural products that we use as medicines (i.e. anti-cancer, anti-viral, anti-infectives, anti-microbials). While the plant is an amazing chemist, these compounds are produced in limited concentrations. The overall vision of our research is to understand how the cells of the plant regulate production towards the goal of engineering their enhanced production and meeting the need for these critical plant-derived pharmaceuticals.

Field of Research
Plant Biotechnology

CONTACT
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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Professor Jutta Lindert

My research focusses on neuropsychiatric epidemiology.

Field of Research

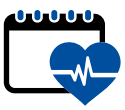
Neuropsychiatric epidemiology, exposome research

Topics of Interests

Neuropsychiatric epidemiology, exposome research

I am looking for …

Partner for a longitudinal epidemiological study



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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Prof. Dr. Jörn Oliver Sass

Jörn Oliver Sass leads the research group 'Inborn Errors of Metabolism' at the Institute for Functional Gene Analytics (IFGA) and the Department of Natural Sciences of Bonn-Rhein-Sieg University of Applied Sciences. Following long-standing experience as laboratory director at University Children's Hospitals in difference countries he is familiar with the requirements of diagnostic laboratories in clinical chemistry and has special expertise in testing for metabolic diseases. Studies of pathobiochemical mechanisms and improving laboratory diagnostics of inborn errors of metabolism are in the center of his research interests. There is some focus on aminoacylases (Aminoacylase 1 deficiency, Canavan disease), on amino acid N-acyltransferases und the metabolism of branched-chain and selected other amino acids (including disorders of ketone body formation and utilization).
However, the small team is quite flexible and is prepared for adaptation of bioanalytical methods including various chromatographic approaches, specialized enzyme activity assays (in native cultured cells and following overexpression studies), confocal laser scanning microscopy, next generation sequencing/ molecular biology and biochemistry techniques, even for small sample numbers. Currently the nematode C. elegans is introduced as an invertebrate animal model.

Field of Research

Pathobiochemistry; Analytical Biochemistry; Enzyme Analysis; Metabolic Diseases; Rare Diseases; Inborn Errors of Metabolism; Amino Acid and Ketone Body Metabolism; Acylation; Deacylation; Sulfur Metabolism

Topics of Interests

Studies of pathobiochemical mechanisms and improving laboratory diagnostics of inborn errors of metabolism. There is some focus on aminoacylases (Aminoacylase 1 deficiency, Canavan disease), on amino acid N-acyltransferases und the metabolism of branched-chain and selected other amino acids (including disorders of ketone body formation and utilization). The small team is quite flexible and is prepared for adaptation of bioanalytical methods including various chromatographic approaches, specialized enzyme activity assays (in native cultured cells and following overexpression studies), confocal laser scanning microscopy, next generation sequencing/ molecular biology and biochemistry techniques, even for small sample numbers. Currently the nematode C. elegans is introduced as an invertebrate animal model.

I am looking for …

-University hospitals and other institutions interested in detailed biochemical/ genetic investigations, e.g., if a rare disease is suspected

-Organizations/ companies/ consortia in need of the development of bioanalytical methods such as enzyme activity tests and metabolite assays/ expertise in pathobiochemistry, next generation sequencing of nucleic acids, nematode C. elegans as an animal model

CONTACT

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Assistant Prof. Natalie Riediger

Sugar sweetened beverages; taxation as a health policy; health equity; social justice; ‚mommy wine culture'; alcohol use; cannabis edible use; women's health; mixed-methods; methods in nutritional epidemiology; dietetics socialization

Field of Research
Public Health Nutrition

Topics of Interests
Sugar sweetened beverages and taxation as a health policy; ‚mommy wine culture'; alcohol and cannabis edible use among mothers (non-pregnant/breastfeeding); advanced methods in nutritional epidemiology

I am looking for …
to expand my networks; potential visiting professorship for research study leave in 2024

CONTACT
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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Prof. Gary Young

We focuses on issues pertaining to the quality, cost and accessibility of healthcare services within and outside the US.

Field of Research

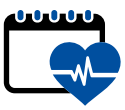
expertise is in Physical Therapy (neuro-rehab), Neuroscience and Biomedical Engineering.

Topics of Interests

measuring and evaluating quality of care, changing provider practice style, effects of provider consolidation on quality and efficiency, diffusion of medical technology and innovations, workforce composition and quality of care, patterns of ownership of healthcare organizations and patient outcomes.

I am looking for …

international colleagues



CONTACT

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Health Care and Social Medicine throughout the Life Course

Matchmaking Part II

Prof. Tilo Mentler

My interest concerns the question of how technical solutions (e.g., virtual reality, pervasive computing) must be designed so that specific user groups (e.g., children, seniors, medical professionals, etc.) can use them contextually (in a clinic, at home, etc.) efficiently, safely, and with the most positive experience possible. Research is characterized by participative development processes and qualitative as well as quantitative approaches.

Field of Research

Human Computer Interaction

Topics of Interests

Human-Centered Design in Safety-Critical Contexts, Human Computer Cooperation, Mixed Reality, Pervasive Computing Environments

I am looking for …

on the one hand, researchers from the healthcare sector who are interested in the interactions between people, technology and organization, and on the other hand, computer scientists/engineers who focus on more technically oriented aspects.

CONTACT

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Innovative Materials – from Synthesis to Application

Matchmaking Part I
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Matchmaking Part II
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Innovative Materials – from Synthesis to Application
Matchmaking Part I

Matchmaking Part I

Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Lothar Berger

Energy-efficient thermal substrate processing through gray-box MPC: Thermal processing in semiconductor fabrication, and biochemical engineering, consumes considerable electrical power for heating and cooling. We are working on improving thermal processing and control algorithms, aiming at enhanced stability, using less heating and cooling power. Already we developed an improved physical model and fast numerical simulation for multiple source heating plates. Now for this proposed project we intend to build upon our expertise and merge physical model and process data obtained from a test stand, to build a gray-box model of the process. This model shall then be used to develop a stable and fast model predictive embedded control algorithm on the test stand.

Field of Research

Control and Process Engineering

Topics of Interests

Semiconductor fabrication, photomask fabrication, biochemical engineering, thermal processing, thermal modeling, machine learning control, embedded control.

I am looking for …

Substrate processing, machine learning control stability, model predictive control stability.

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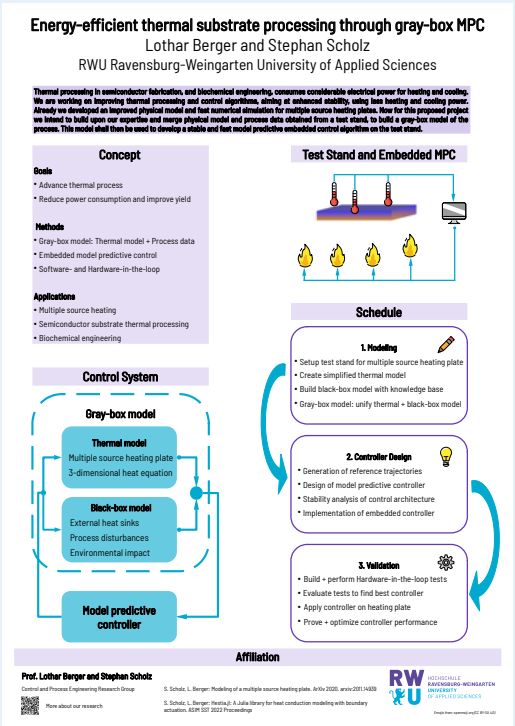

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Associate Prof. Klaus Doelle

Thin Layered Ceramic Paper Product:
A Thin Layered Ceramic Paper (TLCP) product can be used for multiple applications such as; (i) high-temperature ceramic insulation, catalytic & filtration applications, art applications, and defense applications such as hypersonic flight, ballistic projectiles, armor for combat vehicles, and space travel.
The TLCP was originally developed for porcelain-based art applications and can be easily modified and or adopted to other technical applications as mentioned above.
The TLCP as a paper-like product can be formed in its leather stage to any shape an art or technical object may require. The original composition of the TLCP slurry contained 32.0% Kaolin, 18.0% Feldspar, 18.0% Silica, 1.5% Ball Clay and 25.5% water. Based on weight. 0.25% sodium silicate was added to improve dispersion. The ceramic filler suspension was stirred in the holding tank with a mixture to keep the solids in suspension while the suspension was pumped with a peristaltic pump into the headbox supply line.
The TLCP was then produced continuously on a 12-inch (304 mm) wide Fourdrinier laboratory paper machine
The produced ceramic paper product had a ceramic filler level between 59.68% and 78.8% with a basis
weight between 322.9 g/m² and 693.7 g/m², and a final moisture content of 58.6% to 44.7%
respectively. The wooden fiber serves as a support medium for the ceramic filler material during production on the paper machine and during the conversion process into technical products.
After conversion, the TLCP is fired in a gas kiln to produce its final shape and properties during bisque and glaze firing at cone 10 (1300°C/2380°F), typically used for porcelain products.
During firing in the kiln, the fiber material combusts and the ceramic filler material mixture acts
as common pottery clay, and porcelain products fusing together and holding the desired shape of the pieces produced.

Field of Research

Paper engineering, chemical processes, waste water treatment, renewable energy

Topics of Interests

Papermaking topics, new wastewater treatment processes, chemical process design, materials, sustainable products

I am looking for …

collaborations, industry partners

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Dr. Jelena Barbir

Developing and implementing sustainability based solutions for bio-based plastic production and use to preserve land and sea environmental quality in Europe (BIO-PLASTICS EUROPE)
BIO-PLASTICS EUROPE (BPE) is a Horizon2020 project that kicked off in October 2019, running for 4 years. The main focus of the project is to deliver sustainable strategies and solutions for bio-based plastics to support the EU-Plastic Strategy and promote circularity in the economy. We are not only a research project, but also an intervention which takes into account the transformations triggered by a new awareness of bio-based plastics. We believe in a participatory research and innovation process. We are engaged in innovative product design, the development of health and safety standards, end-of-life solutions as well as environmental and economic product life cycle assessments. Further, we aim to develop business models for the efficient reuse and recycling of bio-based biodegradable plastics, ensuring the safety of recycled materials for both the environment and the society. BPE communicates with different target audiences via website, scientific publications, events, press releases, newsletters and social media. In this way information from the project is available to different stakeholders (pool of stakeholders). Engaging with the project is possible as becoming an associate or network partner (mainly companies), as another project, or as a member of the Network of Historic Cities against Plastic Waste (HISCAP), a close-knit group of municipal authorities pledging against plastic waste and implementing project results and recommendations towards bio-based plastics or as a member of the European Bioplastics Research Network (EBRN), an active community of researchers, executives, enthusiasts and activists gathered to discuss and spread cutting-edge knowledge in the field of bio-based plastics. BPE aims to provide strategic networking and research, coordinating knowledge across Europe.

Field of Research
biology, sustainability

Topics of Interests
bio-based and biodegradable (plastic) materials
sustainable development
climate change management

I am looking for …
cooperation opportunities with partners in North America

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Behraad Bahreyni

The research at the Intelligent Sensing Laboratory @ Simon Fraser University (ISL) is focused on the development of materials, devices, systems, and methods for various transducer applications. We conduct experimental research on the development of advanced materials, micromechanical devices, and microelectronic circuits, and sensor signal processing algorithms to enhance the performance of our systems.

We have developed novel devices for automotive, consumer, and defense segments which push the performance levels. We have also utilized off-the-shelf components and relied on our expertise to build high-performance sensor systems for consumer, defense, space, IoT, smart-car, health, and Agri-Tech segments. In majority of the cases, our work has resulted in significant improvements in various performance aspects (noise, sensitivity, power, etc.).

Field of Research

Sensors and Actuators; Microsystems

Topics of Interests

Opportunities to collaborate on research
Opportunities to exchange visiting scholars
Joining forces for multi-national projects

I am looking for …

Research labs with mutual or complementary expertise.

CONTACT

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. rer. nat. Uta Helbig

The working group „Nanomaterials for the PEM Fuel Cell" headed by Prof. Dr. Uta Helbig (Faculty of Materials Engineering, Nuremberg University of Applied Sciences) deals with the development of novel nanomaterials for the polymer electrolyte fuel cell (PEMFC) and their integration into half cells and full cells. The use of carbon nanomaterials in the electrodes of PEM FCs as conductivity additives and catalyst supports is currently state of the art. In fuel cell applications where the PEM FC must operate under varying loads, e.g., in electromobile applications, unfavorable electrochemical environments result that can lead to oxidative damage of the carbons. As a result, the electrodes and catalyst supports are partially degraded, leading to agglomeration of the noble metal catalysts as well as general damage to the so-called membrane electrode assembly (MEA) with damage formation up to delamination of the layered structure.
The characterization of the nanomaterials is typically performed with SEM/TEM, XRD, band gap determination with UV/VIS, Raman spectrometry and electrochemical impedance spectroscopy. The MEA and cells are investigated electrically, using electrochemical measurement as well as impedance and of course SEM/TEM.
The working group can build on many years of experience in the synthesis of nanomaterials, partly in cooperation with industrial companies.

Field of Research

Nanomaterials and PEM Fuel cell

Topics of Interests

I am interested in the develeopment of new electrode materials for PEM fuel cells and their application in MEAs. The goal is to impove the oxidation resistance of the fuel cells under cyclic loading of the fuel cells.

I am looking for …

I am looking for partners in the application of new materials in the PEM fuel cell and the characterization and application of MEA in fuel cell systems.

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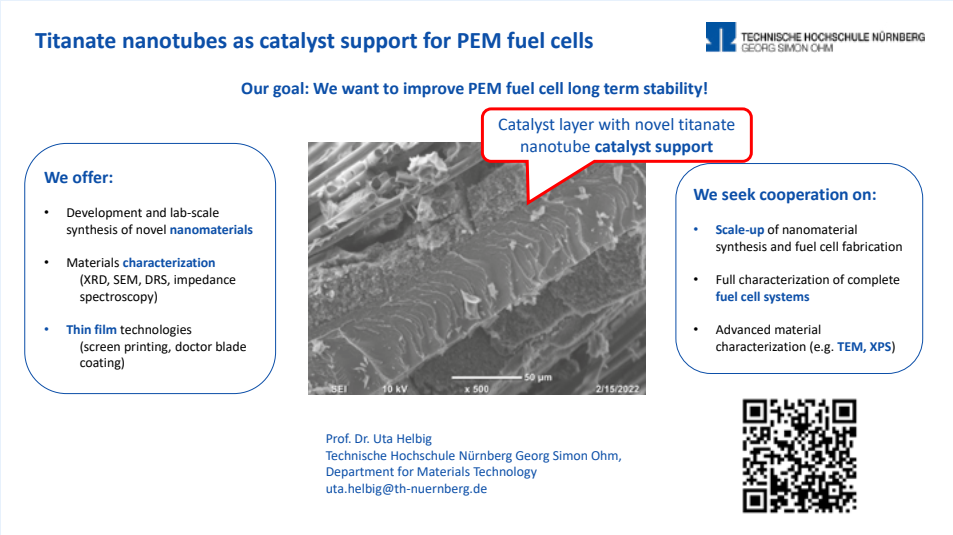

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Sami Khan

The development of alternative clean energy technologies and greener processes to produce chemicals is driven by the growing need to curb reliance on fossil fuels and reduce carbon footprint. With any conversion processes, especially those that involve aqueous environments, there exist fundamental challenges such as 1) maximizing activity (rate of generation of products of interest), 2) selectivity to these products, and 3) longevity and reliability towards maintaining continuous, sustained operations. These challenges often arise from interactions at interfaces, including both (electro) chemical reactions and physical interactions, occurring at distinct length-scales and timescales. We are interested in studying these fundamental physico-chemical interactions at interfaces to optimize conversion and longevity in sustainable energy generation systems, drawing fundamental knowledge from many disciplines, including surface and interfacial science, wetting, fluid mechanics, electrochemistry, reaction engineering and catalysis. By segmenting the study of complex interfacial interactions into simpler interfaces, and specifically tuning physical interfacial processes as well as (electro) chemical reactions, we endeavour to have a far-ranging impact in many industrial sectors.

Field of Research

Wetting and Adhesion

Topics of Interests

Surface Science, Wetting, Adhesion, Crystallization, CO2 Capture + Conversion, Hydrogen Embrittlement

I am looking for …

German academic and industry partners for collaborations

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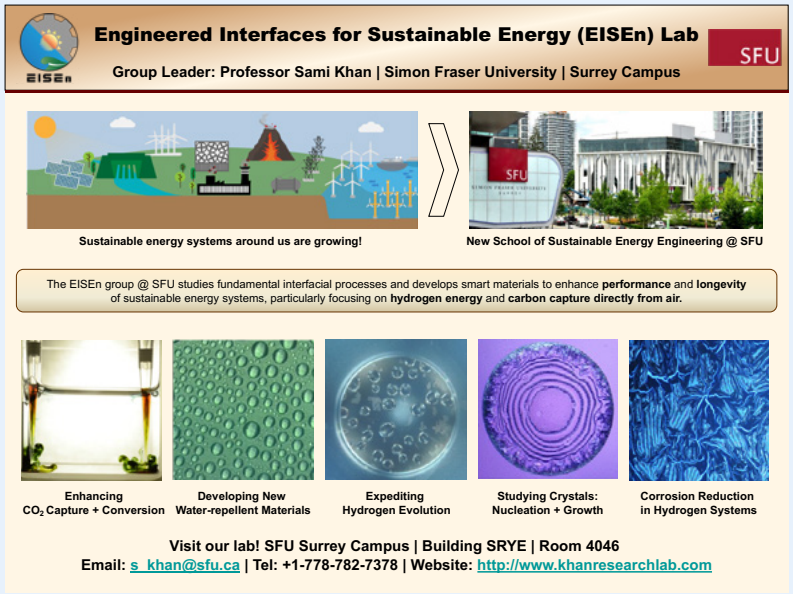

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr.-Ing. Johannes Bader

In Biotechnology, my focus is the production and purification of various substances as e.g. bioplastics, proteins and enzymes for food, pharma or industrial application, biofules or antimicrobial substances with microorganisms or microorganisms as the final product (e.g. probiotics). In a team with several colleagues, we are able to produce and purify many different biotechnological products at our Institute.

Field of Research

Biotechnology - Downstream Processing

Topics of Interests

microbial production and purification of various products as e.g. bioplastics, proteins, biofules or antimicrobial substances

I am looking for …

Collaboration partners for interdisciplinary projects

CONTACT

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Evgeny Gurevich

Ultra-short laser pulses (pico- and femtosecond laser pulses) trigger a complex chain of processes in thin surface layers of metals. These processes result in self-organized nanostructures, which change the optical, tribological and also chemical properties of the surfaces. The physical processes behind

Field of Research
lasers

Topics of Interests
Laser nanopatterning, self-organized nanostructures, nonlinear optics

I am looking for …
numerics for laser-metal interaction, molecular dynamic simulations

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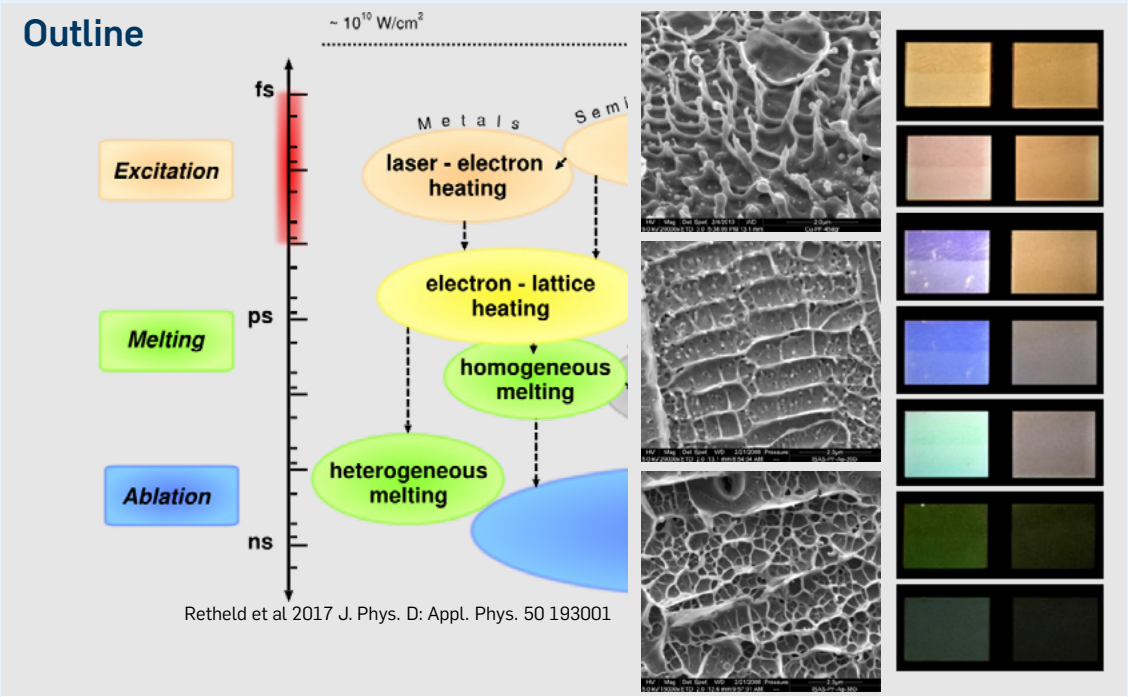

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Dipl.-Ing. Michael Kucher

According to the EU Green Deal, the greenhouse effect has to be avoided from 2050 onwards, or all unavoidable emissions are to be substituted using new technologies. In addition to the use of renewable energies, the transformation of an environmentally friendly economy is one of the necessary future goals. This economy systems, consisting of a circular economy, a waste management and different recycling processes. Furthermore, the European fiber composite industry is facing major challenges, because on the one hand the demand for these lightweight construction materials – such as the wind energy sector or in transportation – will continue to increase. On the other hand, fiber-reinforced polymers (FRP) are difficult to reuse or recycle using the available technologies such as high-temperature pyrolysis or decomposition. These technologies are either not environmentally friendly or economically unattractive. From 2025 onwards, a huge amount of these FRP will be produced annually from end-of-life composite structures. By returning valuable raw materials to the material cycle, the supply with FRP can be ensured. Science and users have therefore increasingly focused on the topic of circular economy of FRP. As a part of this economy, an assessment of the reusability of composite structure according to the R6 Strategy is required. For this purpose, an assessment parameter as well as damage thresholds must be generated on the basis of all available data of the composite structures in the end of the end-of-life phase and enables the classification into the categories Reuse, Repair, Refurbish, Remanufacture, Repurpose and Recycle. This requires the realization and evaluation of various non-destructive, minimally invasive and destructive testing methods. With the help of the classification, a significant proportion of the waste produced can be avoided or reused, so that the amount of FRP that has to be recycled at great expense is significantly reduced.

Field of Research
Mechanical Engineering

Topics of Interests
Material Characterization, Polymers, Composites, FE-Modelling, Vibration Measurements, Biomaterials (Tooth), µCT, Image Processing, Inkompressible Fluid Dynamics

I am looking for …
further research projects for the realization of my project ideas.

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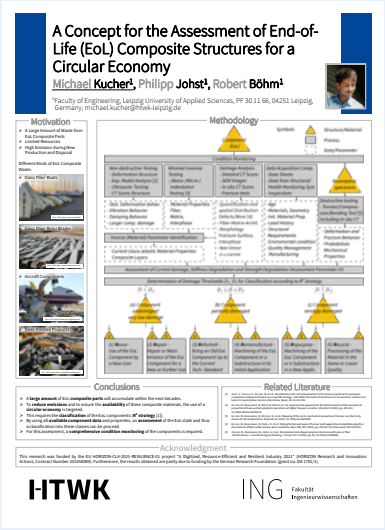

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Nian Sun

My research interests include novel gas sensors, pathogen sensors, sensor systems, novel magnetic, ferroelectric and multiferroic materials, devices and microsystems, etc.

Field of Research

Magnetic materials, magnetoelectric materials, microsystems, topological materials, COVID-19 sensors, etc.

Topics of Interests

Magnetic materials, magnetoelectric materials, microsystems, topological materials, COVID-19 sensors, etc.

I am looking for …

I have long-term collaborations with collaborators in Germany. I am looking for joint DFG and NSF funding opportunities.

CONTACT

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Associate Prof. Gerd Grau

Our research focusses on additive manufacturing (AM) as a means to fabricate electronics with completely new geometries and properties including flexible substrates and 3D surfaces. We study a number of complimentary manufacturing methods and their integration, namely, inkjet printing, dispenser printing, fused filament fabrication (FFF), laser-induced graphene (LIG), and intense pulsed light (IPL) sintering. We use these novel materials and manufacturing techniques to fabricate devices such as transistors, sensors, light-emitting devices or supercapacitors. Some of our recent projects include:

- Using machine vision and machine learning techniques to improve inkjet printing for printed electronics
- Study the sintering of metal nanoparticle inks for printed conductors in terms of electrical, thermal and mechanical properties
- Integrating printed electronics into carbon fiber composites
- Study the formation of laser-induced graphene (LIG), integration of LIG into 3D printed objects, fabrication of LIG devices such as sensors, supercapacitors, transistors
- Modification of 3D printed surfaces to print electronics on top
- Inkjet printed thin-film transistors (TFT)
- Printed tattoo electrodes for electrophysiological measurements

I am looking for partners to collaborate on extensions of these projects or new projects that use our expertise in the above areas.

Field of Research
Printed electronics

Topics of Interests
Advanced manufacturing, Sensors, Nano materials

I am looking for …
Collaborationss

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Assistant Prof. Mahshid Ahmadi

Self-organizing low dimensional hybrid perovskites combine the richness of physical functionalities in inorganic materials and stimulus responsiveness of organic molecules in a single bulk dynamic material. Combined with the ease of fabrication, these materials offer the pathway towards extremely low cost printed electronic devices for environmental sensors, medical and personalized electronic devices, and can be employed to address even truly massive problems such as plastic and battery recycling. However, discovery and optimization of this materials requires joint optimization of the composition of the inorganic components and selection of the molecular moieties, required to harness the phase formation and self-assembly processes on the material level, and extend it to the sub-micro scale functional devices. We are working at the intersection of machine learning driven automated experiment to accelerate the discovery of these material, optimize the processing pathways, and transition from the lab-level to the product level manufacturing.
We also study the chemistry and electronic properties of hybrid perovskites thin films with spatial resolution using techniques such as time of flight secondary ion mass spectrometry, SEM-Cathodoluminescence, AFM (c-AFM and KPFM) .

Field of Research
Hybrid perovskite synthesis and characterization

Topics of Interests
Automated Laboratory
High throughput synthesis and characterization for materials discovery and design with focus on hybrid perovskites
Materials for solar energy

I am looking for …
I am looking for collaborative effort in the new area of automated and high throughput synthesis of materials for optoelectronic applications. we are a group of researchers with expertise in characterization of hybrid perovskites with spatial resolution including time of flight secondary ion mass spectrometry (ToF-SIMS), SEM- Cathodoluminescence, AFM (c-AFM, KPFM) to identify the cause of degradation and ion migration in these materials and are looking for collaboration with researchers who are interested to use these powerful characterization tools in their studies.

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

M. Eng. Natalie Jüngling

Separation efficiency and pressure drop of aerosol filters are in opposing relation to each other - my research focus is to reduce this gap by creating filter structures that fit the application to both targets. With CFD simulation and topology optimization using the adjoint solver, new designs can be generated, which can then be realized using additive manufacturing.

Other key research areas of our team are:
Development of a model for simulation of surfaces of coatings for e.g. dust catching (air pollution control) or rejection of dust (photovoltaic systems);
Numerical methods to reduce the complexity of computer-intensive computational fluid dynamics (CFD) simulations;
CFD simulation of filter structures and other porous media on different scales;
Simulation and measurement of air and particle flow in enclosed spaces (e.g. public transport, classrooms, etc.);
Investigation of indoor air filters;
Testing and development of respiratory masks (SARS-CoV-2);
Measurement of thermal comfort;
Simulation and measurement of technical stream machines;
Simulation, measurement and design of cooling components;
...

Field of Research
Fluid Dynamics

Topics of Interests
Fluid Dynamics, CFD Simulation, Multiphase flows, Aerosol filtration, water treatment, Numerical methods to reduce the complexity of computer-intensive computational fluid dynamics (CFD) simulations, Topology optimization, cooling and heating of various components...

I am looking for ...
Collaboration in research, interesting and challenging applications, interdisciplinary scientific dialogues

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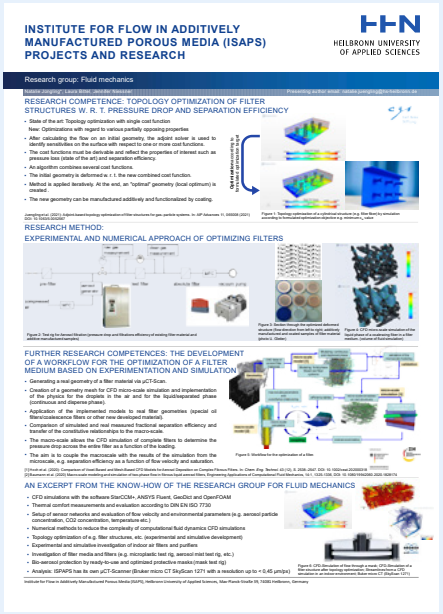

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Thomas Kordisch

The Bielefeld Institute for Applied Materials Research (BIfAM) was founded in 2013 as one of the first research institutes of the Bielefeld University of Applied Sciences. The expertise of the participating scientists comprises physics, chemistry, biology, biotechnology, mechanical engineering, process engineering, electrical engineering, plastics engineering, and computer science. Research interests cover aspects of measurement technologies, structure-function interactions in materials, energy transfer, sensor technologies, materials analytics, destructive and non-destructive materials testing, additive manufacturing, fermentation and formulation of biologicals and chemicals, and multiscale computational materials science and engineering. The scientific-technical projects within the BIfAM comprises both research and development, often in collaboration with industrial companies, to face the great societal challenges with innovative approaches – from fundamental research on novel materials, via material and technology development towards product and process development. Interdisciplinary research teams develop creative solutions in the hot topic areas mobility, medical engineering, energy and resource efficiency, digitization, bio economy, and sustainability.

Field of Research
Materials Engineering

Topics of Interests
Lightweight materials, Coatings, Fatigue Behaviour, Materials Testing, Corrosion

I am looking for …
„Contact to universities in order to start a cooperation in the field of materials engineering.
Member of the „ "Bielefeld Institute for Applied Materials Research - BIfAM" " and therefore interesting in presenting the reasearch focus of the complete institute for further collaborations."

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Danka Katrakova-Krüger
Materials and Process Development with Focus on Environmental Issues

Field of Research
Material and Process Development

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Associate Prof. Sanjiv Dhingra

MXene based biomaterials, Tissue engineering, Stem cells, Cardiac Regeneration, iPSC based disease modelling, Metabolic disorders; Immunomodulatory biomaterials, allograft rejection

Field of Research

Biomaterials, tissue engineering, Stem cells, Regeneration

Topics of Interests

MXene based biomaterials, Tissue engineering, Stem cells, Cardiac Regeneration, iPSC based disease modelling, Metabolic disorders

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Dr. Hossein Kazemian

Environmental application of Porous Materials, from Zeolites to MOFs.
Air, water and soil pollution control and remediation.
CO2 capture and conversion to value-added chemicals
synthesis, characterization, properties and environmental/energy applications (for water, air and soil remediation processes) of porous zeolitic materials from natural and synthetic zeolite to MOFs & ZIFs.

Field of Research

Environmental / Energy application of Porous Materials, from Zeolites to MOFs. CO2 Capture and conversion,

Hydrogen generation/separation/storage

Topics of Interests

CO2 capture and conversion to value-added chemicals.
Air, water and soil pollution control and remediation.
Woode-based Biopolymers

Environmental/Energy applications of Pours materials,
Hydrogen generation/separation/storage

I am looking for …

Finding collaborators

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Ingela Tietze

Ingela Tietze deals with issues of energy management and operational energy management. Her main areas of expertise are the sustainability assessment of energy systems, sharing concepts in the energy industry, the efficient design of energy and material flows, (climate-neutral) operational energy supply, decentralized energy conversion and cross-company energy concepts in the context of cooperations. Ingela Tietze has extensive consulting and project experience both in the scientific environment and in practice. In recent years, she has regularly supported a medium-sized company in the procurement of electricity for several locations.

Currently, Ingela Tietze is working on a project funded by the Deutsche Bundesstiftung Umwelt (DBU, Osnabrück) on the integrated cost- and lifecycle-based planning of decentralized energy systems for energy- and resource-efficient neighborhood development. To this end, two new buildings and one existing neighborhood in Gerstetten, Constance and Wiernsheim are being subjected to a comprehensive environmental impact assessment with the integration of technical and economic aspects.

Prior to this, Ingela Tietze worked with colleagues from six research institutions on the BMWi-funded joint research project InNOSys (Integrated Sustainability Assessment and Optimization of Energy Systems). The main objective of the project was to evaluate and optimize existing and future energy systems on the basis of economic, social and environmentally relevant target variables. Taking into account costs and sustainability aspects, particularly advantageous system configurations for the energy sector in Germany were identified for society as a whole.

Field of Research
Sustainable Energy Economics

Topics of Interests
Climate Change, Energy Transition

I am looking for …
partners for joint research projects

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Klaus Peter Koch

The aim of the Carl-Zeiss Project at the University of applied Science in Trier is to integrate sensor elements into the composite material that enable continuous component monitoring (structural health monitoring, SHM). Conductive structures are to be used for this purpose. It has been found that the surface roughness of certain conductive materials, such as copper, increases under load. This increase in surface roughness alters the high-frequency electrical properties of the conductor. Smart integration of such sensor elements therefore makes it possible to draw conclusions about the mechanical load history of the component with the aid of high-frequency signals.

The project is divided into 3 main research areas. On the one hand, the material understanding of pure natural fiber materials must be expanded. For this purpose, extensive static and dynamic tests are carried out with test subjects, in which the influence and effect of various parameters are investigated. Furthermore, a detailed understanding of the damage mechanism of the material is required in order to be able to make statements about component condition and (residual) service life.

The second research focus is on the monitoring of composite materials with the aid of high-frequency technology. By specifically modifying the mechanical properties of the conductor in advance, it should be possible to adapt it for various applications. Furthermore, it must be clarified how the selected conductors can be integrated into the natural fiber composite.

The third research focus is on so-called cable microphonic. This is generally understood to mean the generation of noise through mechanical movement, such as vibrations, shocks or increased temperatures. Until now, this effect has only been perceived as a disturbance. Within the scope of the project, a change in microphonics is to provide information about the condition of composite structures.

Field of Research
durability of composite materials

I am looking for …
Research partners, industrial partners

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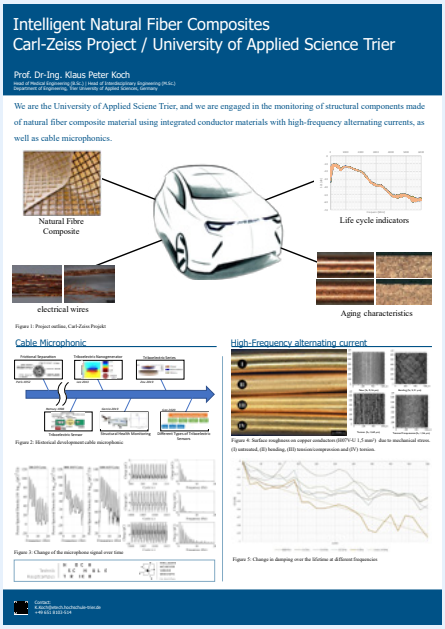

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Innovative Materials – from Synthesis to Application

Matchmaking Part I

Prof. Dr. Barbara Hintz

my reserch focus is material modelling, ceramics and bricks, microstructural modelling and design of special material properties from microstructure to application. Targets are strength, thermal conductivity, acoutic properties and 3D print (clay, ceramics, metals) and compositions with optimized properties for the application. We also simulate acoustic properties, kontinuum mechanics, also energy saving over the whole life cycle is a big target (for ex. geopolymer)

Field of Research

Energy, thermal insulation, Ceramics, 3d print, 3D manufacturing, FE simulation (all domains), material modelling, medical applications, diagnotic imaging, implants

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Innovative Materials – from Synthesis to Application
Matchmaking Part II

Matchmaking Part II

Innovative Materials – from Synthesis to Application
Matchmaking Part II

Prof. Jinfeng Liu

Water is essential for our everyday life and we are facing a water crisis now due to climate change and population growth. Agricultural activities (mainly irrigation) consume about 70% of all the freshwater withdrawals globally and the water-use efficiency in irrigation is about 50-60%. It is clear that one critical step in addressing the water crisis is to improve the water-use efficiency in irrigation. Center pivot irrigation systems are the mostly used irrigation system for large-scale agricultural fields. A close exam of the current irrigation practice shows that the current irrigation is essentially in open-loop, in which the actual field conditions are not actually used in the irrigation decision making. Closed-loop irrigation is the way to improve the current irrigation practice. In our work, we have developed a way to construct the soil water distribution maps based on state and parameter estimation. How to use the soil water distribution maps to make optimal irrigation decision is the challenge to address. We hope that we can team up with researchers that are good at model approximation, decision making for very complex systems to address this issue.

Field of Research
Advanced process control

Topics of Interests
Irrigation decision making

I am looking for …
Researchers that are good at model reduction and decision making for very complex processes

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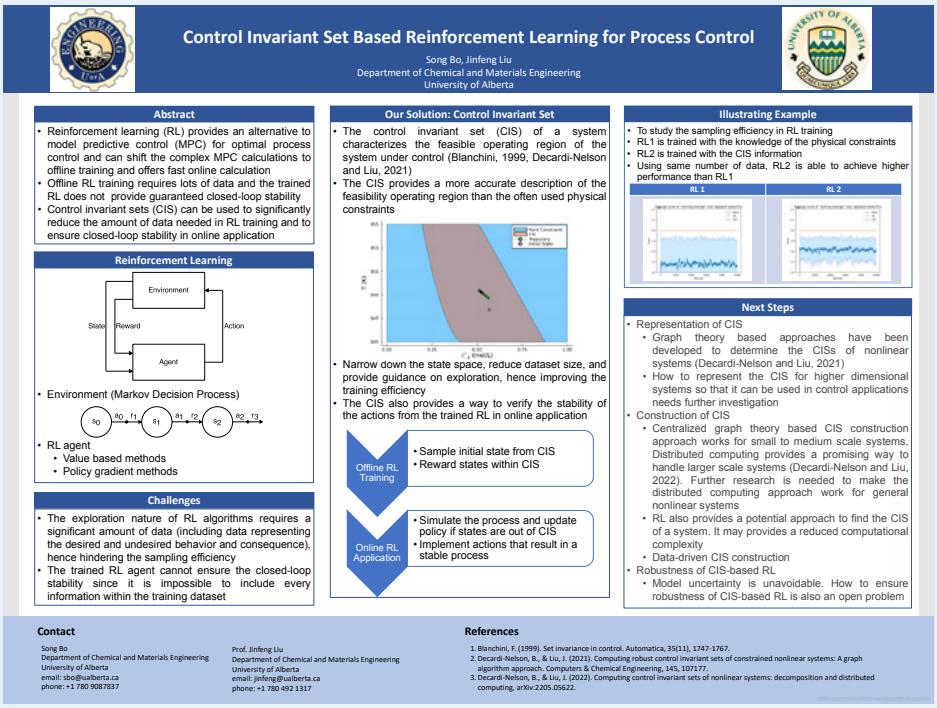

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Dr.-Ing. Ali Zahedi

The ever-increasing demand for enhanced wear and corrosion resistance of engineering parts, which are subject to extreme thermomechanical und chemical loads leads to the continuous development of novel materials such as advanced ceramics and Ceramic-Matrix-Composites (CMC). However, an economical and ecological manufacturing of most of these novel materials requires in turn a modification or a combination of traditional manufacturing processes to cope with the corresponding technical challenges. The development of CMC materials has made the integration of a wide range of mechanical, physical, chemical und tribological properties possible. Though, different material removal mechanisms of the comprising components and their high bulk hardness and brittleness introduce serious challenges to their manufacturing processes. SiC-bonded diamond (Diamond-SiC) is a novel composite material containing up to 50 vol.% diamond. This material offers outstanding Hardness, wear-resistance, thermo-mechanical stability and unique tribological characteristics (coefficient of friction can be less than 0.1). Pressure-less infiltration of shaped green forms of diamond with liquid silicon is a promising technique for the manufacturing of complex and large geometries out of diamond-SiC composites. However, this method suffers from low dimensional controllability and surface quality. Therefore, a finishing process (generally grinding with diamond grinding tools) is inevitable for manufacturing high precision diamond-SiC parts. As the grinding of diamond-SiC workpieces is associated with extremely large tool wear (grinding ratio < 0.01) and very low material removal rate, a hybrid method is proposed to combine short-pulsed laser processing and fine-grinding to achieve large removal rates and supreme surface quality and dimensional accuracy. Regarding the current research gap in the material removal mechanisms of diamond-SiC the heat-affected zone resulting from laser processing will be investigated. Furthermore, single-grain scratch tests will be performed to characterize the chip formation and tool wear behavior of diamond-SiC.

Field of Research

Precision Manufacturing

Topics of Interests

Advanced engineering materials
Grinding
Non-conventional machining processes
Laser technology
Electrical Discharge Machining (EDM)

I am looking for …

Collaboration within the proposed research topic (conducting the experiments, analysis of the results, modeling approaches, optimization)

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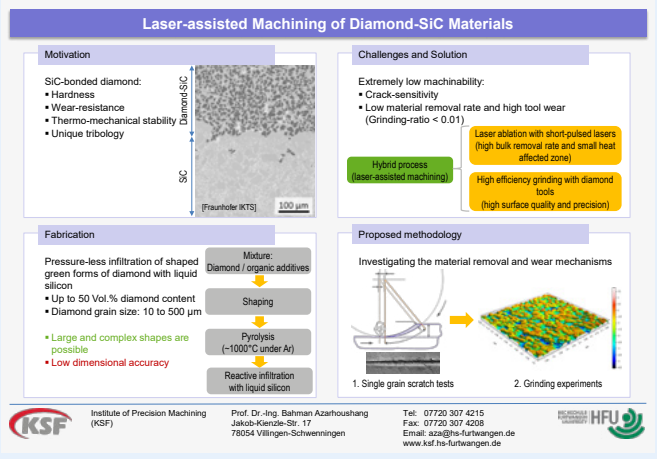

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Woo Soo Kim

The SFU Additive Manufacturing Laboratory is the research group of Professor Woo Soo Kim, a faculty member of the Mechatronic Systems Engineering at Simon Fraser University. This research group is focused on the Additive Design Engineering & Technology Development for Additive Manufacturing, and 3D integration to investigate state-of-art engineering challenges for Sensing Robotics, e-Health, and Internet-of-Things sensing applications with a wide range of research projects.

Field of Research

Advanced 3D printing

Topics of Interests

New material and process development for advanced 3D printing and additive manufacturing, multi-directional 3D printing technology, 3D structural electronics, 3D architectured materials and meta materials

I am looking for …

international collaboration with German University researchers and companies in the field

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Assoc. Prof. Oleg Rubel

The mainstream of our work is focused on developments that extend DFT calculations of material properties beyond traditional boundaries, and application of those modelling techniques to address outstanding problems in modern optoelectronic, quantum, and energy materials. Specific examples include:
* group III-V highly mismatched semiconductor alloys (dilute N, Bi), their optical properties, effective band structure, localization of electronic states;
* ferroelectric materials, modern theory of polarization (Berry phase, software development and implementation for WIEN2k);
* topological characteristics of materials (Weyl semimetals, Chern number, Z2 insulators, software development and implementation for WIEN2k);
* unfolding the band structure of disordered solids (software development and implementation for WIEN2k, VASP, ABINIT);
* hybrid halide perovskites for photovoltaics (stability, "dynamic" band structure, Rashba splitting);
* adsorption of molecules at transition meta oxides;
* 2D materials (structure transition, optical properties, excitons, band alignment).

Field of Research
Computational Materials Science

Topics of Interests
Atomistic first-principle modelling
Density functional theory
Optoelectronic materials
Topological materials
Materials for energy storage
Software development and implementation

I am looking for …
Experimental groups that will be interested in verifying computational predictions and shedding light onto results of their measurements. Theory groups that will be interested in pushing boundaries of modern DFT codes by implementing new capabilities in calculating material properties, which are not readily available.

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Dr. Carola Pickhardt

Optimisation of 3D-Printing-Processes and development of materials for 3D-Printng using LA-ICP-MS and Rheology as analytical techniques in order to create new and innovative Material - from Synthesis to Application

Field of Research

Laserablation-ICP-MS, Rheology, rheological simulation of 3D printing

Topics of Interests

Innovative Materials - from Synthesis to Application

I am looking for …

Colleagues with interest in optimisation of 3D-Printing-Processes and development of materials for 3D-Printing using LA-ICP-MS and Rheology as analytical techniques in order to create new and innovative Material - from Synthesis to Application

CONTACT

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Dr. habil. Margit Schulze

Lignocellulose feedstock (LCF) and biomass exploitation including pre-treatment and pulping. Focus on low-input crops such as perennial C4 plants (Miscanthus) and fast growing wood. Valorization of lignocellulose waste (i.e. grape pomace, pruning). Polysaccharide and lignin isolation and structure analysis via spectroscopy/chromatography combined with chemometric data processing. Development of structure-property-relationship: influence of biomass origin, genotype and/or harvesting conditions on biomass composition, 3D structure and morphology.

Field of Research
Sustainable materials

Topics of Interests
biomass exploitation for future material production (focus on polymers)

I am looking for …
expanding network, meeting other researchers in the field and looking for potential project partners for future cooperation

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Dr. Jens Helbig

Our research focus is in the development of new materials, processes for the industrial fabrication and application of new materials and new applications with new processes, technologies and materials. Focus is on sustainable technologies and applications for sustainability and CO2 reduction.

Field of Research

Materials Science

Topics of Interests

I am the representatitive and general manager of the Institute for Chemistry, Materials and Product Development ath the Technische Hochschule Nürnberg. The institute is working in the fields of materials technologies, with special focus on the following topics:

- Materials for PEM-fuel cells
- Additive manufacturing and development of printers for AM
- Printed electronics and packaging technologies
- Corrosion and surface technologies
- Bionics

I am looking for …

Partners who are interested in collaborative joint research in the above mentioned topics. Of special interset would be partners in

- Development of MEA and fuel cells with new electrode materials
- Ageing of fuel cells and batteries
- Corrosion and embrittlement of materials in contact with hydrogen
- New printers and technologies for AM
- Packaging for inkjet printed electronics
- Development of new applications with additive manufacturing and AM, especially hybrid technologies and electronics
- Development of surface mofifications on metals based on bionic principles
- Robotics based on bionic principles

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Innovative Materials – from Synthesis to Application
Matchmaking Part II

Associate Prof. Jeffrey Horn

This project applies a new algorithm, Deep-Scale Evolution, to the problem of shape-nesting: finding the largest set of shaped pieces that can fit together without overlap on a substrate of any material. The pieces and the substrate can be any shape, making DSE applicable to auto-manufacturing, shipbuilding, sign-making, textiles, etc. Typical examples are stamping door panels from rolled steel, cutting upholstery from leather hides, or cutting letters from plastic sheets. DSE is based on massively-parallel simultaneous consideration of global layout patterns, producing tighter nestings faster than existing software.

Current nesting products nest shapes sequentially, placing each piece on the substrate one after another. But creating a global solution through a series of local, irreversible decisions typically leads to inefficient nesting. Substrate material is wasted.

In contrast DSE looks at hundreds of thousands of piece placements as "species" competing and cooperating with each other simultaneously, using Darwinian selection to allow maximally cooperative groups of species to emerge over a few generations. This substrate-wide scale of decision-making leads to globally efficient solutions.

Because evolution is inherently parallel DSE can take advantage of massively parallel hardware, especially graphics processing units (GPUs). GPUs are being developed by NVIDIA, Google, etc. for naturally parallel algorithms such as Deep Learning Neural Nets and crypto currency mining, in response to the widely recognized breakdown of Moore's Law for CPUs. DSE rides that wave. Sequential nesters cannot.

Finally tighter, faster nesting leads to real-time interactive runs: the user can "tweak" intermediate nestings, re-nest, and repeat. Current nesting software lacks the ability to re-nest repeatedly due to the length of time needed for each nesting.

Field of Research
Artificial Intelligence

Topics of Interests
Layout problems, Packing problems, Scheduling problems, evolutionary optimization, genetic algorithms, multiobjective decision making, sign making, textile manufacturing, ship building, metal cutting.

I am looking for …
Industry users of shape nesting software who need to improve the efficiency of their layout patterns for cutting shapes from substrates (metal, wood, plastics, composites, textiles, leather, etc.) in order to reduce wasted (unused) material and to maximize substrate yield.

Also vendors of shape nesting software who could integrate our algorithm into their current software in order to handle true shapes, complex shapes, non-convex polygons, nesting-in-holes, re-nesting, etc.

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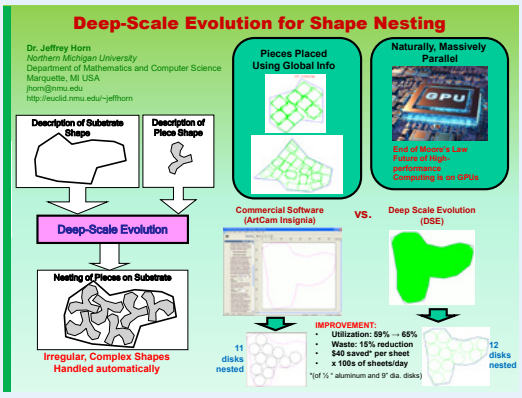

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Dr.-Ing. Petra Maier

My topics of interest are bioresorbable metals, mainly Magnesium alloys, for biomedical applications, the fracture behavior of materials after different loading conditions and the influence of the microstructure on mechanical (static, quasi-static, dynamic) and corrosion (fatigue or stress corrosion) properties, especially when modified by processing and post-heat treatment.
My research focus is on stress corrosion cracking and fatigue behavior, mainly of Magnesium alloys, and on the correlation of microstructural features and crack initiation and propagation / fracture behavior. Magnesium alloys are known to form corrosion pits, so I am focusing on the effect of non-uniform corrosion on remaining strength. To characterize the corrosion morphology micro-Computer Tomography supports a full 3D data set – parameter describing the corrosion attack is in progress.

Field of Research

Materials characterization

Topics of Interests

- Bioresorbable Mg alloys for biomedical applications
- Stress corrosion and fatigue behavior of magnesium alloys
- Fracture behavior of materials
- Material characterization (micro-CT)
- Influence of microstructural composition on the strength behavior of components (static, quasi-static, dynamic)

I am looking for …

- partners with innovative manufacturing methods of materials for characterization and correlation microstructure-process routes, - partners, where products are already the focus of research (preferably materials for medical devices)

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

M.Sc. Maciej Wylezek

The goal of the research project is to develop a high temperature (UPR). The challenge is to achieve it using the renewable or mass balanced raw materials.
Unsaturated polyester resins consist of unsaturated polyester (UP) and reactive diluent (RD). UPs are produced in polycondensation process from unsaturated diacids, saturated diacids and saturated diols. Unsaturated acids or their anhydrides such as fumaric acid or maleic anhydride provide double bonds to the UP chain. The aromatic rings of saturated diacids such as phthalic acid increase the thermosets (cured UPRs) toughness. Multiple diols can be used to synthesize UPs having various influence on their properties. Neopentyl glycol improves the styrene solubility of UPs as well as temperature, weathering and chemical resistance of their thermosets. One of the most interesting biobased diols is isosorbide (ISOS), which is derived from glucose. ISOS provides high glass transition and high stiffness of the UP thermosets. Biobased 1,4-cyclohexanedimethanol (CHDM) improve the mechanical properties. Isophorone diamine improve thermal stability and styrene solubility of UPs.

Highly viscous or solid UPs need a RD to create low viscous resin. Styrene dissolves a broad range of UPs. Moreover, it provides good thermal and mechanical properties as well as good resin process ability. Main disadvantages of styrene are its intensive odor and constantly increasing toxic regulations. Therefore, a styrene substitutes for UPRs are searched. The formulation of styrene-free, bio-based UPRs with non-toxic and odorless RD is currently under patent procedure.
The high temperature UP thermosets are general very brittle due to the high crosslink density. Conventional toughening agents for UPRs have low glass transition temperatures, thus cannot be used at high temperatures. Because of the good process ability and improved mechanical properties, at high temperatures styrene-maleic anhydride copolymers proved to be effective toughening agents for high temperature UPRs. They consist of monomers that are present in most UPRs, therefore they can be easily incorporated into the thermoset network.
Combining the above mentioned parameters provides a high-temperature UPR with a glass transition temperature above 200°C and excellent mechanical properties at 160°C.

Field of Research
Polymer Chemistry

Topics of Interests
Thermosetting polymer, Unsaturated Polyester Resins, Vinyl Ester Resins, Styrene substitutes, Macromolecular Chemistry, Polymer Chemistry

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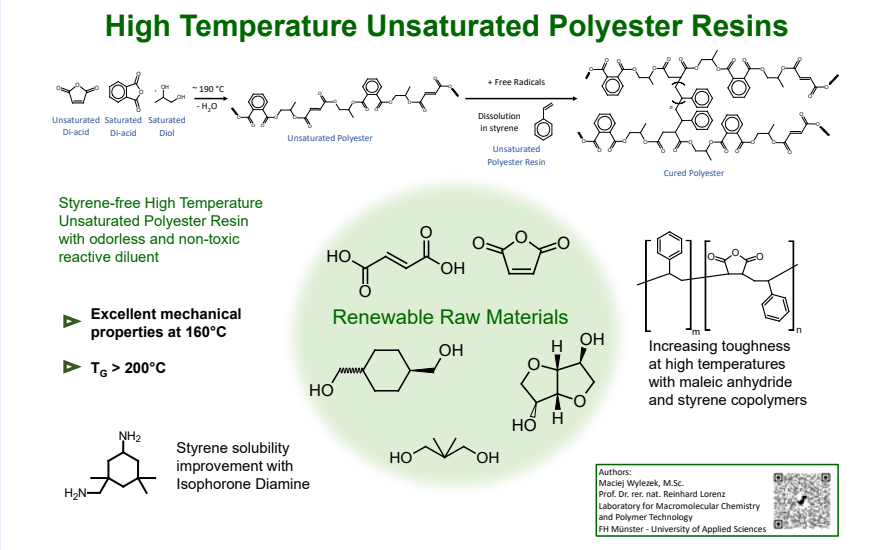

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Dr. Bert Stegemann

Lasers are becoming increasingly important in many sectors of materials processing. In the photovoltaic industry, ultra short-pulse lasers in particular have enormous potential in the processing and production of solar cells and modules.
We develop laser-based manufacturing processes both for the processing of new materials and for the realization of novel solar cell concepts. Highest precision and excellent reproducibility are required, so that conventional technologies can potentially be replaced in the production process and at the same time production costs can be reduced and solar cell efficiencies increased.
The constant further development of existing concepts as well as the introduction of completely new material systems require a continuous development of the patterning processes and the continuation of the understanding of the underlying laser-material interactions.
The current focus is on laser patterning of perovskite tandem solar cells in order to obtain serial interconnection of the individual cells in the module. Tandem solar cells are a new concept that promises significantly higher efficiencies, but also poses new challenges in terms of interconnection and laser processing.
Currently, the cells are still being produced on a very small laboratory scale to optimize the cell properties as well as the stability. However, the necessary up-scaling to industrially relevant module sizes requires patterning of the layers for serial electrical interconnection. Since such solar cells consist of a sequence of several thin layers, these must be selectively ablated line by line on the micron scale by means of a laser in order to achieve the desired serial interconnection.
For these research tasks, we have a versatile, industry-oriented laser patterning tool that includes a high-precision and fast-moving positioning system as well as nanosecond or picosecond lasers.

Field of Research

Photovoltaics, Laser material processing

Topics of Interests

Perovskite and tandem solar cells, laser-matter interaction, thin film preparation and analytics;
laser-based series interconnection, ablation of thin films

I am looking for …

Cooperation in fundamental and applied research projects;
Preparation and exchange of solar cell samples;
Analysis and characterization of laser-patterned solar cell and thin-film samples: Electrical losses, morphology, chemical and structural modifications, stability;
Spectroscopy, plasma diagnostics;
Femtosecond laser patterning;
Laser pulse shaping;
Applications of laser material processing in other technologies

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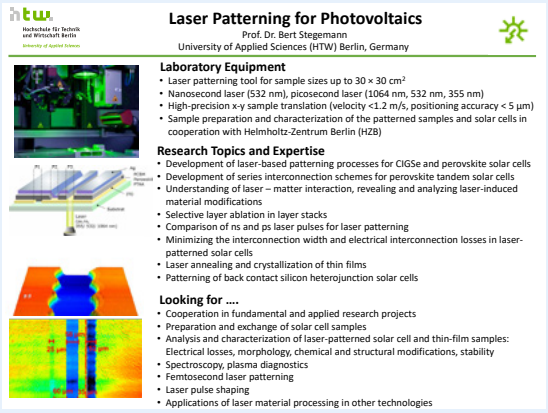

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Innovative Materials – from Synthesis to Application

Matchmaking Part II

Prof. Dr. Jörg Töpfer

My research group is working in the field of innovative ceramic materials for applications in electronics and energy. We study functional oxides (magnetic oxides, thermoelectric oxides, ferro- and piezoelectric oxides, semiconducting oxides) including their synthesis, structure, defect chemistry and miccrostructure - properties correlations. Our research also focuses on the preparation and optimization of passive multilayer devices, including thermoelectric generators, multilayer inductors, actuators, thermistors, and the integration of functional ceramic materials into LTCC multilayer devices.

Field of Research
functional ceramics

Topics of Interests
functional ceramics, thermoelectric oxides and modules, hard and soft magnetic ceramics, lead-free piezoelectric materials and multilayer actuators, LTCC and multilayer modules,

I am looking for …
research partners

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

16:30 h – 18:00 h CEST

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Matchmaking Part II

18:15 h – 19:45 h CEST

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Secure Digitalisation of Industrial Engineering
Matchmaking Part I

Matchmaking Part I

Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr. Dennis-Kenji Kipker

It is essential to develop pragmatic technical solutions that are capable of maximizing data sovereignty even when foreign technology is used in „legally insecure" third countries from EU perspective. In this context, it is desirable to ensure technically that data is consistently anonymous for third parties. The basic idea should be the interface openness of such a solution: for example, a large number of cloud computing offerings require the trust of their users for market success, especially if they are also to be used for applications that process sensitive personal data or are particularly risky in terms of data protection impact assessment (e.g., health and fitness apps), or sustainable applications from the areas of smart home, smart living, smart energy grids, or those that process users' financial information.

In terms of the problems described, the research project „"More Privacy through Cloud Anonymity"" (MORPY) aims to develop a cross-domain technical-legal solution in which data is consistently anonymous, at least for third parties. From a technical point of view, the use of „"confidential computing technology"" establishes the processing of data in a secure execution environment, the so-called enclave, which, according to relative theory, eliminates any reference to individuals.

Field of Research

Cybersecurity, Data Privacy, Law

Topics of Interests

Cybersecurity, Data Privacy, Law

I am looking for …

Cybersecurity, Data Privacy, Law

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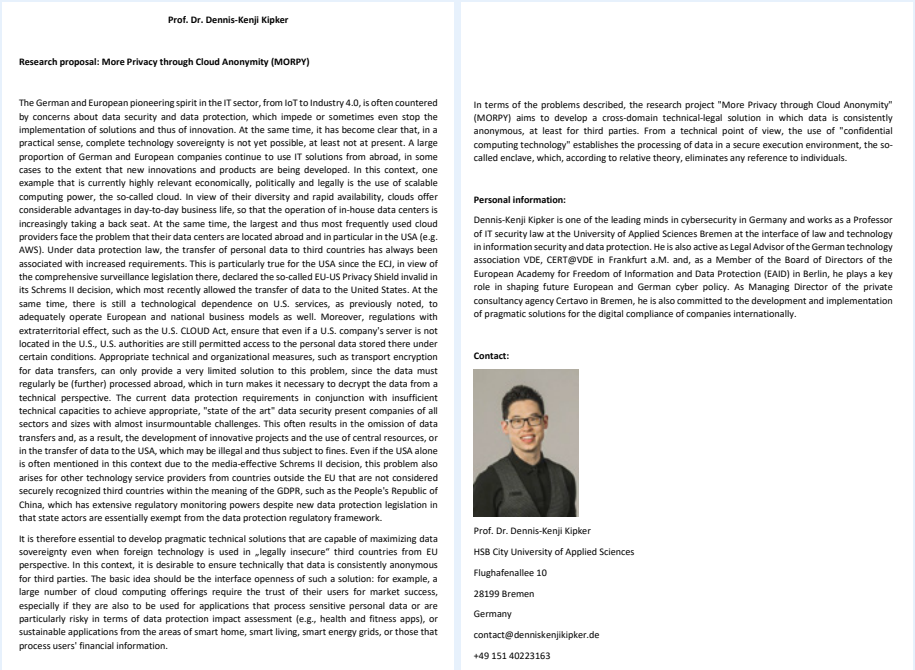

Prof. Dr. Dennis-Kenji Kipker

Research proposal: More Privacy through Cloud Anonymity (MORPY)

The German and European pioneering spirit in the IT sector, from IoT to Industry 4.0, is often countered by concerns about data security and data protection, which impede or sometimes even stop the implementation of solutions and thus of innovation. At the same time, it has become clear that, in a practical sense, complete technology sovereignty is not yet possible, at least not at present. A large proportion of German and European companies continue to use IT solutions from abroad, in some cases to the extent that new innovations and products are being developed. In this context, one example that is currently highly relevant economically, politically and legally is the use of scalable computing power, the so-called cloud. In view of their diversity and rapid availability, clouds offer considerable advantages in day-to-day business life, so that the operation of in-house data centers is increasingly taking a back seat. At the same time, the largest and thus most frequently used cloud providers face the problem that their data centers are located abroad and in particular in the USA (e.g. AWS). Under data protection law, the transfer of personal data to third countries has always been associated with increased requirements. This is particularly true for the USA since the ECJ, in view of the comprehensive surveillance legislation there, declared the so-called EU-US Privacy Shield invalid in its Schrems II decision, which most recently allowed the transfer of data to the United States. At the same time, there is still a technological dependence on U.S. services, as previously noted, to adequately operate European and national business models as well. Moreover, regulations with extraterritorial effect, such as the U.S. CLOUD Act, ensure that even if a U.S. company's server is not located in the U.S., U.S. authorities are still permitted access to the personal data stored there under certain conditions. Appropriate technical and organizational measures, such as transport encryption for data transfers, can only provide a very limited solution to this problem, since the data must regularly be (further) processed abroad, which in turn makes it necessary to decrypt the data from a technical perspective. The current data protection requirements in conjunction with insufficient technical capacities to achieve appropriate, "state of the art" data security present companies of all sectors and sizes with almost insurmountable challenges. This often results in the omission of data transfers and, as a result, the development of innovative projects and the use of central resources, or in the transfer of data to the USA, which may be illegal and thus subject to fines. Even if the USA alone is often mentioned in this context due to the media-effective Schrems II decision, this problem also arises for other technology service providers from countries outside the EU that are not considered securely recognized third countries within the meaning of the GDPR, such as the People's Republic of China, which has extensive regulatory monitoring powers despite new data protection legislation in that state actors are essentially exempt from the data protection regulatory framework.

It is therefore essential to develop pragmatic technical solutions that are capable of maximizing data sovereignty even when foreign technology is used in „legally insecure" third countries from EU perspective. In this context, it is desirable to ensure technically that data is consistently anonymous for third parties. The basic idea should be the interface openness of such a solution: for example, a large number of cloud computing offerings require the trust of their users for market success, especially if they are also to be used for applications that process sensitive personal data or are particularly risky in terms of data protection impact assessment (e.g., health and fitness apps), or sustainable applications from the areas of smart home, smart living, smart energy grids, or those that process users' financial information.

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Personal information:

Dennis-Kenji Kipker is one of the leading minds in cybersecurity in Germany and works as a Professor of IT security law at the University of Applied Sciences Bremen at the interface of law and technology in information security and data protection. He is also active as Legal Advisor of the German technology association VDE, CERT@VDE in Frankfurt a.M. and, as a Member of the Board of Directors of the European Academy for Freedom of Information and Data Protection (EAID) in Berlin, he plays a key role in shaping future European and German cyber policy. As Managing Director of the private consultancy agency Certavo in Bremen, he is also committed to the development and implementation of pragmatic solutions for the digital compliance of companies internationally.

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr. habil. Steffen Wendzel

I am interested in CPS/IoT/smart building communications and security and the application of machine learning/AI for anomaly detection in networks and CPS. Another major domain of my research is information hiding (network covert channels and network steganography). I am also working on the security of (embedded) communication protocols as well as on terminology/taxonomy in information security and scientometrics/bibliometrics.

A list of my research projects can be found here:
http://www.wendzel.de/projects/

Publications: http://www.wendzel.de/pub/

Field of Research
Cyber Security

Topics of Interests
Steganography / Covert Channels
Smart Building Security / Smart Home Security / IoT Security / CPS Security
Anomaly Detection

I am looking for …
Research collaborators / joint funding applications

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Asst. Prof. Deveeshree Nayak

At present time, Cybercrime is not limited to any particular industry. Academia and industries partnership should be formed to protect everyone from Cyberattacks. This project idea covers the hacks of Academia and Industry partnerships to address Cyebrsecurity solutions. The key takeaways from this project idea are as follows

- Collaboration Strategies between Academia and Industry to address Cybercrime challenges
- Mitigation Strategies to address Cybersecurity skill gaps
- Strategies of community involvement to mitigate cyber attacks

Field of Research
Cybersecurity

Topics of Interests
Privacy, Cybersecurity, Cybercrime, and Interdisciplinary study of Cybersecurity

I am looking for …
Collaborating on Research Projects and Partnering with other universities

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Session title: A partnership initiative of Industry and Academia

At present time, Cybercrime is not limited to any particular industry.

Academia and industries partnership should be formed to protect everyone from Cyberattacks.

This project idea covers the hacks of Academia and Industry partnerships to address Cybersecurity solutions.

The key takeaways from this project idea are as follows

- Collaboration Strategies between Academia and Industry to address Cybercrime challenges
- Mitigation Strategies to address Cybersecurity skill gaps
- Strategies of community involvement to mitigate cyber attacks

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr.-Ing. habil. Natasa Zivic

AI based correction mechanisms for time and security critical applications

New fast transmission systems such as 5G or TSN (Time Sensitive Networks) allow long-distance-transmission of more and more real-time-critical applications that could previously only be controlled locally: Examples are switching commands inside of sub- and control stations in energy distribution (smart grids) and process control and monitoring in industry (4.0, smart manufacturing). However, these applications are not only time-critical - the transmission must take place in less than 5 ms, e.g. in smart grids - but mostly also safety-critical: transmission errors, modifications, delays, losses can have negative impact on the environment, investments and human health. Therefore, the messages of these applications require special reliability.
Errors are always possible during transmission, which are recognized by error detection mechanisms. However, there is no time for a request and repetition of the message if the time-critical limit values are to be observed.

The project proposal provides for the introduction of error-correcting codes, with the additional use of artificial intelligence algorithms, e.g. learning algorithms based on error-free transmitted messages. The error detection and correction mechanisms can contain cryptographic checksums to also detect intentional manipulations. The use of corrective codes is not new, but now they are to be combined with methods of artificial intelligence (learning, correcting, verifying).
Error-correcting codes require more redundancy than just error-detecting codes, but due to the high transmission speed of 100 Mbit/s and more, the message enlargement has only an insignificant effect, since the messages themselves only have a very limited length.
The project focuses on increasing the reliability of time- and safety-critical applications in energy generation, distribution and processing, in industrial automation and manufacturing (process control and monitoring, sensors, robotics)x, in communication systems within vehicles (aircraft, (autonomous) vehicles, ships) and other remote controls where message repetitions are not possible due to long transmission times.

Field of Research

Robust secure communications in Industrial Automation

Topics of Interests

Artificial Intelligence, Industrial Automation, Smart Grids, Traffic Control, Blockchain, Information Theory and Coding

I am looking for …

Cooperation and Business Partners

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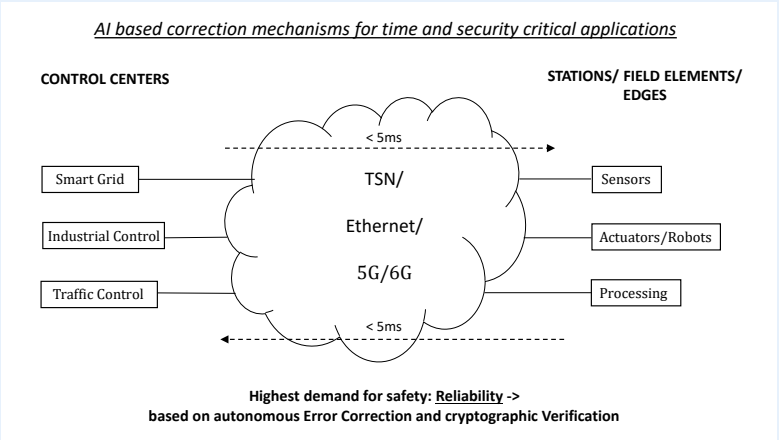

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr.-Ing. Thomas Leich

In recent years, the requirements for industrial software are becoming increasingly individual, e.g., due to customer demands, industry standards, or legal regulations. Therefore, there is a need for configurable applications with a large number of different features to meet these requirements, resulting in systems that are able to adapt their behavior as required. However, while each feature ideally provides functionality that adds value to a system, it is also more complex to manage such configurable systems. Due to this complexity, but also the uniqueness of such systems, there is a particularly high risk of becoming subject of cyber attacks or simply exposing sensitive data by exploiting vulnerabilities due to (dynamic) feature interactions. In recent years, a lot of research has been done in the field of (industrial) configurable systems, especially based on product-line techniques. However, based on own research, we already found out that security in the context of configurability is still underexplored, as security and related concerns, e.g., safety of industrial hardware, are usually not or only superficially addressed as quality attributes or non-functional requirements. Therefore, our main objective is to develop scalable and variable data security concepts for configurable systems. In this context, we aim to systematically and empirically analyze configurable industrial applications to develop a variable classification framework for the comparable investigation of their technological structure and security demands. Based on this framework, we plan to extract security patterns as construction manuals to support the engineering and evolution of configurable software. In addition, we aim to develop and introduce product-line techniques for evaluating the security of configurable systems by incorporating binding time, security standards, and relevant vulnerabilities, and analyzing security-related differences in configurability at design time and runtime.

Field of Research

Cyber Security; Software Engineering and Evolution;
Cyber Physical Systems

Topics of Interests

Software Engineering and Evolution;
Software Product Lines;
Cyber Security;
Cyber Physical Systems;
Empirical Software Engineering
Human Factors
Program Comprehension

I am looking for …

project collaboration

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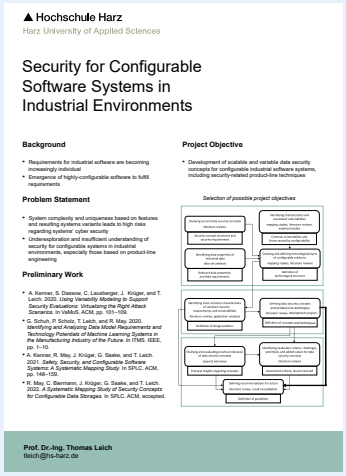

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Dr. Baijian Yang

Dr. Yang's most impactful work is his recent study on Big Data Machine Learning. Historically, big data were solved either by sampling (mostly in statistics), or by parallel computation (mostly in computer science), or the combination of the two. Dr. Yang has developed a number of modeling based approach that provides a third pillar to tackle big data problems. His working sufficient statistics based approach can provide exact solutions to multiple models, such as linear regressions, polynomial regressions, and transformed linear regressions, with a single access of the data. His proposed solution on logistic regressions and penalized regression can significantly improved the convergence speed and provide a streaming solution for real time big data logistic regression analyses.
Dr. Yang's most known work are in the field of cybersecurity. He has applied visual analytics to network traffic based anomaly analyses. He has applied a number of machine learning techniques for anomaly detection. He has also integrated software defined networking (SDN) with machine learning to learn and control the network in respond to network intrusions. Dr. Yang has also advised many graduate students in cybersecurity research projects. In particular, he advised students and designed a number of technical solutions to provide GPU forensic analyses, GPU malware analyses and data residual analyses on GPUs, including images, web pages and videos. There are also a number of applied work on vulnerability analyses on IoT devices and applications, and SDN applications.

Dr. Yang's unique strength in both theoretical analyses and hands-on skills helped him to expend his in fields other than cybersecurity. He has applied machine learning in cloud computing resource scheduling, he has applied machine learning in smart manufacturing. He is interested in integrating data science, computer science, computer technology and cybersecurity in interdisciplinary work.

Field of Research
Machine Learning, Cybersecurity, Networking

Topics of Interests
Applied Machine Learning
Cybersecurity
Smart Cities

I am looking for …
Projects that need knowledge in computer networks, cybersecurity, and applied machine learning. I will need the funding to support my graduate students and a portion of my summer pay.

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr. Ronald Petrlic

My research focus is on building systems that are secure and privacy-preserving by design. I am one of few computer scientists that are dealing with legal aspects of digitalization. In my previous position at a German data protection authority, I consulted the European Commission on autonomous driving and I am responsible for the first GDPR fine in Germany.

Field of Research
IT security and data protection

Topics of Interests
E-mail security, data protection by design, Blockchain development

I am looking for …
Interesting practical scenarios where I can apply my knowledge

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Kumar Ashutosh Anand

Our current research aims to develop an AI mechanism that quickly detects network attackson infrastructures, becoming rapidly digital such as industrial and automotive, and tries tocommence effective countermeasures. The applications of various Artificial Intelligence(AI) models have made their way up for classification purposes like anomaly detection in cybersecurity. In an autonomous driving system, data from the different sensors are evaluated and examined for anomalies in network communication. In a digital industrialenvironment, smart devices like sensors and processors are interconnected through a datacommunications network to share, process, and analyze information locally and remotely.Our research group focuses on developing and enhancing the robustness of AI cybersecuritysystems that deal with monitoring infrastructure, ranging from faster detection of potentiallyabnormal events to analyzing the detected events in real-time and initiating remedial incidentresponse accordingly. Furthermore, we acknowledge the expanding need to augment theseAI systems with additional security mechanisms to remain resilient during possible intrusionattacks on themselves.

Field of Research
AI, CY

Topics of Interests
AI for cybersecurity, DNN, SNN

I am looking for …
Research collaboration

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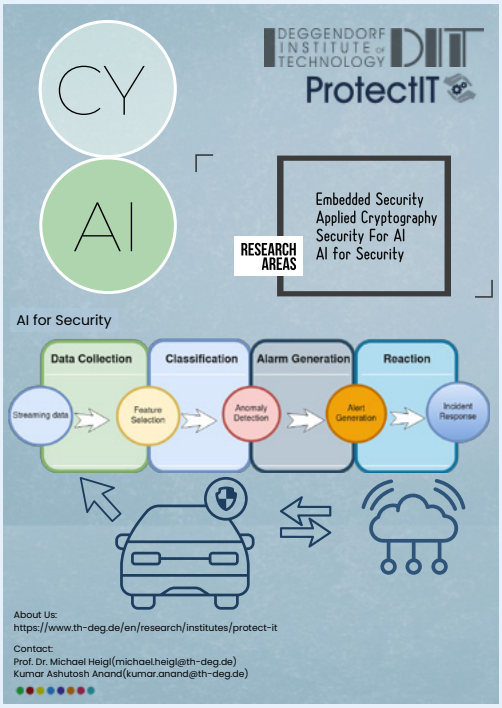

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr. Christoph Reich

The Institute for Data Science, Cloud Computing and IT Security (IDACUS) works in the are of security in various industry challenges. We use blockchain for inter-company networking of production and process data, use machine learning to detect behaviour anomalies in container infrastructures, detect data integrity attacks in CPS data flow by a distributed data quality network, work on the automation of MLOps, and investigate adversarial attacks in deep neural networks.

Field of Research
Data Science, IT Security, Distributed Systems

Topics of Interests
Secure Digitalisation of Industrial Engineering

I am looking for …
research project collaboration

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

M.Sc. Nils Freyer

My research is divided into research on data preprocessing in natural language processing and ethics of technology. This transdisciplinary research focus is motivated by the idea that technological solutions need ethical foundations and vice versa.
In the context of natural language processing, I am particularly interested in methodologies to avoid or diminish biases in the initial data to impact the supposed model.
Therefore, I examine the use of different metrics for fairness in data and in the final model.
Further, I am currently studying active learning strategies for fairness metrics.
Regarding Ethics of Technology, I work closely with members of the applied ethics research group at RWTH-Aachen University, conducting research on the ethical relevance of interpretability, explainability and contestability of machine learning based systems.

Field of Research
Natural Language Processing and Ethics of Technology

Topics of Interests
Model interpretability and explainability, both from technological and ethical perspectives.
Methodology for debiasing in data preprocessing

I am looking for …
Research cooperation and exchange with other researchers in related fields

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

Prof. Dr. Helmut Wittenzellner

Typologies of Cyber Aggressors and Types of Attacks, Prevention in Organisational Management, Maturity levels Industrial Engineering and Exposure Measurement in CyberSecurity, International CyberDefense-Challenge

Field of Research

Entrepreneurship, CyberSecurity, Transformation, Media Convergence

Topics of Interests

Industrial Engineering, CyberSecurity, Transformation, Media Convergence, Organisational Development, Startup-Consulting, Entrepreneurship, Management

I am looking for …

Partnerships in Funding and Research Partners for DFG-Projects

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Secure Digitalisation of Industrial Engineering

Matchmaking Part I

M.Eng. Willi Zschiebsch

Finding optimal designs during the classical engineering design process requires a lot of resources. This is the case especially when in addition to virtual tasks, like simulation and computer aided design, physical tasks, such as manufacturing and experimental testing, also need to be performed. Further, complex load scenarios, narrow design space and hybrid materials are increasingly confronting established methods with their limits.

As part of the currently ongoing digital transformation, the question arises if a complete digital design approach can be developed which reliably finds solutions with less development effort, such as time, costs or hardware and encourage the wider use of more efficient design approaches.

For that purpose, a modular digital framework for an automated design optimisation is actively developed, which varies pre-defined key parameters to find the optimal solutions for multi-domain development goals. The developed method should be capable of accounting for complex design scenarios with the help of analytical, numerical and experimental analysis. A standardised Application Programming Interface (API) enables interactions between different models by connecting different simulation and design tools and will hopefully support a faster engineering process for the future.

Field of Research

Mechanical Engineering, Digitalization, Development Process, Simulation

Topics of Interests

Automatization of engineering design processes

I am looking for …

Partner, which are interested in the developement of a complete digital description of engineering design processes and helping to connect the large variaty of system together, so that development processes of the future can be automated, have lower development time/cost and better product performance.

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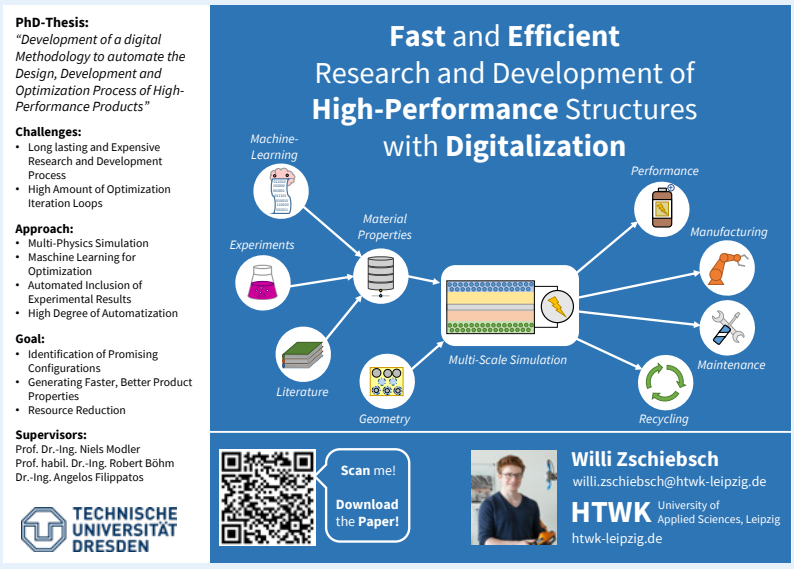

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Secure Digitalisation of Industrial Engineering
Matchmaking Part II

Matchmaking Part II

Secure Digitalisation of Industrial Engineering

Matchmaking Part II

Prof. Julius Schöning

A fundamental paradigm in developing interactive AI systems is the „human-in-the-loop" as a trainer and evaluator during machine learning. While this paradigm is prevalent, it does not represent all approaches to AI. What is not yet prominent in the debate are alternative HCI paradigms in AI development, i.e., the option of using AI primarily and only asking the users in case the AI is unsure about solving the task. The new paradigm, „ai-in-the-loop", will combine ideas of how AI and human analyses relate. Thus, AI might become available in many applications soon since HCI will make AI even more reliable and explainable. With „ai-in-the-loop" even AI-based closed-loop control systems might be viable, and AI algorithms can be run on the smartphone without a mainframe.

Field of Research

AI-in-the-loop

Topics of Interests

artificial intelligence, human computer interaction, closed-loop control systems, agriculture

I am looking for …

I am looking for partners interested in joint projects, bilateral exchange of studies, joint lecture series, etc

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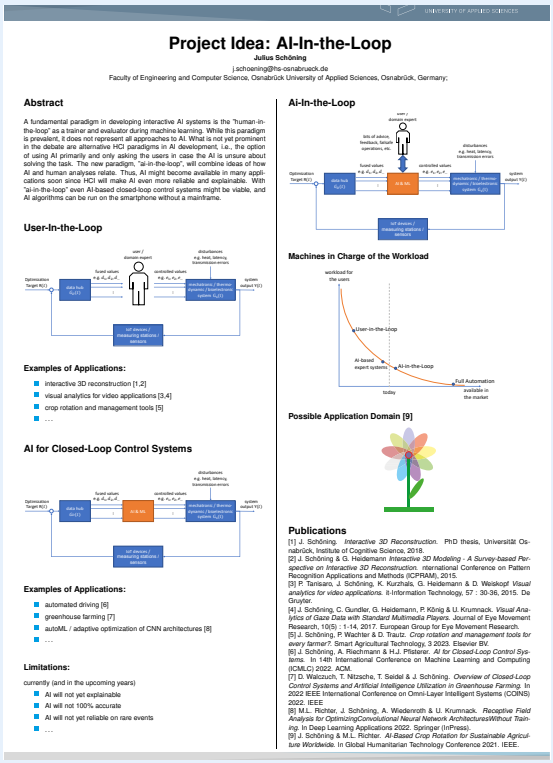

Project Idea: AI-In-the-Loop

Julius Schöning

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Faculty of Engineering and Computer Science, Osnabrück University of Applied Sciences, Osnabrück, Germany;

Abstract

A fundamental paradigm in developing interactive AI systems is the "human-in-the-loop" as a trainer and evaluator during machine learning. While this paradigm is prevalent, it does not represent all approaches to AI. What is not yet prominent in the debate are alternative HCI paradigms in AI development, i.e., the option of using AI primarily and only asking the users in case the AI is unsure about solving the task. The new paradigm, "ai-in-the-loop", will combine ideas of how AI and human analyses relate. Thus, AI might become available in many applications soon since HCI will make AI even more reliable and explainable. With "ai-in-the-loop" even AI-based closed-loop control systems might be viable, and AI algorithms can be run on the smartphone without a mainframe.

User-In-the-Loop

Examples of Applications:

- interactive 3D reconstruction [1,2]
- visual analytics for video applications [3,4]
- crop rotation and management tools [5]
- …

AI for Closed-Loop Control Systems

Examples of Applications:

- automated driving [6]
- greenhouse farming [7]
- autoML / adaptive optimization of CNN architectures [8]
- …

Limitations:

currently (and in the upcoming years)

- AI will not yet explainable
- AI will not 100% accurate
- AI will not yet reliable on rare events
- …

AI-In-the-Loop

Machines in Charge of the Workload

workload for the users

User-in-the-Loop

AI based expert systems

AI-in-the-Loop

Full Automation available in the market

today

Possible Application Domain [9]

Publications

[1] J. Schöning. *Interactive 3D Reconstruction*. PhD thesis, Universität Osnabrück, Institute of Cognitive Science, 2018.
[2] J. Schöning & G. Heidemann *Interactive 3D Modeling - A Survey-based Perspective on Interactive 3D Reconstruction*. international Conference on Pattern Recognition Applications and Methods (ICPRAM), 2015.
[3] P. Tamisara, J. Schöning, K. Kurzhals, G. Heidemann & D. Weiskopf *Visual analytics for video applications*. it-Information Technology, 57 : 30-36, 2015. De Gruyter.
[4] J. Schöning, C. Gundler, G. Heidemann, P. König & U. Krumnack. *Visual Analytics of Gaze Data with Standard Multimedia Players*. Journal of Eye Movement Research, 10(5) : 1-14, 2017. European Group for Eye Movement Research.
[5] J. Schöning, P Wachter & D. Trautz. *Crop rotation and management tools for every farmer?*. Smart Agricultural Technology, 3 2023. Elsevier BV.
[6] J. Schöning, A. Riechmann & H.J. Pfisterer. *AI for Closed-Loop Control Systems*. In 14th International Conference on Machine Learning and Computing (ICMLC) 2022. ACM.
[7] D. Walczuch, T. Nitzsche, T. Seidel & J. Schöning. *Overview of Closed-Loop Control Systems and Artificial Intelligence Utilization in Greenhouse Farming*. In 2022 IEEE International Conference on Omni-Layer Intelligent Systems (COINS) 2022. IEEE
[8] M.L. Richter, J. Schöning, A. Wiedenroth & U. Krumnack. *Receptive Field Analysis for OptimizingConvolutional Neural Network ArchitecturesWithout Training*. In Deep Learning Applications 2022. Springer (InPress).
[9] J. Schöning & M.L. Richter. *AI-Based Crop Rotation for Sustainable Agriculture Worldwide*. In Global Humanitarian Technology Conference 2021. IEEE.

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Secure Digitalisation of Industrial Engineering
Matchmaking Part II

Prof. Dr. Michael Moeckel

Hybrid modelling (Machine Learning and simulation) for industrial process monitoring and model predicted control

The research focus of the Laboratory for Hybrid Modelling in the University of Applied Sciences Aschaffenburg, led by Prof. Moeckel, is in applying Machine Learning and Artificial Intelligence methods for scientific discovery and the monitoring, understanding and control of industrial processes or machinery. In engineering applications typically massive a priori knowledge on the intended functioning of processes and devices is available which often can be expressed in terms of differential equations and process simulations. Equally, deviations from ideal behavior are omnipresent in real-world applications, require monitoring based on imaging and physical sensors which generates data. Hence, the combination of empirical, data-driven methods and deterministic, simulation-based approaches to hybrid methods for process monitoring and model predictive control is a promising route to make machine learning techniques more explainable, less data intensive and more adapted to typical problems in the sciences or engineering.

As our research is project based, we include and test hybrid modelling approaches in actual use cases: In additive manufacturing, monitoring techniques are improved by model-based predictions on physical quantities which cannot be measured directly, but influence the quality of a built part. In battery cell production, we try to reconfigure a huge parameter space of many process variables and parameters by including a priori knowledge and search for additional early indicators for failure or quality limitations. Together with a leading producer of industrial forklift trucks we develop predictive maintenance solutions for forklift trucks.

Field of Research

Hybrid modelling (data science & simulation) for process monitoring and control

Topics of Interests

Data science, machine learning, artificial intelligence
Simulation, process modeling, physical modeling

I am looking for …

Intl collaborations (joint research)
Joint grant applications
research stay (sabbatical) in a stimulating research environment (salary paid by home institution)

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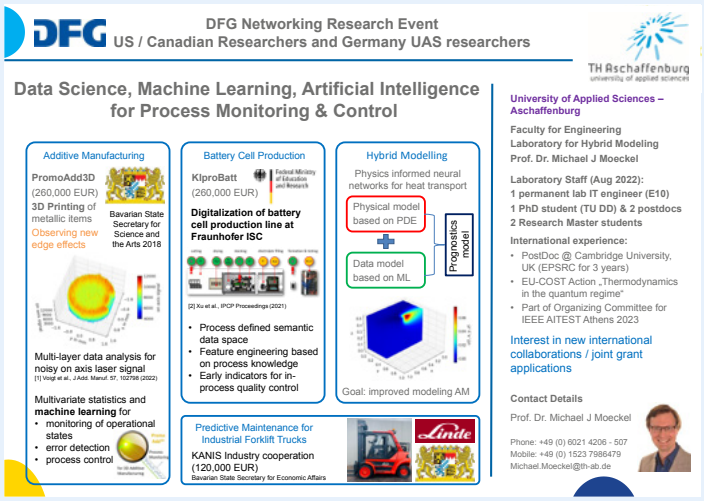

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Secure Digitalisation of Industrial Engineering

Matchmaking Part II

Prof. Dr. Christian Becker-Asano

I am working on the intersection between AI and (social) robotics with a special interest in social signals. Following the ideas of Affective Computing I am interested in creating very human-like, robotic interfaces such as android robots that can detect and mirror social signals passively and actively. Therefore, my laboratory is equipped with robotic hardware from Japan. We aim to combine machine learning with classical AI modelling to achieve the most convincing interactions.

Field of Research
Computer Science / Robotics

Topics of Interests
Affective Computing, Social Robotics, Android Science, Artificial Intelligence

I am looking for …
Cooperation and funding opportunities for bi-lateral projects

CONTACT
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Secure Digitalisation of Industrial Engineering

Matchmaking Part II

Prof. Dr. Axel Busboom

Im am interested in all aspects of digital technologies for „Industry 4.0“, including:
- digital twins, modeling and optimization of industrial processes
- OT / SCADA security
- OPC UA
- industrial data analytics, e.g. for predictive maintenance or diagnostics
- AI-supported engineering

Field of Research
Industrial Digitalization

Topics of Interests
- digital twins
- process modeling and optimization
- predictive maintenance
- AI in industrial engineering
- OT security

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Secure Digitalisation of Industrial Engineering

Matchmaking Part II

Prof. Dr.-Ing. Dipl.-Ing. Dipl. Wirt.-Ing. Axel Sikora

- secure field-level connectivity
- seamless & life-cycle oriented device and communication security
- applications in industrial, smart-energy & smart-city domains
- real-time communication (TSN over anything / 5G & 6G)

Field of Research

Secure Connectivity for the Industrial IoT

Topics of Interests

- secure field-level connectivity
- seamless & life-cycle oriented device and communication security
- applications in industrial, smart-energy & smart-city domains
- real-time communication (TSN over anything / 5G & 6G)

I am looking for …

interesting research partners from academia and industry

CONTACT

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Secure Digitalisation of Industrial Engineering

Matchmaking Part II

Prof. Dr. Sebastian Doehler

I am a mathematician working in the department of mathematics of Hochschule Darmstadt. My research interests include

- High dimensional data analysis
- Multiple testing procedures
- False discovery rate (FDR) and related error measures
- Selective inference
- Applications in computer science, finance, medicine etc.

Currently, I am working with colleagues from Sorbonne Universite on improving multiple testing methods for heterogeneous data. This work is financially supported by the Deutsche Forschungsgemeinschaft (DFG). Together with colleagues i have also authored several R packages that implement our new data analysis methods.

Field of Research
Data Science & Statistics

Topics of Interests
- High dimensional data analysis
- Multiple testing
- False Discovery Rates
- Heterogeneous data

I am looking for ...
- Opportunities for collaborating
- Interesting problems and applications in engineering, computer science, science, biology, finance,...
- Ph.D. students

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Secure Digitalisation of Industrial Engineering
Matchmaking Part II

M.Sc. Laura Bittel

One project aims to predict and control an indoor ventilation system, e.g. in a classroom or in a public transport vehicle, and to adapt it in an energy-efficient and health-oriented manner using an artificial intelligence. Generating the data required for a neural network (ANN) using computational fluid dynamics (CFD) is very time consuming and computationally intensive. To reduce the time required, a numerical method is used to create data sets. The last point is the main focus of my work.

Other key research areas of our team are:
CFD-simulation of filter structures and other porous media;
Adjoint-based topology optimization of filter structures;
Simulation and measurement of technical stream machines;
Simulation and measurement of air and particle flow in closed environments (e.g. public transport, classroom, etc.);
Measurement thermal comfort;
Investigation of indoor air filters;
Testing and development of respiratory mask (SARS-CoV-2);
Simulation, measurement and design of cooling components;
Development of a model for simulation of surfaces of coatings for e.g. dust catching (air pollution control) or rejection of dust (photovoltaic systems);
and more...

Field of Research
Fluid dynamics

Topics of Interests
- Fluid dynamics
- Multiphase flow
- CFD-Simulations
- Aerosol filtration
- Water treatment
- Numerical methods to reduce the complexity of computer-intensive computational fluid dynamics CFD simulations
- Topology optimization
- Cooling and heating of different components

I am looking for ...
Collaboration in research; Interesting and demanding applications; Interdisciplinary scientific dialogues

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Secure Digitalisation of Industrial Engineering Matchmaking Part II

Prof. Dr. Alexander Schiendorfer

I work on artificial intelligence, operations research, and machine learning applications based on problems in industrial and engineering settings. That includes process and quality data in manufacturing, combinatorial optimization in MiniZinc with embedded ML models (vehicle routing, scheduling) and/or predict-and-optimize approaches as well as combining reinforcement learning and anomaly detection for critical system infrastructure.

Field of Research
Combinatorial Optimization and Machine Learning in Industrial Engineering

Topics of Interests
Constraint Programming
Reinforcement Learning
Vehicle Routing Problems
Product sequencing
Reliable machine learning under uncertainty

I am looking for …
Academic and industrial cooperation partners

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Smart Cities

Matchmaking Part I
16:30 h – 18:00 h CEST
Page 105 – 117

Matchmaking Part II
18:15 h – 19:45 h CEST
Page 118 – 130

Smart Cities
Matchmaking Part I

Matchmaking Part I

Smart Cities
Matchmaking Part I

Prof. Dr.-Ing. Michael Buehler

Infrastructure - Digital Transformation in Construction - Federated Digital Platforms - Future of Engineering

I have been teaching construction economics and construction business management at HTWG since 2019. My research interests focus on infrastructure planning and development, the future of the engineering profession in the face of complex global challenges and opportunities such as climate change and the fourth industrial revolution.

Field of Research
Sustainable construction / Digital Platforms / Urban Climate Resilience

Topics of Interests
Citizen Science and Smart City solutions
Building with sustainable materials, eg rammed earth
Circular economy
Data platforms and data sharing in construction

I am looking for …
Likeminded partners // preferably west coast

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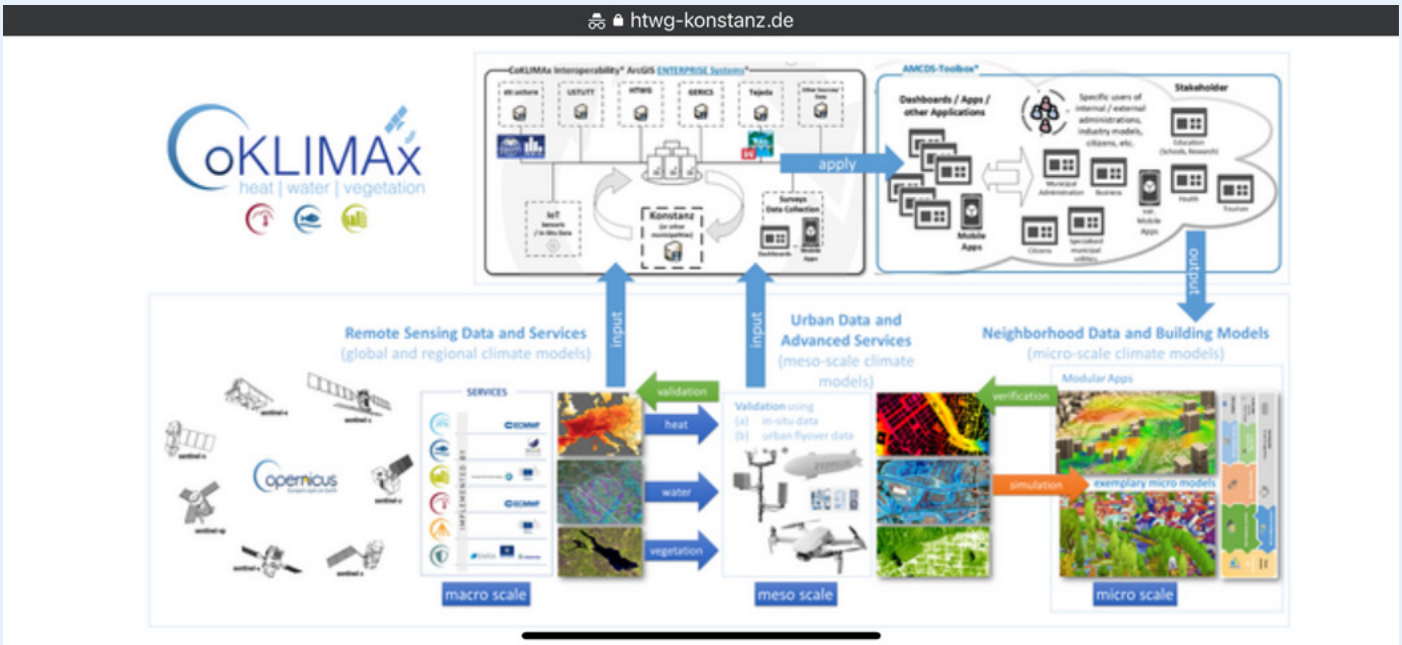

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Smart Cities
Matchmaking Part I

Dr. Ramla Qureshi

The focus of my research is to understand and build a correlation between resilience and sustainability for civil infrastructure within the context of extreme events and cascading multi-hazard scenarios by developing industry-ready probabilistic frameworks and next-generation code guidelines. Over the past eight years, I have been involved in computational and experimental investigation for characterizing structural performance against extreme hazards such as earthquakes, fires, and blasts. Simultaneously, I have conducted risk assessment, uncertainty modeling, and reliability analyses to quantify the impact of such events on the built environment, and to advance performance-based design.

Field of Research
Multi-hazard resilience of civil engineering structures

Topics of Interests
1. Structural resilience against extreme hazards: earthquakes, fire safety, and blast engineering.

2. Experimental mechanics, real-time hybrid simulation and other forms of cyber-physical testing.

3. Sustainable structures: Mass timber and hybrid timber-steel/concrete structures.

4. Risk assessment, uncertainty modeling, and reliability analyses for performance-based design of sustainable structures.

I am looking for …
Research collaboration on Cyber-Physical testing and monitoring setups including the design, construction, monitoring and evaluation of smart, low energy and low carbon sustainable structures using real-time hybrid simulation testing techniques, advanced sensors and other digital technologies.

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Smart Cities
Matchmaking Part I

Prof. Mauricio Soto Rubio

I am currently focused on merging Indigenous Traditional Ecological Knowledge (TEK) with current digital design and fabrication techniques to design sustainable housing options for disadvantaged communities in North America. The research is multidisciplinary by nature, and includes emerging construction materials, robotics, green energy systems, prefabrication, lightweight and deployable structures, etc.

Field of Research
Architecture

Topics of Interests
Lightweight and deployable structures
Traditional Ecological Knowledge
Indigenous Culture
Prefabrication and Affordable Housing
Digital Fabrication and Design

I am looking for …
Collaborative research relationships with Architects, Urban Planners, Engineers, Biologist, Sociologist, etc

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Smart Cities
Matchmaking Part I

Prof. Berthold Best

Asset Management of Infrastructure, especially roads, bridges and airfields
Building Information Modeling with the focus on life cycle management of infrastructure
Climate resilience of infrastructure

Field of Research
Transportation Engineering

Topics of Interests
Asset Management of Transportation Infrastructure

I am looking for …
Research partners, funding opportunities for international projects

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Smart Cities
Matchmaking Part I

Anna Buerklen

With urbanization as ongoing global trend, increasing economic and transport activities are observable in cities worldwide. Consequently, goods movement in urban areas is increasing and is responsible for a significant part of predominant issues such as congestion, pollution, accidents and noise impairing the quality of life of the city's citizens. Against this background, existing research underlines the importance of participatory approaches in urban freight transport policy and planning in order to achieve a resilient urban development. In general, stakeholder involvement can be classified and assessed in many ways. First, stakeholder involvement can be seen from a strategic management perspective aiming at capturing knowledge, reducing conflicts, encouraging innovation and facilitating development and maintenance of partnerships. Secondly, from an ethical perspective, stakeholder involvement can be seen to enhance the decision-making process during the implementation of projects and policy development. Furthermore, stakeholder involvement can be seen from the perspective of social learning as an opportunity to generate a social process, in which the different stakeholders develop a shared vision, objectives and learn about each other's opinions and values. However, there is limited research on combining all the three perspectives although in the context of sustainability assessment it has been shown that sustainable outcomes of urban logistics projects are closely linked with the success of the stakeholder involvement.
Thus, this research idea aims to develop an approach to assess stakeholder involvement as part of sustainability assessment considering the three perspectives on stakeholder involvement and discusses its integration into urban transport policy and planning in order to provide further information regarding sustainability implications of key decisions made in urban freight initiatives.

Field of Research
Commercial Transport

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Smart Cities
Matchmaking Part I

Prof. Dr. Edwin Kamau

Autonomous driving is one of the most promising new technologies in mobility. It not only offers the chance of safer and more environmentally friendly cities as well as more efficient road traffic, but can also enable better participation in mobile life. My research work is centered around the fields of sensor data fusion, communication and intelligent algorithms.

Field of Research
Automated and autonomous driving

Topics of Interests
Sensors (LIDAR, Cameras, Radar, etc.), Sensor fusion, AI, Computer Vision Algorithms

I am looking for …
Partners, Cooperation

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Smart Cities
Matchmaking Part I

Asst. Prof. Hongyu Zhou

My research focuses on smart and energy-efficient building systems and built environment, with an emphasis on using innovative materials, designs, and cyber-physical technologies to improve the life-cycle performance of buildings and infrastructures.

Field of Research
Decarbonatization, energy efficient and smart cities

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Smart Cities
Matchmaking Part I

M.Sc. Florian Rupp

Artificial intelligence (AI) promises to improve citizens' lives in smart city contexts. However, previous research has shown that AI-based systems are prone to making unfair decisions and exacerbating social inequalities. To learn about the emergence and mitigation of such effects, project CAIUS (Consequences of Artificial Intelligence for Urban Societies) investigates how AI-based systems interact with the social environment in which they are placed. Our research combines expertise from computer science, information science, and social sciences, and develops approaches and models that are generalizable, but also applicable to concrete urban contexts. We present a refined agent-based model that simulates citizens' behavior in urban car traffic as a use case. We show the basic structure of our simulation and examine the effects of AI-driven pricing strategies on a variety of urban policy goals, such as traffic flow or equal accessibility to the city. Moreover, we present a data catalog on open government data in Germany that can be used for current and future projects such as creating innovative smart city applications.
We are Kai Eckert, professor at Stuttgart Media University and Florian Rupp, PhD Student. As computer scientists we contribute expertise in the fields of AI and data management to the CAIUS project. Our research focus is the investigation of AI application and its proceedings with a focus towards smart city environments. To do so, simulations are one of our core methodical approaches. This Matchmaking Event is a great opportunity to get in touch with international researchers. In favor we are mostly interested in smart city domain experts and the exchange about use cases of AI in that field of expertise. According to this, actual data samples for academic research are very interesting for our work as well. Furthermore, another point is to share thoughts on ethical problems coming along with the usage of AI such as reinforced social inequalities.

Field of Research
Artificial Intelligence & Smart Cities

Topics of Interests
Data Science
Artificial Intelligence
Smart Cities
Simulations

I am looking for …
Smart city domain experts
Smart city data
AI in smart city environments

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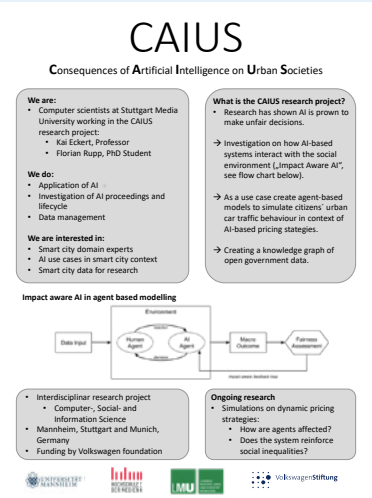

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Smart Cities
Matchmaking Part I

Prof. Dr. Anne Stockem Novo

Automated vehicles are capable of driving on highways and rural roads without major issues. We are at the transition to level 3, where the human driver can take eyes off traffic for up to 10 seconds. In cases where the driver is required to take back control, this time gap has to be managed by the system.
Deep learning models can predict the traffic evolution for a couple of seconds and thus support safety and comfort of level 3 automated vehicles. However, there are several aspects to be clarified for such systems. Most important is a safety concept which is currently a topic of research. The training data turns out to be the central part, in accordance with a data-centric approach. Furthermore, it is still not clear how and to what extent simulation data can support the verification and validation process.

Field of Research
Automated Driving

Topics of Interests
Deep Learning
Trajectory prediction
Intention recognition
Decision making

I am looking for …
Collaboration

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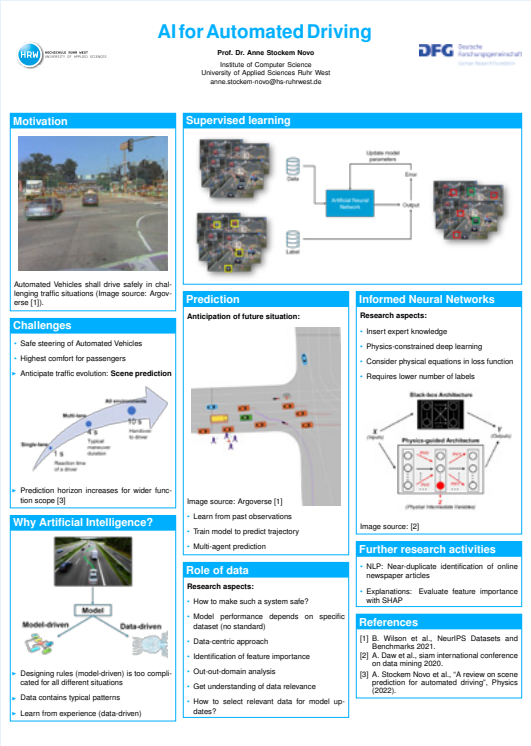

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Smart Cities
Matchmaking Part I

M.Sc. Christian Danowski-Buhren

Municipal spatial planning processes often face challenges regarding the preparation inspection and analysis of spatio-temporal geodata. During a german four-year-funded BMBF-project (2017-2021), the monitoring platform KomMonitor was developed by Bochum University of Applied Sciences and partners Bochum University and the departments of geodesy of the german cities Essen and Mülheim an der Ruhr. As a web based spatial decision support system for smart city administrations it offers dedicated tools for data integration, -presentation and cross-sectional data analysis. Aiming to support city development, the main focus of KomMonitor makes use of geospatial and statistical display of multispatial and multitemporal indicator data. Utilizing common GIS-techniques the platform also enables users to view and analyse arbitrary additional geodata. E.g. for planning purposes reachability analysis can be conducted for variable points of interest based on OpenStreetMap network data.
Implemented as a modular spatial data infrastructure the platform offers interfaces to enable appropriate integration into existing municipal data infrastructures. The software is Open Source and its components are offered for free usage via GitHub and DockerHub. After project completion in 2021 KomMonitor keeps growing as several other cities in the german federal state of North Rhine-Westphalia start to utilize the platform. The Bochum University of Applied Sciences continues the development and support of KomMonitor.

Field of Research
geoinformatics

Topics of Interests
geodesy, geoinformatics, software development, web programming, education, spatio-temporal geodata analysis, GIS

I am looking for …
Collaboration

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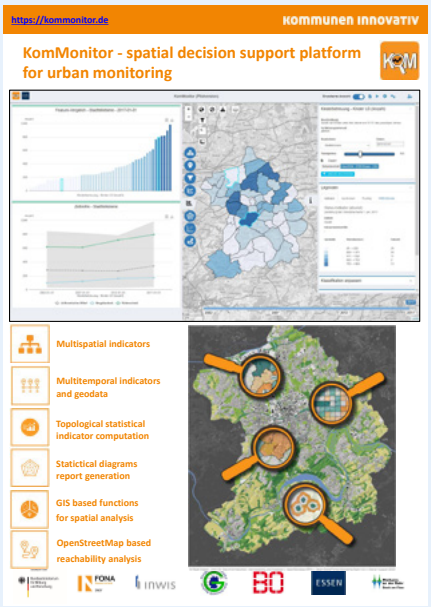

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Smart Cities
Matchmaking Part I

Prof. Patrick Planing

Our research focus is the human perspective on innovation: how users want to and are able to interact with the technology of our future. We use a human-centered research approach for new technologies and innovations of all kinds, from new transport solutions, such as air taxis, to new applications of artificial intelligence, such as digital assistants.

Field of Research
Consumer Psychology

Topics of Interests
Intersection of new technology and consumer psychology

I am looking for …
Research on new technologies, especially technologies which aim for widespread adoption in the population and at the same time require a change in habits and routines of users. Taking over sub-workpackages on user acceptance and related fields. Our goal is to help make the technology of our future more humane – incorporating human needs and desires from the earliest point possible into the technological development and commercialization plan of innovations. We believe that any new idea and technology should ultimately serve us – the humans. Therefore, our primary research focus is to develop an understanding of the conscious and unconscious reasons potential user have for accepting or rejecting a new technology.

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Smart Cities
Matchmaking Part I

Prof. Raymond Fu

Dr. Y. Raymond Fu is widely-renowned AI expert, Professor, and a successful serial entrepreneur. He received the Ph.D. degree in Electrical and Computer Engineering from the University of Illinois at Urbana-Champaign. He is Professor affiliated with both College of Engineering and the Khoury College of Computer Sciences at Northeastern University. He has authored more than 450 scientific publications as well as over 30 patented inventions. He received 7 Prestigious Young Investigator Awards from NAE, ONR, ARO, IEEE, INNS, UIUC, Grainger Foundation; 12 Best Paper Awards from IEEE, ACM, IAPR, SPIE, SIAM; many major Industrial Awards from Google, Amazon, Samsung, Adobe, JPMorgan Chase, NEC, Snap, Cisco, MERL, PicsArt, Konica Minolta, Zebra, and Mathworks, etc. He is fellow of IEEE, IAPR, OSA, SPIE, and AAIA; a Lifetime Distinguished Member of ACM, Lifetime Member of AAAI and Institute of Mathematical Statistics, member of ACM Future of Computing Academy, Global Young Academy, AAAS, and INNS.

Successful in entrepreneurship, he was the Founder and CEO of AI startup Giaran acquired by the prestigious global cosmetic firm Shiseido (Stock 4911: Tokyo) in 2017, which applies his AI based augmented reality technology to benefit Shiseido's global thousands-of-million e-commerce market. It was the first M&A of such AI based digital cosmetics in the global cosmetics and beauty market. He was also the co-founder, board member, CTO and later Chief Scientist of TVision Insights since 2015, a big data company inventing novel computer vision technology to measure second-by-second, eyes-on-screen Attention to TV and CTV content and ads. Tvision raised in total $40million fund after series B and was the winner of the Advertising Research Foundation's Innovation A-List, Microsoft Innovative Award, Mass Challenge 2015 Gold Award, MIT Innovation Initiative, $100K MIT Entrepreneurship Competition, MIT Enterprise Forum, and First prize of NECINA NEW Accelerator 2015.

Field of Research
Artificial Intelligence, Computer Vision, Machine Learning

I am looking for …
Collaborations

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Smart Cities
Matchmaking Part II

Matchmaking Part II

Smart Cities
Matchmaking Part II

Prof. Dr. Hossein Arefi

In this research idea, we aim at analyzing the 2D and 3D geometric and radiometric changes of urban structures based on the Sentinel-2 satellite data. To this end, an integrated super-resolution and depth prediction DL network is proposed which inputs Sentinel-2 images and outputs optical images and elevation data with a higher spatial resolution. Time-series analysis of these two products allows us to monitor the magnitude and direction of urban sprawl over time and generate relevant maps. We believe that learning the super-resolution and 3D modeling parameters jointly has advantage over treating each of these tasks separately.

Field of Research
Geoinformatics and Remote Sensing

Topics of Interests
Main topic: Urban sprawl and population monitoring using super-resolution satellite imagery based on machine learning algorithms

Other interested topics:
- The impacts of urban patterns on urban heat islands (UHI)

I am looking for …
I am looking for a research partner from complementary and interdisciplinary research fields such as urban planning, environmental science, and computer science.

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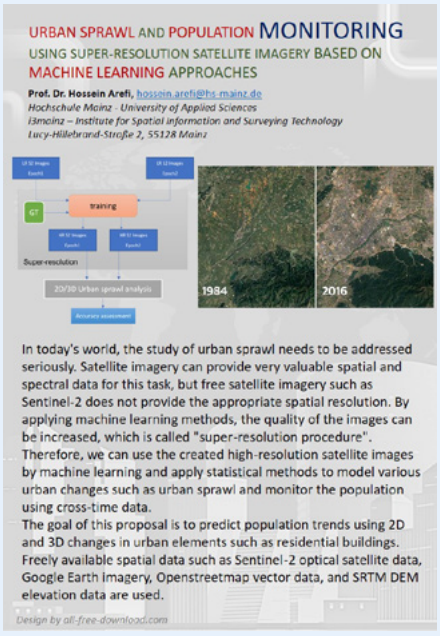

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Smart Cities
Matchmaking Part II

Alisa Lorenz

„Digitalization improves our everyday lives and contributes to economy and society with data-driven solutions that can be applied to e.g., energy transformation, sustainable mobility, or health care. With smart cities evolving, the living environment of citizens go through a digital transformation process. Simultaneously, environmental, and social challenges like climate change raise awareness of municipalities to take responsibility and ensure a livable future.
The German city Wetzlar in central Hesse is currently facing such a transformation process with the VLUID project as one central driver that focuses on the development of intelligent applications for data-driven traffic management. In terms of this project several data sources will be integrated into one digital platform to make predictions through analytics and suggest transportation alternatives.
Since the project is aimed to mitigate the negative effects resulting from major construction sites that the city will face soon, the acceptance of the applications we plan to build is of highest importance. Only with usage and adoption that result in changed behavior, e.g., by using public transport instead of a car, the project will accomplish its goal to improve the traffic situation. Therefore, my research focuses on ways to integrate citizens in three main stages of the project: the selection of data-driven applications, the rollout and communication of the applications and the evaluation of the applications and their success. The question of my research during my PhD studies is: how can we integrate citizens into the project phases of developing data-driven applications in the context of a smart city in order to achieve high acceptance and system success? Building on research on smart cities, technology acceptance and citizen science approaches, I want to explore how citizens can contribute to a project's success and whether their involvement has a positive impact on the acceptance.

Field of Research
Smart Cities, Smart Mobility and Citizen Science

Topics of Interests
Smart City, Smart Mobility, Citizen Science, Intelligent traffic management, sustainabiity, Technology acceptance, behavioral science

I am looking for …
New contacts, feedback for my research field and plan, inspiration for further research

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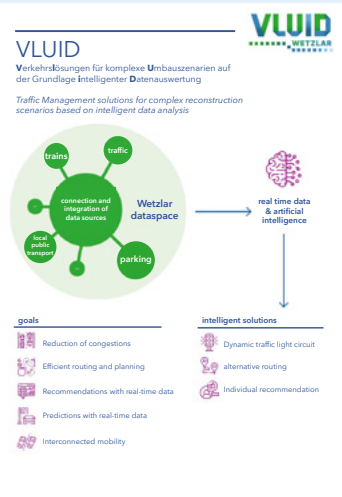

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Smart Cities
Matchmaking Part II

Prof. Dr. Thomas Clemen

The research focus of the MARS Group http://www.mars-group.org/ is mainly on very large-scale agent-based simulation models utilized in a wide variety of domains, e.g., smart cities, epidemiology, public health, national security, environmental management, and others. In most cases, the models incorporate humans as agents. In these projects, we aim to understand the cognitive and decision-making process of the humans involved, transferring this into their AI-based representatives ("agents").
One advantage of agent-based systems is the autonomy of the software agents, which allows them to interact with other agents and their collaborative environment. In MARS, the environment usually comprises various layers of spatial and temporal information, similar to the layer concept in GIS. Ideally, perception, communication, and interaction lead to self-organization and emergent behavior, like a flock of starlings creating beautiful geometric patterns under migration. Multi-agent systems can also be utilized to build so-called Digital Twins, where physical/biological entities are tightly coupled with their virtual counterparts.

Field of Research
Artificial Intelligence

Topics of Interests
- multi-agent modeling & simulation in various domains, e.g., smart cities, climate change mitigation, epidemiology
- geoinformatics, e.g., earth observation
- human behavior modeling
- cooperative AI
- Digital Twins & Digital Patients

I am looking for …
… project partners
… extending my professional network

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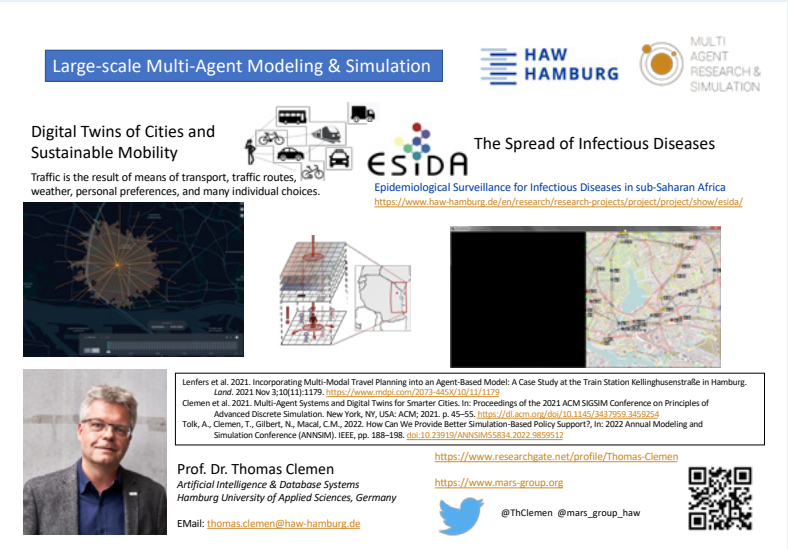

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Smart Cities
Matchmaking Part II

Asst. Prof. Chang Soowon

My research focus is revolving around designing, constructing, and managing sustainable and resilient built environments by considering infrastructure networks, humans, and society. My research is grounded in three areas 1) connections between buildings and other infrastructure networks for resilient urban environments, 2) transformations of building and infrastructure planning and design for energy security and efficiency as well as human comfort, and 3) applications of technological advancements for process innovations and economic benefits.

Field of Research
Smart and Connected Communities, Building Energy, Energy Infrastructure Transitions, PV+EV

Topics of Interests
Smart and Connected Communities, Building Energy, Energy Infrastructure Transitions, PV+EV

I am looking for …
Funding opportunities & collaborators

CONTACT
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Smart Cities
Matchmaking Part II

Prof. Dr. Olaf Schroth

My research is on the use of geodata and sensors 1) to contribute to the maintenance of green infrastructure in cities and 2) on the application of „smart" technologies in the region („smart region") and settlements in rural areas. Green infrastructure is still neglected in most smart cities and their digital representation („digital twin") although the potential is large because green infrastructure can fulfill multiple functions in terms of recreation, biodiversity, stormwater management, etc. Sensors can be used to monitor the condition of vegetation in open spaces, to adopt to diverse uses of spaces, to increase the effeciency of irrigation systems, to control lighting in open spaces, etc.

In another area of research, addressing the transformation of the energy sector, I am using geodata-based landscape visualization to illustrate renewable energy scenarios in the landscape and research people´s preferences on how renewable energies are integrated in the landscape. The research is also contributing to the explanation of social acceptability of different renewable energy scenarios.

Field of Research
IT in landscape architecture and planning

Topics of Interests
Smart Regions
Sensor-based solutions for green infrastructure in smart cities
Landscape and visual impact assessment and social acceptability of renewable energies
Geodesign
Participatory and online GIS
Landscape visualisation and the impact of climate change adaption and mitigation on the landscape scale

I am looking for …
Existing consortiums and potential partners for new funding proposals

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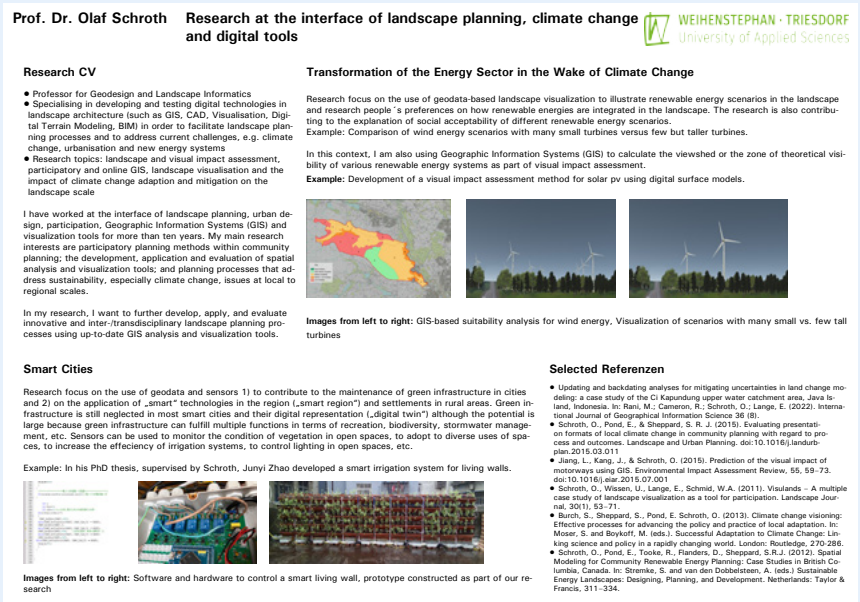

Prof. Dr. Olaf Schroth — **Research at the interface of landscape planning, climate change and digital tools** — WEIHENSTEPHAN · TRIESDORF University of Applied Sciences

Research CV

- Professor for Geodesign and Landscape Informatics
- Specialising in developing and testing digital technologies in landscape architecture (such as GIS, CAD, Visualisation, Digital Terrain Modeling, BIM) in order to facilitate landscape planning processes and to address current challenges, e.g. climate change, urbanisation and new energy systems
- Research topics: landscape and visual impact assessment, participatory and online GIS, landscape visualisation and the impact of climate change adaption and mitigation on the landscape scale

I have worked at the interface of landscape planning, urban design, participation, Geographic Information Systems (GIS) and visualization tools for more than ten years. My main research interests are participatory planning methods within community planning; the development, application and evaluation of spatial analysis and visualization tools; and planning processes that address sustainability, especially climate change, issues at local to regional scales.

In my research, I want to further develop, apply, and evaluate innovative and inter-/transdisciplinary landscape planning processes using up-to-date GIS analysis and visualization tools.

Transformation of the Energy Sector in the Wake of Climate Change

Research focus on the use of geodata-based landscape visualization to illustrate renewable energy scenarios in the landscape and research people´s preferences on how renewable energies are integrated in the landscape. The research is also contributing to the explanation of social acceptability of different renewable energy scenarios.
Example: Comparison of wind energy scenarios with many small turbines versus few but taller turbines.

In this context, I am also using Geographic Information Systems (GIS) to calculate the viewshed or the zone of theoretical visibility of various renewable energy systems as part of visual impact assessment.
Example: Development of a visual impact assessment method for solar pv using digital surface models.

Images from left to right: GIS-based suitability analysis for wind energy, Visualization of scenarios with many small vs. few tall turbines

Smart Cities

Research focus on the use of geodata and sensors 1) to contribute to the maintenance of green infrastructure in cities and 2) on the application of „smart" technologies in the region („smart region") and settlements in rural areas. Green infrastructure is still neglected in most smart cities and their digital representation („digital twin") although the potential is large because green infrastructure can fulfill multiple functions in terms of recreation, biodiversity, stormwater management, etc. Sensors can be used to monitor the condition of vegetation in open spaces, to adopt to diverse uses of spaces, to increase the effeciency of irrigation systems, to control lighting in open spaces, etc.

Example: In his PhD thesis, supervised by Schroth, Junyi Zhao developed a smart irrigation system for living walls.

Images from left to right: Software and hardware to control a smart living wall, prototype constructed as part of our research

Selected Referenzen

- Updating and backdating analyses for mitigating uncertainties in land change modeling: a case study of the Ci Kapundung upper water catchment area, Java Island, Indonesia. In: Rani, M.; Cameron, R.; Schroth, O.; Lange, E. (2022). International Journal of Geographical Information Science 36 (8).
- Schroth, O., Pond, E., & Sheppard, S. R. J. (2015). Evaluating presentation formats of local climate change in community planning with regard to process and outcomes. Landscape and Urban Planning. doi:10.1016/j.landurbplan.2015.03.011
- Jiang, L., Kang, J., & Schroth, O. (2015). Prediction of the visual impact of motorways using GIS. Environmental Impact Assessment Review, 55, 59–73. doi:10.1016/j.eiar.2015.07.001
- Schroth, O., Wissen, U., Lange, E., Schmid, W.A. (2011). Visulands – A multiple case study of landscape visualization as a tool for participation. Landscape Journal, 30(1), 53–71.
- Burch, S., Sheppard, S., Pond, E. Schroth, O. (2013). Climate change visioning: Effective processes for advancing the policy and practice of local adaptation. In: Moser, S. and Boykoff, M. (eds.). Successful Adaptation to Climate Change: Linking science and policy in a rapidly changing world. London: Routledge, 270-286.
- Schroth, O., Pond, E., Tooke, R., Flanders, D., Sheppard, S.R.J. (2012). Spatial Modeling for Community Renewable Energy Planning: Case Studies in British Columbia, Canada. In: Stremke, S. and van den Dobbelsteen, A. (eds.) Sustainable Energy Landscapes: Designing, Planning, and Development. Netherlands: Taylor & Francis, 311–334.

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Smart Cities
Matchmaking Part II

Frank Edenharter

The Technology Campus Grafenau (TCG) is a research institution of the Deggendorf Institue of Technology (DIT) and bundles the know-how of DIT in the four interdisciplinary research fields „Smart Region", „Business Data Analytics and Optimization", „Applied Artificial Intelligence" and „Artificial Intelligence for Context & Activity Recognition". The research fields are aligned to the major challenges of our time: digitalization in industry and society, urbanization, sustainability.
The researchers of "Smart Region" develop strategies and solutions for rural areas . Intelligent – innovative – integrative – digitally networked. The aim is to make best possible use of the opportunities offered by digitization to meet everyday challenges of life in rural areas across all generations and for all sections of the population.

Our spectrum includes sustainable optimization analytics and digital solutions for practical applications. Our strength lies in analysis, design and development of everyday helpers. Our interdisciplinary team develops customized concepts in close cooperation with the population, local authorities and companies.
Regional sustainability is achieved through the development of joint, long-term research projects. Cost reduction, efficiency increase, service improvement and the formation of regional networks are the tools of modern and attractive rural areas of the future.
Our services reflect the current state of research. We are objective, neutral and not fixed on a specific solution. Experts from various fields work together and develop cross-sectional solutions.

Field of Research
Smart City & Smart Region

Topics of Interests
Smart City, rural development, sustainability, digitization

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Smart Cities
Matchmaking Part II

Prof. Dr.-Ing. Heiko Thimm

My research focuses on smart IT-based solutions that help business organizations to meet sustainability goals and to comply with environmental legislation. In particular, I am developing concepts for innovative AI-based assistance systems that support corporate environmental decision making through smart assessments and deep data analyses. Corresponding prototypes are built in order to evaluate the concepts and obtain ideas for improvements through feedback from practitioners. I also devote some part of my time to explorative studies to investigate corporate environmental disclosure. Currently, we are preparing a Greenwashing study with a sample of more than 5000 of the largest manufacturing companies of the world. The websites of the companies will be scraped through a home grown software tool.

Field of Research
Sustainable Computing, Environmental Informatics, Smart Assistance Systems

Topics of Interests
IT Use for Corporate Environmental Compliance Management
Smart Assistance Systems for Corporate Environmental Management
NLP/NLU-Processing of Environmental Legislation
Automated Measurement of Greenwashing

I am looking for …
All kinds of researcher groups with common research interests that are open for collaboration at all levels.

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Smart Cities
Matchmaking Part II

Prof. Dr. Björn Machalett

Björn Machalett conducts research on soils and sediments as archives of landscape and climate development and on the landscape-scale observation of abiotic resources. The focus is on past/historical and current climate dynamics in landscapes, the influence of landscape change on soil and geo-ecosystems and the scientific analysis of cultural landscape changes. One methodological focus is on high-resolution particle size analysis as a tool for interdisciplinary research in geosciences, soil science, climatology and landscape ecology. To this end, Björn Machalett has been establishing the Thuringian Centre for Sustainable Soil and Land Use with a focus on particle size analysis and soil physics at the University of Applied Sciences Erfurt since 2020, supported by third-party funding from the Federal Ministry of Education and Research of approximately €700 ka. The laboratory combines unique instrumental equipment for the investigation of particle sizes, material properties and for the characterization of ecological dynamics in landscapes.

Field of Research
Geosciences, Sustainability & Conservation of the Abiotic Environment

Topics of Interests
Soil development and vegetation in agricultural and forest ecosystems, as well as in urban ecosystems,

Knowledge and technology transfer from application-oriented basic research to agricultural and forest soil science and geotechnical practice,

Further development, refinement and standardization of soil physics methodology and applications,

Sustainable landscapes, Urban climates, Research Biosphere reserves

I am looking for …
Project partners for future cooperation in research and education

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Smart Cities
Matchmaking Part II

Prof. Liu Jinfeng

Water is essential for our everyday life and we are facing a water crisis now due to climate change and population growth. Agricultural activities (mainly irrigation) consume about 70% of all the freshwater withdrawals globally and the water-use efficiency in irrigation is about 50-60%. It is clear that one critical step in addressing the water crisis is to improve the water-use efficiency in irrigation. Center pivot irrigation systems are the mostly used irrigation system for large-scale agricultural fields. A close exam of the current irrigation practice shows that the current irrigation is essentially in open-loop, in which the actual field conditions are not actually used in the irrigation decision making. Closed-loop irrigation is the way to improve the current irrigation practice. In our work, we have developed a way to construct the soil water distribution maps based on state and parameter estimation. How to use the soil water distribution maps to make optimal irrigation decision is the challenge to address. We hope that we can team up with researchers that are good at model approximation, decision making for very complex systems to address this issue.

Field of Research
Sustainable agriculture

Topics of Interests
Irrigation decision making

I am looking for ...
Researchers that are good at model reduction and decision making for very complex processes

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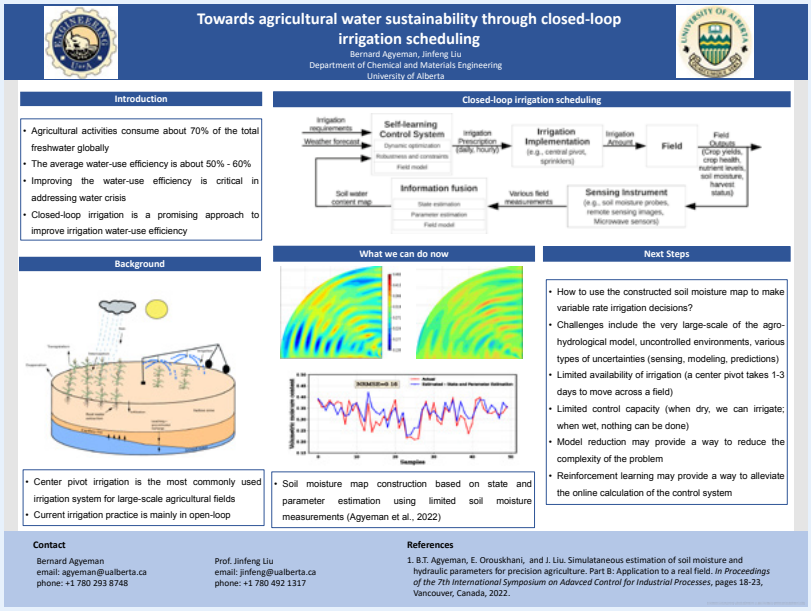

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Smart Cities
Matchmaking Part II

Myriam Guedey

Field of Research
Smart Public Buildings, Internet of Things, Smart Cities

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Smart Cities
Matchmaking Part II

Prof. Dr.-Ing. Michael Buehler

How does a city feel?
Join the Sensing City Konstanz workshop and win an interdisciplinary competition in the winter semester.

Scientists and students of the HTWG Konstanz are starting a special project in the winter semester. Together with municipal offices, businesses and interested citizens, data will be collected from various sources and with the help of so-called Smart Citizen Kits, digital sensors that provide information about environmental factors such as fine dust, toxic gases and noise. The aim is to find out how the quality of life in the city can be studied and improved.
It had already become apparent during the Long Night of Science that there is great interest among citizens in improving the quality of life in Constance. This could be done with the help of sensor technology and remote sensing, with appropriate devices that are easy to operate. It was also suggested that a public event be offered to gather initial practical experience with the Smart Citizen Kits, which are to be set up and installed throughout the city of Constance, and to deal with the topic in a practical way overall.
Therefore, Professor Michael Bühler, other HTWG professors and external experts in the field want to offer a kick-off event on the topic in October. The longer-term goal is to go beyond the format of a lecture ""and give HTWG students the opportunity to experiment with smart city sensor technology and gain practical experience together with Constance citizens, municipal employees and experts from various disciplines as part of a Citizen Science Workshop," " says Professor Bühler. The whole approach is also understood under the term ""Citizen Science"" and defined as scientific work by citizens, often in cooperation with or under the guidance of professional scientists and scientific institutions.
With this in mind, the first step will be to launch the interdisciplinary and digital workshop ""Sensing City Konstanz"" at HTWG in October in cooperation with the city of Konstanz, Konstanz citizens and experts from science and industry. By the beginning of January 2023, the best interdisciplinary teams will be assessed and awarded prizes by a jury of experts. Further information can be found at https://coklimax.net/ and https://www.htwg-konstanz.de/de/hochschule/personen/michael-buehler/projekte-forschung/. Applications can be submitted immediately by email to mbuehler@htwg-konstanz.de.

Field of Research
Digital Construction; Construction Business Administration; Climate Resilience

Topics of Interests
Smart Green Cities; Federated Digital Platforms in Infrastructure and Construction; Remote sensing for urban planning and development; citizen science programs

I am looking for …
Partners in Western Canada with similar interests and similar mindset

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Smart Cities
Matchmaking Part II

Rushikesh Padsala

We focus on applied research in the use of geospatial technologies to study the effect of climate change and urbanization on the existing and future urban built environment. Our particular interest is in the modeling, simulation, and visualization of urban digital twins using Open Geospatial Standards (OGC) for urban energy simulation, zero carbon cities, food-water-energy nexus approach for sustainable urban development, digital public participation, and AR/VR.

Field of Research
GeoInformatics, Urban Digital Twins, Urban Informatics, Urban Energy Simulation, Smart and Sustainable Cities

Topics of Interests
3D City Modelling, Urban Digital Twins, Urban Energy Simulation, Food-Water-Energy Nexus, Zero Carbon Cities, Ar/VR, Digital Public Participation

I am looking for …
Expanding network, meeting other researchers sharing similar research interest, and looking for potential project partners for future cooperation

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

16:30 h – 18:00 h CEST

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Matchmaking Part II

18:15 h – 19:45 h CEST

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Matchmaking Part I

Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Dr. Katharina Gapp-Schmeling

The heat transition is one of the central topics of future climate-neutral energy production and supply in Germany as well as in Europe. While renewable electricity already accounts for the largest share of German electricity generation at over 40 percent, the renewable share in heat supply has stagnated at a consistently low level of about 15 percent since 2010. With a comprehensive implementation of innovative, sustainable, municipal heat supply solutions and the associated investments in the necessary heat generation and heating infrastructures, significant, previously unimplemented CO2 reduction potential and flexibility capacities necessary for sector coupling can be developed.

The research project KoWa - ‚Heat transition in municipal energy supply' aims to support municipal utilities in the development of sustainable heat supply systems. For this purpose, different heat supply options were designed in six study areas and compared using a multi-criteria sustainability assessment. In order to ensure a comparable and transparent procedure, a methodology for the sustainability assessment of municipal heat supply concepts was developed and published in a method description. The Poster will present the evaluation framework and the results for a specific study area.

Field of Research

Sustainability, Transformation of the Energy Sector

Topics of Interests

- heat transition
- sustainability indicators
- stakeholder perpective in the energy transformation

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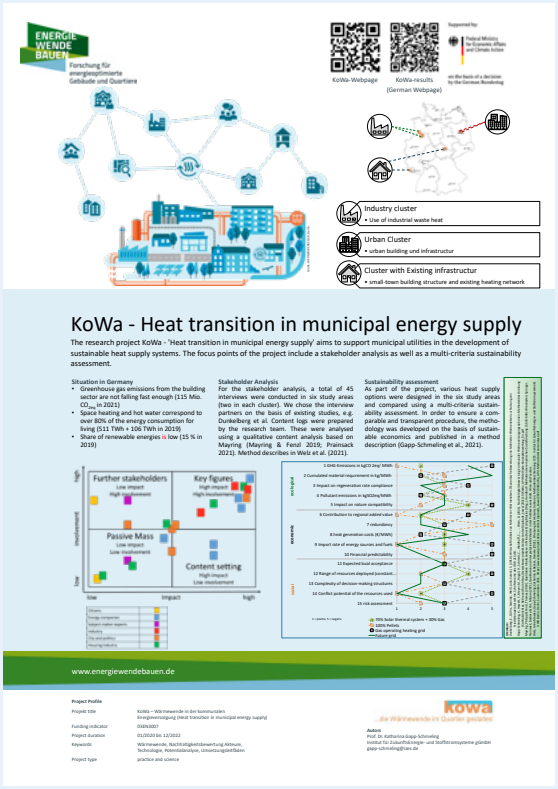

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Dr.-Ing. Andreas Hopf

Sulphur hexafluoride (SF6) is the most common insulation gas in high voltage technology. Besides the excellent insulation properties SF6 has the most known global warming potential with a long lifetime in the atmosphere of 23800 CO2-equivalent. Unfortunately, alternative insulation gases have only a fraction of the insulation level of SF6, because of this SF6 was used often in electrical applications. This is the key point of this research to investigate alternative eco-friendly insulation gases to replace SF6 in technical application which are used in high voltage technology and energy distribution e.g. switchgears, circuit breaker, instrument transformer…
Our high voltage laboratory is set up to investigate dielectric insulation gases up to 500 kVAC and 1100 kV lightning impulse in break down measurements, pre-discharge current and partial discharge (PD) and dissipation losses (tan delta) measurements up to a pressure of 1.5 MPA (15 bar 210 psi). Our special testing vessel differentiate currently from other high voltage laboratories.
In the past there were a lot of measurements done to investigate the principal techniques and there were already efforts achieved to replace successfully SF6 in GIS and GIF technology up to 420 kV. However, there are a lot of influences left to investigate. E.g. PFC gases, surface roughness, ionization, superimposed voltages, long time polarization, influence of and on different solid insulators like PVC, PET, XLPE etc.
The main focus on this investigation is based on clean air technology, nitrogen and gas mixtures.

Field of Research

high voltage, high current and high power test systems and components

Topics of Interests

high voltage, high current and high power test systems and components

I am looking for …

partners and topics for future connections and networking

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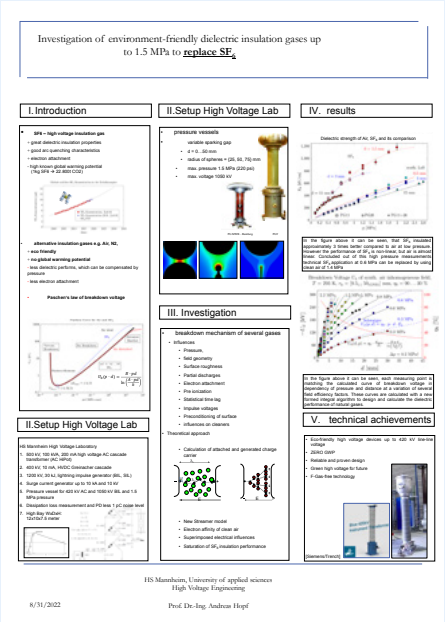

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Erik Kjeang

Engineering research on fuel cells and water electrolyzers

Field of Research

Fuel cells

Topics of Interests

Canada Research Chair in Fuel Cell Science and Technology
Development

I am looking for …

Collaborations on fuel cells and electrolyzers

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Assoc. Prof. Connie Van der Byl

Research interests focus on energy organizations and their strategic response to sustainability issues. Including: energy transition to net zero; stakeholder responses to energy challenges; the role of collaboration in achieving environmental performance; the evolution of entrepreneurial firms in sustainable industries; energy firm best practices in ESG; and the challenges, both environmental and economic, of corporate reconfiguration.

Field of Research

energy and environment; sustainability strategy

Topics of Interests

energy transition; climate change; sustainability strategy; net zero; full cycle scope 3 analysis

I am looking for …

Researchers interested in sharing insights on Canadian vs European challenges, opportunities, perspectives and approaches to energy and climate.

CONTACT

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Dr. Jan Lohbreier

Computer-based numerical simulations with coupled physical domains (e.g., thermodynamics and structural mechanics).

Field of Research

Computational Physics

Topics of Interests

Green Energy

I am looking for …

partners for research projects

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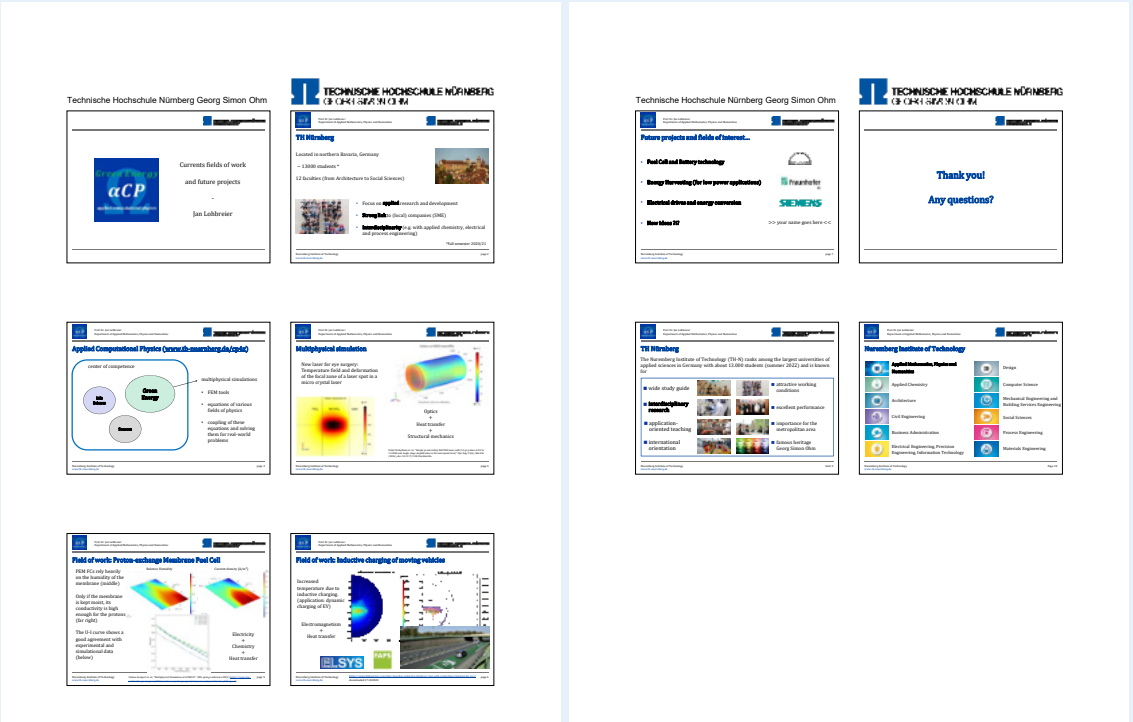

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Transformation of the Energy Sector in the wake of Climate Change
Matchmaking Part I

Dr. Christoph Gimmler
We're developing and manufacturing advanced (noble) metal-based, nanoscale catalysts for fuel cell and electrolysis applications. Using our manufacturing technique we're able to control size, shape and composition of the catalysts in order to reduce noble metal content and enhancing efficiency and durability.

Field of Research
Chemistry/Electrocatalysis

Topics of Interests
Catalysts and CCM for Fuel Cells and electrolysis

I am looking for …
partners for R&D, especially testing of materials and components

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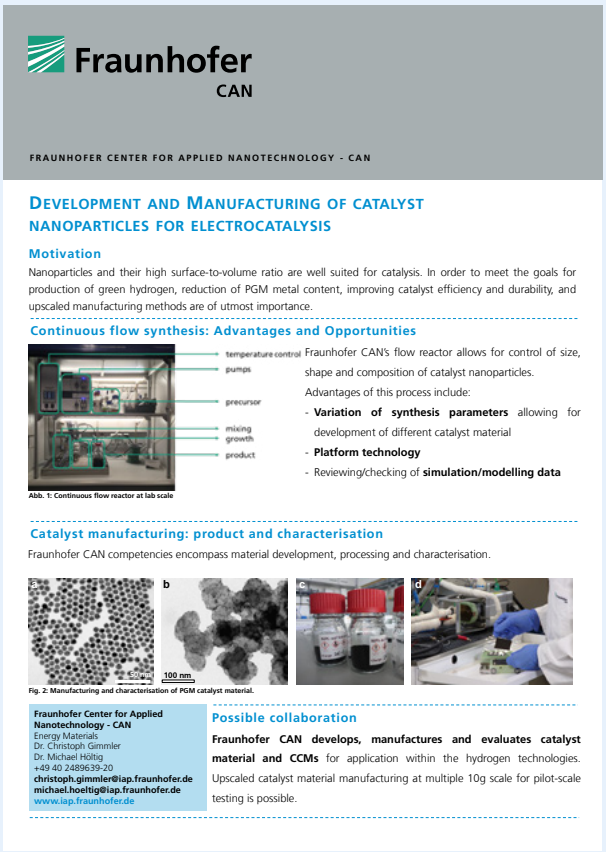

Fraunhofer CAN

FRAUNHOFER CENTER FOR APPLIED NANOTECHNOLOGY - CAN

DEVELOPMENT AND MANUFACTURING OF CATALYST NANOPARTICLES FOR ELECTROCATALYSIS

Motivation

Nanoparticles and their high surface-to-volume ratio are well suited for catalysis. In order to meet the goals for production of green hydrogen, reduction of PGM metal content, improving catalyst efficiency and durability, and upscaled manufacturing methods are of utmost importance.

Continuous flow synthesis: Advantages and Opportunities

temperature control
pumps
precursor
mixing
growth
product

Abb. 1: Continuous flow reactor at lab scale

Fraunhofer CAN's flow reactor allows for control of size, shape and composition of catalyst nanoparticles.

Advantages of this process include:

- **Variation of synthesis parameters** allowing for development of different catalyst material
- **Platform technology**
- Reviewing/checking of **simulation/modelling data**

Catalyst manufacturing: product and characterisation

Fraunhofer CAN competencies encompass material development, processing and characterisation.

a b c d

100 nm

Fig. 2: Manufacturing and characterisation of PGM catalyst material.

Fraunhofer Center for Applied Nanotechnology - CAN
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Possible collaboration

Fraunhofer CAN develops, manufactures and evaluates catalyst material and CCMs for application within the hydrogen technologies. Upscaled catalyst material manufacturing at multiple 10g scale for pilot-scale testing is possible.

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Assoc. Prof. Walter Leon-Salas

The focus of my research is optical communications. Within this focus, we are intersted identification, tracking and sensing. We use solar cells and LEDs for multiple purposes such as transmitting and receiving signals as well as for energy harvesting.

Field of Research
Microelectronics

Topics of Interests
optical communications, energy harvesting, embedded systems

I am looking for ...
animal scientists, agronomists, biomedical researchers, environmental resesarchers, oceanographers, sport researchers

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Dr. Henrik te Heesen

We developed the sector-coupled energy model (UCB-SEnMod). Its unique features are the modular structure, high flexibility, and applicability, enabling it to model any system constellation and can be easily extended with new functions due to its software design. Due to the software architecture, it is possible to map individual buildings, companies, regions, or even countries. In addition, we plan to make the energy model UCB-SEnMod available as an open-source framework to enable users to understand the functionality and configuration options more easily.

Field of Research

Renewable Energy, Simulation

Topics of Interests

Renewable Energy, Energy Model, Energy Efficiency

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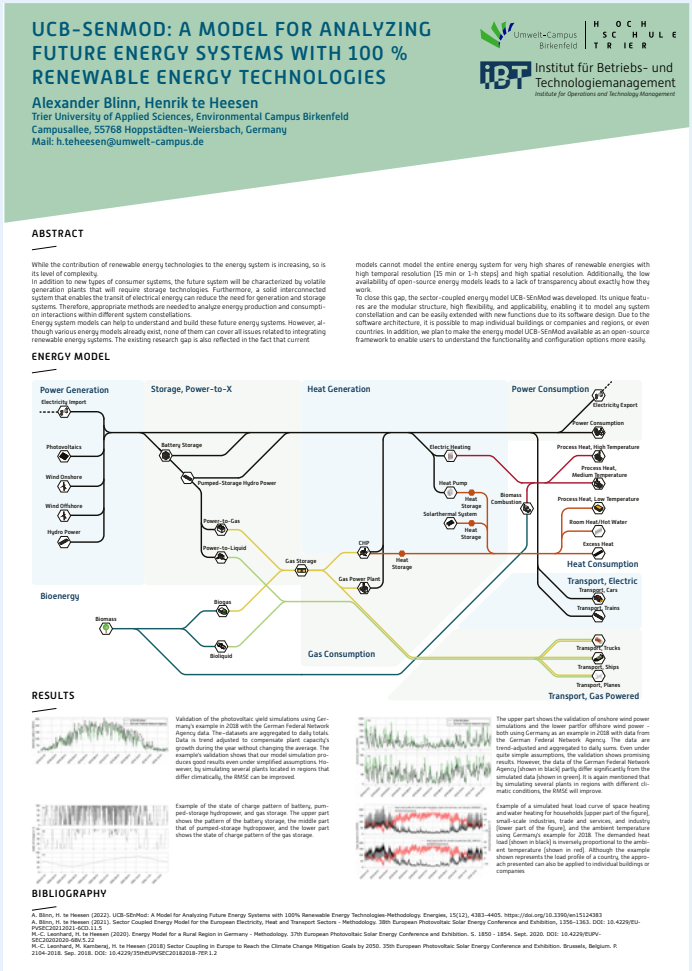

UCB-SENMOD: A MODEL FOR ANALYZING FUTURE ENERGY SYSTEMS WITH 100 % RENEWABLE ENERGY TECHNOLOGIES

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IBT Institut für Betriebs- und Technologiemanagement
Institute for Operations and Technology Management

ABSTRACT

While the contribution of renewable energy technologies to the energy system is increasing, so is its level of complexity.
In addition to new types of consumer systems, the future system will be characterized by volatile generation plants that will require storage technologies. Furthermore, a solid interconnected system that enables the transit of electrical energy can reduce the need for generation and storage systems. Therefore, appropriate methods are needed to analyze energy production and consumption interactions within different system constellations.
Energy system models can help to understand and build these future energy systems. However, although various energy models already exist, none of them can cover all issues related to integrating renewable energy systems. The existing research gap is also reflected in the fact that current models cannot model the entire energy system for very high shares of renewable energies with high temporal resolution (15 min or 1-h steps) and high spatial resolution. Additionally, the low availability of open-source energy models leads to a lack of transparency about exactly how they work.
To close this gap, the sector-coupled energy model UCB-SEnMod was developed. Its unique features are the modular structure, high flexibility, and applicability, enabling it to model any system constellation and can be easily extended with new functions due to its software design. Due to the software architecture, it is possible to map individual buildings or companies and regions, or even countries. In addition, we plan to make the energy model UCB-SEnMod available as an open-source framework to enable users to understand the functionality and configuration options more easily.

ENERGY MODEL

RESULTS

Validation of the photovoltaic yield simulations using Germany's example in 2018 with the German Federal Network Agency data. The—datasets are aggregated to daily totals. Data is trend adjusted to compensate plant capacity's growth during the year without changing the average. The example's validation shows that our model simulation produces good results even under simplified assumptions. However, by simulating several plants located in regions that differ climatically, the RMSE can be improved.

The upper part shows the validation of onshore wind power simulations and the lower partfor offshore wind power - both using Germany as an example in 2018 with data from the German Federal Network Agency. The data are trend-adjusted and aggregated to daily sums. Even under quite simple assumptions, the validation shows promising results. However, the data of the German Federal Network Agency (shown in black) partly differ significantly from the simulated data (shown in green). It is again mentioned that by simulating several plants in regions with different climatic conditions, the RMSE will improve.

Example of the state of charge pattern of battery, pumped—storage hydropower, and gas storage. The upper part shows the pattern of the battery storage, the middle part that of pumped-storage hydropower, and the lower part shows the state of charge pattern of the gas storage.

Example of a simulated heat load curve of space heating and water heating for households (upper part of the figure), small-scale industries, trade and services, and industry (lower part of the figure), and the ambient temperature using Germany's example for 2018. The demanded heat load (shown in black) is inversely proportional to the ambient temperature (shown in red). Although the example shown represents the load profile of a country, the approach presented can also be applied to individual buildings or companies

BIBLIOGRAPHY

A. Blinn, H. te Heesen (2022). UCB-SEnMod: A Model for Analyzing Future Energy Systems with 100% Renewable Energy Technologies-Methodology. Energies, 15(12), 4383–4405. https://doi.org/10.3390/en15124383
A. Blinn, H. te Heesen (2021). Sector Coupled Energy Model for the European Electricity, Heat and Transport Sectors - Methodology. 38th European Photovoltaic Solar Energy Conference and Exhibition, 1356–1363. DOI: 10.4229/EU-PVSEC20212021-6CO.11.5
A. Blinn, H. te Heesen (2020). Energy Model for a Rural Region in Germany - Methodology. 37th European Photovoltaic Solar Energy Conference and Exhibition. S. 1850 - 1854. Sept. 2020. DOI: 10.4229/EUPVSEC20202020-6BV.5.22
M.-C. Leonhard, M. Xamberaj, H. te Heesen (2018) Sector Coupling in Europe to Reach the Climate Change Mitigation Goals by 2050. 35th European Photovoltaic Solar Energy Conference and Exhibition. Brussels, Belgium. P. 2104–2018. Sep. 2018. DOI: 10.4229/35thEUPVSEC20182018-7EP.1.2

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Transformation of the Energy Sector in the wake of Climate Change
Matchmaking Part I

Prof. Dr.-Ing. Jennifer Niessner

Our team develops numerical and experimental methods for the description of multiphase flows, e.g. in porous media and indoor environments. The close connection of experimental and numerical approaches is one of the great strengths of the working group, which allows an in-house validation of modeling approaches and simulations by comparison with experimental data and, conversely, a plausibility check and understanding-based interpretation of experimental investigations. In our research, modern structural analysis methods such as µCT scans are used in the working group as well as modelling, flow simulation (Computational Fluid Dynamics - CFD), optimization methods, e.g. topology optimization using the adjoint method and experimental methods, or proper orthogonal domain decomposition (POD). These building blocks form the basis for an efficient solution to applied problems in the field of flow and transport in porous media and indoor environments and its relation to the outdoor environment.

Out team is also involved in several research projects with experimental and numerical studies of the transport and deposition of aerosol particles indoors and outdoors (lecture halls, classrooms, industrial processes, traffic) and - in cooperation with virologists - the inactivation of viruses in aerosol particles.
Current examples:
- the investigation of the effectiveness of room air filters, actual / total filtration efficiency and thermal comfort of air purifiers,
- the development of energy-efficient concepts for indoor environments
- Aerosol particle transport in public transport vehicles including optimization of ventilation
- Design and construction of test benches for aerosol filtration (fractional filtration efficiency, pressure drop), virus inactivation, and exhaled particle size distribution

Field of Research
Fluid mechanics

Topics of Interests
- single- and multi-phase flow and transport (e.g. filtration, aerosol particle transport, indoor air quality)
- computational fluid dynamics (CFD) modeling and simulation
- flow in porous media
- topology optimization
- fast approximate models for CFD, e.g. proper orthogonal domain decomposition (POD)

I am looking for …
Partners who need fluid mechanics (experimental and numerical) expertise for their applied topics in order to reduce energy needs, e.g. for reduction of pressure losses or for ensuring thermal comfort

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Assoc. Prof. Klaus Doelle

Phosphorous (P) abundance in water bodies has worldwide negative environmental affect such as eutrophication, bacterial growth, algal blooms, creation of dead zones in water bodies, and can have an overall negative economic impact on tourism.
Our developed Cavitation Phosphorous Removal from Water (CPRW) technology at a laboratory scale is able to remove up to 90% of the total P content from the inflow water. The technology can be operated in batch and/or continuous. The CPRW technology allows a high reaction rate of the phosphor contained in the water by using a Sustainable Chemical (SC) to form a precipitate product (PP). The PP together with the biomass and grid from the inflow water can be recovered and sold as a value-added product.
For the laboratory benchtop experiments, Artificial Wastewater (AWW) was manufactured using ammonium dihydrogen phosphate with a phosphorous content of 50 mg/l (50,000 ppb) at 20°C.
For the laboratory benchtop experiments at a Wastewater Treatment Plant (WWTP), pre-clarified wastewater (PCWW) was used with a TP influent level of 30 mg/l (30,000 ppb) at the time of testing.
AWW, and PCWW was then treated with the CRPW process, able to be operated in batch and/ or continuous mode, at a rate of 10 gal/ min for 4 minutes. A Sustainable Chemical (SC) was prepared prior to the experiments in a slurry form containing 80% water and 20% SC. The slurry containing the SC was added at a rate of 80 ml/min to the CPRW process. The SC slurry was continually stirred during the experiment.
The CRPW process can have a positive impact on major water chemistry parameters. The process allows for adjustment of pH and alkalinity to any outflow level, minimizes pathogenic bacteria, and generates a fertilizer product from the nitrogen, biomass, and phosphorus contained the in the inflow water.
In addition, it might be possible to precipitate metals by controlling the pH. However, further testing and funding for pilot-scale testing are needed to validate this technology.

Field of Research
State University of New York (SUNY), College of Environmental Science and Forestry (ESF)

Topics of Interests
Chemical Processes, wastewater treatment

I am looking for …
collaboration, Academic and Industry

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

M.Sc. Davood Peyrow Hedayati

Multi-Physics Modelling of Next-Generation Structural Supercapacitors (SCCs)

Lightweight construction with composites

Climate change and the economy of fossil fuels, among other factors, have necessitated a paradigm shift in the energy sector. While there has been a huge development in renewable energy generation, further development in efficient energy storage has faced technological challenges. In this sense, storing vast amounts of electrical energy combined with a rapid discharge capability over many cycles has been the aim of research community over the last decade. Nevertheless, effective weight reduction in vehicles through designing load-bearing energy storing structural components is a novel and promising concept which can inherently address two main concerns: (1) Enhancing efficiency in energy storage devices and (2) Achieving more energy-efficient transportation devices by reducing weight. In order to be able to do so, it is required to comprehend the underlying phenomena and define the determining processes and their influences. In this research, the aim is to develop models for the multi-physics involved in SCCs and analyse the coupling between various physical processes happening simultaneously. The models are then solved using FEM analysis. The results are later used to optimise the design and provide guidelines for various use-cases.

Keywords: Structural Supercapacitors, Multi-Physics Modelling, FEM Analysis

Field of Research

Structural Supercapacitors

Topics of Interests

Multi-physics Modeling, Simulation, FEM Analysis, Battery, Supercapacitor, Lightweight Structures, Carbon Composites

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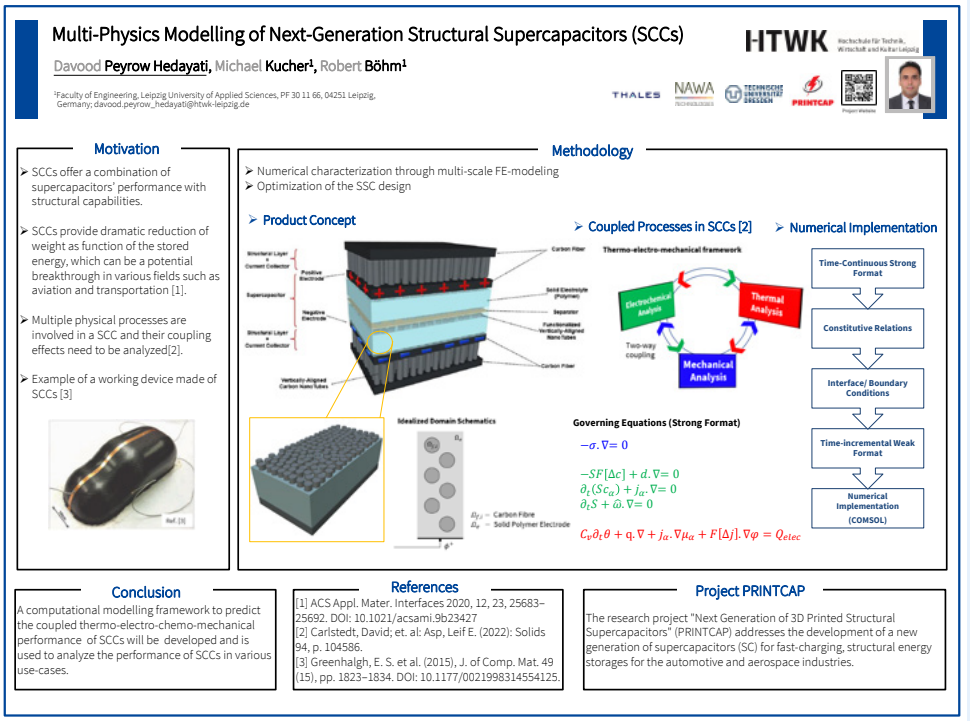

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part I

Prof. Dr.-Ing. Ralph Lindken

My research group focuses on the application of fluid mechanics to renewable energy. We investigate and optimize fluid mechanics problems of renewable energy applications experimentally and numerically at laboratory scale and -if possible- in field trail. Numerical methods are computational fluid dynamics (CFD). Experimental methods are laboratory test rigs under controlled conditions and with repeatable parameter variations. For the experimental flow investigation, we use advanced methods like Particle Image Velocimetry (PIV), spray analysis, and time resolved pressure measurements.

Field of Research
fluid mechanics

Topics of Interests
renewable energy, microfluidics

I am looking for …
cooperation partners

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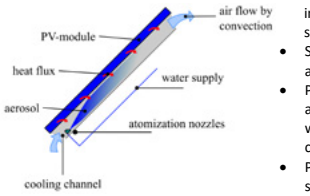
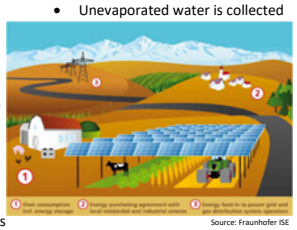
Research Field, Expertise:	Fluid mechanics
Research Interests, Methods:	Experimental fluid mechanics methods, fluid mechanics simulation, renewable energy

Agri-photovoltaics with spray cooling for combined efficiency improvement of photovoltaics (PV) and water-efficient irrigation of agricultural lands



- PV loose electrical efficiency by increased cell temperature due to solar radiation
- Sustainable cooling system is of advantage
- Proposed system is based on atomization and evaporation of water in a back-mounted cooling channel
- Previous laboratory tests have shown an efficiency gain of 10%
- Unevaporated water is collected

- PV and agriculture are land intensive
- Agri-Photovoltaics combines them on one area
  - More efficient land use
  - Advantageous for e.g. crop cultivation
- PV shades soil and reduces evaporation
- Sustainable water spray-based cooling can add positive aspects
  - Water that is needed for irrigation can increase efficiency of PV in a first run
  - Atomization and evaporation enrich the air with moisture
  - Water that is technically needed for atomization but excess for evaporation can be used for direct irrigation
- Similar positive effects for floating photovoltaics



Source: Fraunhofer ISE

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Transformation of the Energy Sector in the wake of Climate Change
Matchmaking Part II

Matchmaking Part II

Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Dr. Norbert Bernhard

Topic 1: Plasma texturing of solar silicon: For making efficient solar cells, it is necessary to reduce the reflectivity of the silicon surface a much as possible. This is achieved by a micro-roughening (texturing) of the surface and deposition of an anti-reflective coating (ARC), which also serves as a passivation layer. The industrial standard process for texturing is a wet-chemical etch process which depends on crystallographic orientation and needs a pre-roughening of the surface (as creating by sawing of the wafers from the ingot). Plasma texturing is an alternative which is independent of crystallographic orientation and works also for smooth surfaces, as they are typical for kerf-less separation technologies (to which the industry will have to move, if solar cells become much thinner; another motivation is to avoid the sawing losses). In our previous research it was shown that a reflectivity reduction better than for the wet chemical process can be reached in combination with still good charge carrier lifetimes.

Topic 2: Thermal Laser Separation (TLS). Since the Ohmic losses in a solar module are proportional to the square of the current, the trend goes towards half-cell modules (or even third-cell modules), in order to reduce these losses. The standard separation technology is „"Scribe and Break"", an ablative laser scribe with subsequent mechanical breakage. Thermal Laser Separation is an alternative which produces much smoother separation edges with lower damage and without material loss by first generating a compressive stress in the material by laser light absorption and heating, and then a tensile stress by fast aerosol cooling. The process works independent of the crystallographic orientation and also for multicrystalline material. In our previous research it was shown that the mechanical stability of TLS separated cells is superior to cells separated by the „"Scribe and Break"" process and that in principle it can be used for halving solar cells. It was also shown that in principle TLS could also be used for dicing GaAs-based triple cells on a wafer (usually Ge) for high-performance concentrator modules.

Field of Research

Technologies of Photovoltaics

Topics of Interests

My current research is on plasma texturing of solar silicon for refection reduction of solar cells (as an alternative to wet chemical texturing; the advantage is that it works indedendent of crystallographic orientation and also for smooth surfaces).

A second topic is Thermal Laser Separation (TLS) for halving solar cells for making half-cell modules to reduce Ohmic losses. TLS is a non-ablative separation technology completely free of material loss, the cleavage is just created by internal tensile stress (by laser heating and subsequent fast cooling).

I am looking for …

Cooperation in one of the above topics, but I am also open for new research topics.

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Transformation of the Energy Sector in the wake of Climate Change
Matchmaking Part II

Asst. Prof. Wenbo Zheng

My research program aims to develop and improve our ability to extract geo-resources effectively and mitigate induced geohazards by integrating rock/soil/fluid mechanics. To advance these long-term objectives, our short-term research goals focus on applying experimental techniques to characterize geomaterials and developing numerical models to predict their hydraulic and mechanical behaviours accurately. Following this principle, we have examined geotechnical/geomechanics issues including sand crushing in hydraulic fractures, slope instability/landslides, and tunnelling, among other research topics.

Field of Research
Geotechnical Engineering/Geomechanics

Topics of Interests
Shale gas, hydraulic fracturing, geothermal, landslides/slope stability

I am looking for …
Extending the research network and potential research collaborations

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Simon Foo

High efficiency multijunction III-V compound solar cells, organic/polymer solar cells, graphene anodes for lithium ion batteries, machine learning for energy applications

Field of Research

Photovoltaics, Solar energy harvesting, energy storage, lithium ion batteries, machine learning

Topics of Interests

Photovoltaics, Solar energy harvesting, energy storage, lithium ion batteries, machine learning, renewable energy

I am looking for …

collaborations on renewable energy and energy storage

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Dr. Michael Eley

Due to rising energy prices and newer requirements from demand side management, energy criteria also must be considered during production planning. However, today in many industrial companies, production planning is often carried out in a way that only production criteria (e.g. throughput times, capacity utilization, delivery reliability, setup cost) are taken into account.
The aim of a potential project would be the systematic identification and evaluation of the flexibility of production systems and the optimization of the energy consumption while adhering to production key figures. From the energy side, for example, peak load reduction or revenue maximization when participating in demand side management could be pursued.
As part of a project, solution algorithms are to be developed, implemented and tested for selected industrial partners. Methods of combinatorial optimization, AI and simulation are to be used.

Field of Research
Logistics, operations management with respect to energy consumption

Topics of Interests
identification of energy flexibility in manufacturing company

I am looking for …
academic partners preferably with contacts to industrial companies or logistics companies

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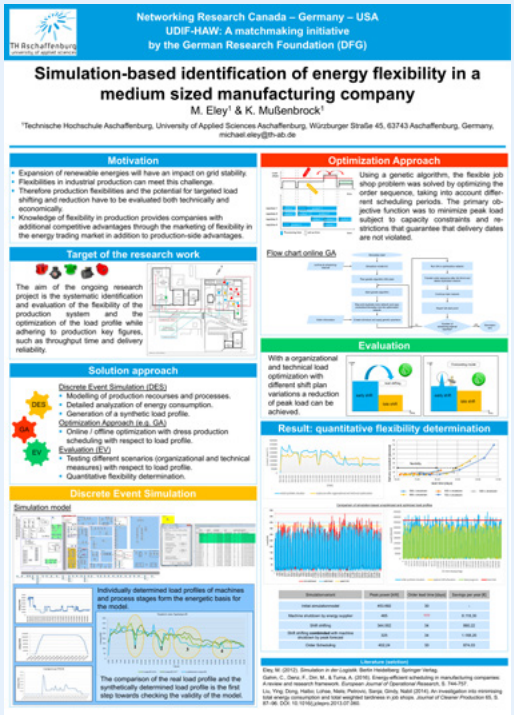

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Dr. Andreas Bartelt

Our interests are metal-halide perovskite solar cells and their material development for stable and efficient energy conversion devices. We develop, use and correlate spectroscopic, microscopic and electrical material analysis methods for in-situ characterization. In combination with controlled in-situ stress test environments (humidity, oxygen, heat, light, voltage, mechanical strain) the material and device stabilities are tested in-situ and in-operando.

We develop and operate photoluminescence microscopes with time-resolved and multi-/hyperspectral functionality. Photocurrent mapping and micro-Raman are planned to assist in-situ characterizations. Ex-situ and a-posteriori measurements including SEM, XRF, AFM etc. are also possible. Stress-test sample chambers for in-situ experiments are designed and developed for specific applications.

Field of Research

Perovskite photovoltaics, spectro-microscopy on thin-film optoelectronics

Topics of Interests

- stability of metal-halide perovskites in solar cells
- in-situ and in-operando spectroscopy and microscopy

I am looking for …

Project partners in the field of
- perovskite material and device development
- complementary material analysis methods

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Dr. Steffen Hundt

In the wake of energy transition, owners of renewable energy assets are seeking alternative sales channels besides subsidy schemes. Power purchase agreements (PPAs) can help both off-takers and sellers of renewable energy to reach their economic targets. However, these contracts have to be structured in a way that ensures that the renewable energy asset receives project financing. To show the interdependency between a PPA and project financing, we conduct a study based on three parts. First, we implement a financial model that shows the strong connection between PPA pricing and the debt sizing. Second, we analyze credit ratings and CDS spreads of different off-taker types and detect that electricity end consumers like corporates can be a good alternative to the traditional utility off-taking the energy output. Finally, we conduct a survey among international banks having an exposure in global PPA markets. The survey results indicate that the bankability of a PPA strongly depends on the credit risk of the off-taker.

Field of Research
Energy Markets and Project Financing

Topics of Interests
Power Purchase Agreements and Corporate Decarbonization
Financing of Renewables

I am looking for …
Cooperation Partners in the Industry and Researchers being interested in working in the field of energy markets

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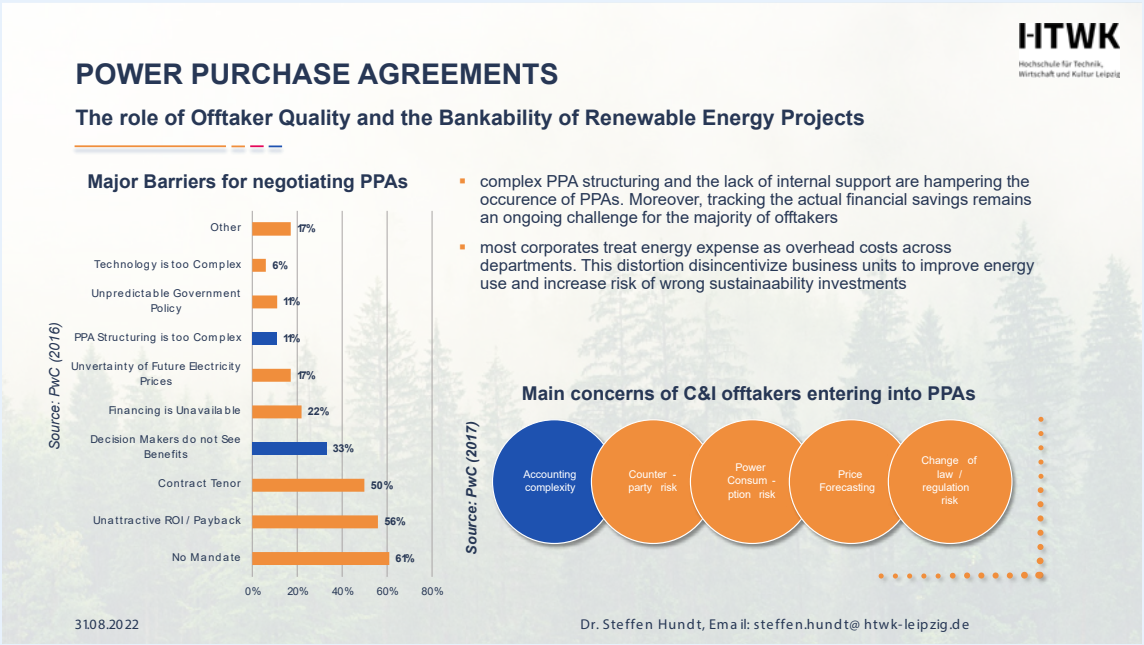

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Sebastian Dittmann

The Anhalt Photovoltaic Performance and Lifetime Laboratory (APOL-LO) focuses on Photovoltaic (PV) metrology, PV performance, module and system reliability, and durability. We operate an outdoor and indoor laboratory with state-of-the-art test facilities to characterize PV cells, modules, and system components under laboratory and real operation conditions.

The highlights of our laboratory facility are:
- Class AAA LED sun simulator with two independent light sources according to IEC standards
- Mobile LED sun simulator to characterize PV modules in the field
- Spectrometer for time-resolved (TCSPC) and time-integrated (Raman)
- High-precision meteorological equipment for on-site measurement of environmental parameters
- Energy yield measurement of single PV Module with I-V tracer in different applications (e.g., open rack or facade)
- Energy yield measurement of grid-connected Monofacial and Bifacial PV systems
- Agri-PVplus demonstrator with vertical east/west mounted Bifacial PV modules

Field of Research
Photovoltaic

Topics of Interests
Photovoltaic modules and systems, Energy yield measurement and simulation, AgriPV, PV reliability

I am looking for …
Cooperation in research projects

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Mary Johnson

Climate Change in a systemic view for aviation.

Field of Research

Aviation Sustainability and Fuels Research

Topics of Interests

ESG Reporting
Airport Sustainability
Airline Sustainability
Transportation System Design
Aviation Safety and automation for GA

I am looking for …

Cooperation in research projects

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Transformation of the Energy Sector in the wake of Climate Change
Matchmaking Part II

Dr. Oliver Iorhemen

My current research theme is mining of resources from wastewater to achieve the biorefinery concept within circular economy. Specifically, my focus is on resource recovery from biosolids generated from wastewater treatment systems that use the aerobic granular sludge (AGS) biotechnology. I am looking at optimizing the biosynthesis of xanthan, curdlan, tyrosine, and phenylalanine in AGS systems treating municipal wastewater and exploring options for their recovery and purification from waste granules.

Field of Research
Biological Wastewater Treatment

Topics of Interests
Aerobic Granular Sludge, resource recovery, biofiltration for climate change adaptation and resilience as applied to water and wastewater treatment

I am looking for …
collaborations.

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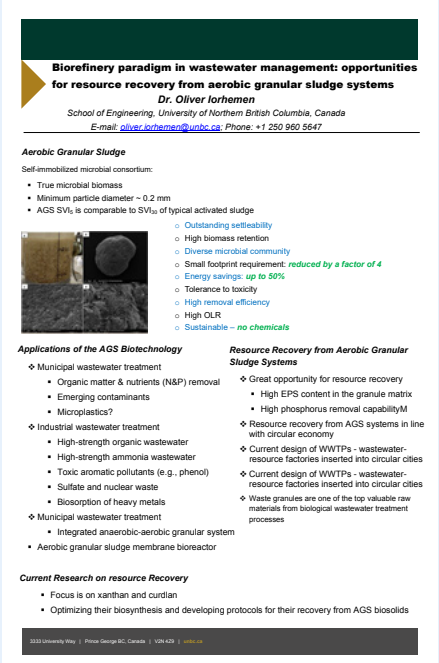

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Dr. Volker Paul Schulz

Prof. Dr. Volker P. Schulz has a strong background in the field of electrochemistry, additive manufacturing and testing.
Since completing his PhD at the University of Heidelberg (2003), Prof. Dr. Volker Schulz has been involved in the simulation of multiphase flows using the Lattice-Boltzmann method and other numerical methods. Areas of application for the simulations have hitherto mainly been processes in porous microstructures, such as e. g. the gas diffusion layer of the fuel cell or the phase distribution in lithium-air batteries.
Prior to joining the DHBW Mannheim, Prof. Schulz was an employee at the Fraunhofer Institute for Industrial Mathematics in the department of „"Flow and Material Simulation"". Within the framework of industrial projects and publicly funded projects, the Fraunhofer Institute has produced several publications in the field of porous materials, in particular technical textiles and nonwovens.
In recent research project, Prof. Schulz uses additive manufacturing (‚metal 3D printing') for the optimization of electrochimical devices, especially in the field of phase-transition cooling.

Field of Research
Electrochemical energy devices, Hydrogen, Energy storage

Topics of Interests
Optimziation of fuel cells and electrolysers. Hydrogen storage.
Application of fuel cells for heavy and light trucks and planes.

I am looking for …
Contact to research groups in Canada and the US in the broad field of energy storage. Preferentially, applied research with the focus on optimization of existing devices in cooperation with industrial partners.

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DHBW Mannheim (Full Professor) & University of Toronto (Status-only Professor), Germany, mannheim.dhbw.de

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Dr.-Ing. Florian Wallburg

I am heading a research group at Leipzig University of Applied Sciences. We mainly deal with mechanical and fluid mechanical simulations and apply them to practical problems. For example: How can bicycles be designed more reliably, how can buildings be ventilated more efficiently (also concerns questions about health aspects such as the spread of viruses), or how can solar cell production be made less fragile.
We are a research group that is significantly dealing with numerical simulations.
I am therefore looking for scientists or research groups that do experimental research in the areas of cycling, building technology, ventilation technology or production/handling of brittle materials for a scientific exchange and/or joint projects.

Field of Research
Mechanics (especially numerical methods like FEM) CFD

Topics of Interests
CFD in building technology
mechanical strength and reliability of bicycle components
numerical simulation of airborne transmission of sars-cov-2
fracture mechanics (especially silicon)

I am looking for …
joint projects scentist exchange

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Transformation of the Energy Sector in the wake of Climate Change

Matchmaking Part II

Prof. Dr. Daniel Piazolo

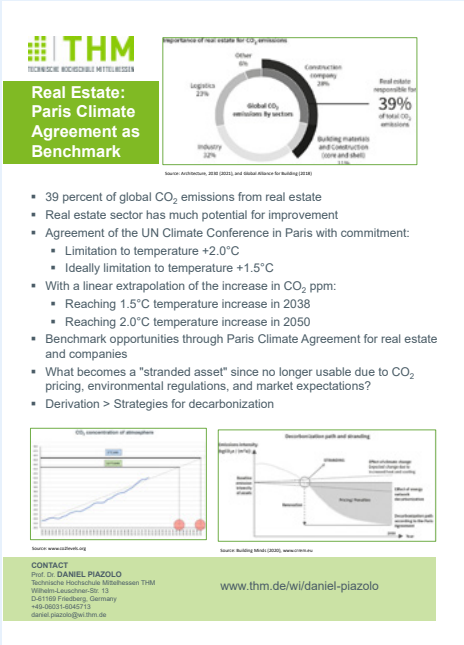
Real Estate is a very diverse, fascinating and dynamic asset class. Due to its size real estate has a high obligation to do more about its share of CO2s emissions. I am analysing the possibilities for the European real estate investment markets. It will be interesting to compare the various approaches in North America and in Europe.
My research covers the responsibilities of the real estate investment markets in tackling climate change. Of the various approaches to reducing greenhouse gases, increasing energy efficiency is one of the most promising. In North America, the United Kingdom and in Germany, the real estate sector is the largest energy consumer. The real estate sector is responsible for 40% of energy consumption and 36% of CO2 emissions in the EU. The European Commission set the target of a 32.5% energy saving relative to the base year 1990 by the year 2030. In the real estate sector a decisive challenge is connected to the long amortization periods until savings from modernization measures cover the additional resources required. Many real estate investors shy away from high modernization costs, especially for older buildings. 75% of buildings in Europe are energy inefficient and most (75%-90%) of today's buildings will still be in use in 2050. Real Estate investments in higher energy efficiency are often seen as risky. Therefore, one strategy to achieve the EU energy savings target is to create more transparency about the risks and returns of property modernization.

Field of Research
Real Estate

Topics of Interests
Transformation of the REAL ESTATE Sector in the wake of Climate Change

I am looking for …
Cooperation, Joint Research Project, Staff Exchange

click on poster to see full size



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Attendees without Presentation

Health Care and Social Medicine throughout the Life Course

Matchmaking Part I

Dr. Ahmed Allahwala

Interested in exploring opportunities for a comparative project (North America/Germany) on community health, the uneven geography of health outcomes, neighbourhood inequality, place-based interventions for community health, participatory method in neighbourhood research, especially community-based responses to the COVID-19 pandemic. Preliminary questions: How has the COVID-19 pandemic affected urban communities and neighbourhoods differently? How can we measure the uneven impact of COVID-19 across neighbourhoods? How have public health authorities responded (if at all) to geographic unevenness of the pandemic? What innovative and promising place-based strategies have emerged?

Field of Research
Human Geography / Urban Studies

Topics of Interests
participatory research, community wellbeing and health, social and health policy, urban inequality

I am looking for …
networking opportunities with researchers from Germany

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Attendees without Presentation

Prof. Ph.D. Gabriela Alves Werb

Field of Research
Sustainable Finances

Topics of Interests
Sustainability Strategy
Green Finance
Greenwashing
Topics in the interface Between Finance, Business Informatics and Marketing

I am looking for …
Research cooperations in the field of green finance and firms' sustainability strategy.

CONTACT
Prof. Ph.D. Gabriela Alves Werb
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Attendees without Presentation

M.A. Christine Arndt

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Attendees without Presentation

Prof. Ragu Athinarayanan

Field of Research
cyber-physical systems

Topics of Interests
Application of AI in manufacturing

I am looking for …
Educational & Research Partnerships

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Attendees without Presentation

Janice Au

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Attendees without Presentation

Stefanie Bamberg

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Attendees without Presentation

Lukas Baus

Field of Research
CO2 Capturing and Utilization, Indoor Air Quality, Sector Coupling Technologies

Topics of Interests
DAC, HVAC, Indoor Air Quality, renewable energy, sector coupling, photovoltaics, e-fuels, adaptive energy storage systems

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CBS International Business School - Cologne, Germany
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« back to list of attendees

Attendees without Presentation

Asst. Prof. Robert Beattie

Field of Research
Developmental Neuroscience

Topics of Interests
Neural Stem Cells, Neurobiology, Neural development, Single Cell Approaches, Cell autonomous gene function, copy number variants, evolutionary neural development

I am looking for …
Neural Stem Cells, Neurobiology, Neural development, Single Cell Approaches, Novel molecular techniques

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Attendees without Presentation

Sabine Beißwenger

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Attendees without Presentation

Prof. Dr. Nicolai Beisheim

Field of Research
Digital Engineering

Topics of Interests
- Digital Twin
- Virtual Reality/Augmented Reality
- Remote Services
- Condition Monitoring with AI

I am looking for …
- projects
- partners
- networking in general

CONTACT
Prof. Dr. Nicolai Beisheim
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Albstadt-Sigmaringen University, Germany
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« back to list of attendees

Attendees without Presentation

M.Sc. Rona Bird

Field of Research
Intersectional and diversity-sensitive approaches to gerontology

Topics of Interests
-LGBT* ageing, e.g. social support in family of choice social networks, diversity-sensitive long-term care environments
-Intersectional approaches to health and care disparities, particularly in old age
-Facilitators and barriers to person-centred nursing care approaches in contemporary socio-exonomic contexts

I am looking for …
I am looking for an opportunity to network with other researchers interested in intersectional approaches to health and care disparities, particulary in relation to older adults.

CONTACT
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Attendees without Presentation

Vance Blankers

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Attendees without Presentation

Dr. Samiro Bojarra

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Attendees without Presentation

Michael Bossert

Field of Research
Sustainable and Resilient Communities and Cities

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Attendees without Presentation

Magistra Artium Tanja Brugger

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Attendees without Presentation

Dr. Karin Bugow

Field of Research
Public Management

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Attendees without Presentation

Estefania Ciliotta

Field of Research
Design + Health, Experience, AI, Social Impact

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Attendees without Presentation

Melanie Cline

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Attendees without Presentation

Prof. and Associate Dean Erin Cram

Field of Research
Biology

I am looking for …
Information about the programs.

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Attendees without Presentation

Dr. Simon Decker

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Attendees without Presentation

Prof. Dr.-Ing. Faouzi Derbel

Field of Research
Wireless Sensor Networks, Predictive Maintenance, Asset Management, Smart Grids

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Attendees without Presentation

Prof. Dr. Jan-Henning Dirks

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Attendees without Presentation

Prof. Ursula Eicker

Field of Research
Energy systems; Urban Energy Simulation

Topics of Interests
Transformation of the Energy Sector in the wake of Climate Change,
Smart Cities

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Attendees without Presentation

Assistant Prof. Adel El-Shahat

Field of Research
Energy Systems

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Attendees without Presentation

Prof. Dr. Simone Emmert

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Attendees without Presentation

Dr. Escamilla Ixhel

Field of Research
health

Topics of Interests
*(e-) mental health
*HIV/AIDS-STIs prevention
*women health
*health system research

I am looking for …
*Networking
*Future research collaborations

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Attendees without Presentation

Lisa Eser

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Attendees without Presentation

PhD Maria Fedoruk

Field of Research
Environmental economics

Topics of Interests
Circular economy, sustainable cities, energy efficiency

I am looking for …
Possibilities for joint project

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Attendees without Presentation

Gudrun Fischer

Field of Research
Smart Cities / Smart Region

Topics of Interests
smart city, smart region, regional management, digital transformation, digitalization in rural areas, public participation

I am looking for …
project partners, interesting smart city projects, participation in field studies, results of field studies

CONTACT
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Attendees without Presentation

Chris Flores

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Attendees without Presentation

Prof. Dr. Charis Förster

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Attendees without Presentation

Prof. Dr. Rodrigo França

Field of Research
Dental Biomaterials

Topics of Interests
Dental Biomaterials, dental ceramics, 3D printing, 3D Bioprinting

I am looking for …
Academic collaboration, scientific exchange.

CONTACT
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Attendees without Presentation

Dr. Liton Furukawa

Field of Research
interdisciplinary studies

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Attendees without Presentation

Prof. Dr. Uta Gaidys

Field of Research
Nursing

Topics of Interests
complex decision making in ethical challenging situations
health care of patients in chronic health care situations
Advanced Nursing Practice

I am looking for …
Colleagues within the field of health care

CONTACT
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Attendees without Presentation

Prof. Dr. Lutz Gaspers

Field of Research
Transportation Engineering

Topics of Interests
Transportation planning, transportation modelling, mobility

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Attendees without Presentation

Prof. Dr. Christian Ghanem

Field of Research
Social work

Topics of Interests
prison research, offender rehabilitation, elderly offenders, evidence-based practice, social network analysis

I am looking for …
networking, cooperation partners for projects

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Attendees without Presentation

Dr. Tristan Glatard

Field of Research
Artificial Intelligence

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Attendees without Presentation

Prof. Dr. Paul Grimm

Field of Research
Virtual Reality and Augmented Reality

Topics of Interests
Virtual Reality and Augmented Reality, Future Learning, Digitalization

I am looking for …
Cooperation

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Attendees without Presentation

Dr. Matthias Günther

Field of Research
energy technology and economics

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Attendees without Presentation

Prof. Dr. Marion Halfmann

Field of Research
Marketing, Marketing Analytics, Market Research, Sales

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Attendees without Presentation

Prof. Dr. Martin Heckelmann

Field of Research
Health Care, Regulatory

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Attendees without Presentation

Prof. Dr. Michael Heigl

Field of Research
Artificial Intelligence for Cybersecurity

Topics of Interests
Artificial Intelligence, Cybersecurity

I am looking for …
expanding my network, meeting other researchers in my field and looking for potential project partners for future cooperation

CONTACT
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Attendees without Presentation

Prof. Dr. Dörte Heüveldop

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Attendees without Presentation

Prof. Dr.-Ing. Sophie Hobrack

Field of Research
Elastomers Mechanics, Biological Tissue, Biomechanics

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Attendees without Presentation

Associate Prof. Pingzhao Hu

Field of Research
Artificial intelligence, bioinformatics, cheminformatics, drug design

Topics of Interests
Artificial intelligence, bioinformatics, cheminformatics, drug design

I am looking for …
Artificial intelligence - driven drug design/discovery

CONTACT
Associate Prof. Pingzhao Hu
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Department of Biochemistry, Western University, Canada
http://www.hu-bioinformaticslab.org/ (I will start my new position at Western University on September 1, 2022), https://www.schulich.uwo.ca/biochem/

« back to list of attendees

Attendees without Presentation

Prof. Dr. Alexander Jesser

Field of Research
Cyber-Physical Systems

Topics of Interests
IoT, Embedded Systems, AI, Industrial Internet, Medical Technology

I am looking for …
Partnerships

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Attendees without Presentation

Prof. Dr. Jörg Jungwirth

Field of Research
Civil Engineering - structural design

Topics of Interests
retrofitting and strengthening of structures, structural design, new materials e.g. UHPFRC, 3D concrete printing, digital digital aproaches for design and construction, BIM, sustainability

I am looking for ...
researchers in the domain: retrofitting and strengthening of structures, structural design, new materials e.g. UHPFRC, 3D concrete printing, digital aproaches for design and construction, BIM, sustainability

CONTACT
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Attendees without Presentation

Prof. Thomas Keenan

Field of Research
Smart Communities

Topics of Interests
Technology; tech policy; ethics, information security

I am looking for …
Collaboration

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« back to list of attendees

Attendees without Presentation

Dr. Maria Kobert

Field of Research
Human AI Collaboration

Topics of Interests
problems, challenges, opprotunities of humans and AIs working together
AI related competencies
coping strategies for a successfull collaboration with AI
strategies for HR departments

CONTACT
Dr. Maria Kobert
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« back to list of attendees

Attendees without Presentation

Prof. Nan Kong

Field of Research

operations research and systems analytics to design and operations optimization problems arising in health systems, ranging from trauma care network design to nursing home staff planning and EMS vehicle dispatch and redeployment.

CONTACT

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« back to list of attendees

Attendees without Presentation

Hannah Kraemer

Field of Research
Voice Marketing

Topics of Interests
Marketing, Voice Marketing, Voice Assistants, Smart Speaker

I am looking for …
- Exchange and development of international research contacts
- Inspiration for interesting and value-adding international research project ideas in the area of voice / voice marketing / smart cities

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Attendees without Presentation

Assistant Prof. Abhishek Kumar

Field of Research
Additive Manufacturing, Digital Twins

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Attendees without Presentation

Assistant Prof. Derek Larson

Field of Research
Animation, color, eye tracking

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Attendees without Presentation

Prof. Dr. Olga Levina

Field of Research
Digital business process management; ethics of digitization

Topics of Interests
Mobility, ethics of digitization

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« back to list of attendees

Attendees without Presentation

Prof. Zhenyi Li

Field of Research
Intercultural Communication, Health Communication

Topics of Interests
Communication for health and well-being

I am looking for …
research partners

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« back to list of attendees

Attendees without Presentation

Prof. Dr. rer. nat. Reinhard Lorenz

Field of Research
Smart Cities, Smart Mobility and Citizen Science

Topics of Interests
Thermosetting polymer, Unsaturated Polyester Resins, Vinyl Ester Resins, Styrene substitutes, Macromolecular Chemistry, Polymer Chemistry

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Attendees without Presentation

Marie Lottmann

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« back to list of attendees

Attendees without Presentation

Prof. Dr. Florian Maehl

Field of Research
Refurbishment of Buildings and Building Envelopes

Topics of Interests
Research Topics to workon together: holistic refurbishment strategies considering the primary energetic impact. Ressource-conserving technologies relating to facade refurbishments. Different viewpoints Germany vs. U.S./Canada.

I am looking for …
Research Topics to workon together: holistic refurbishment strategies considering the primary energetic impact. Ressource-conserving technologies relating to facade refurbishments. Different viewpoints Germany vs. U.S./Canada.

CONTACT
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Attendees without Presentation

Dr. Jamie McGowan

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Attendees without Presentation

Prof. Dr. Alexander Michalski

Field of Research
Computational simulation methodologies, structural design, lightweight structures

Topics of Interests
Smart City, Urban climate simulation, sustainable building materials and design and methodologies, city resilience and green city development

I am looking for …
Partners in Canada with similar interests and mindset

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Attendees without Presentation

Prof. Ghazal Moeini

Field of Research
Additive Manufacturing

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Attendees without Presentation

PD Dr. Sajjad Muhammad

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Attendees without Presentation

Dr. Dominik Naglav-Hansen

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Attendees without Presentation

Dr. Patrizia Nobbe

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Attendees without Presentation

Associate Prof. Farzad Noubary

Field of Research
Biostatistics, Health Sciences

Topics of Interests
-Biostatistics
-Epidemiology
-Infectious diseases
-Neuroscience
-Global health

I am looking for …
Collaborators who would benefit from a collaborative biostatistician colleague

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« back to list of attendees

Attendees without Presentation

Dr. Snezana Obradovic-Ratkovic

Field of Research
Education

Topics of Interests
migration and indigeneity, transnational and transdisciplinary teacher education, decolonizing and arts-based research methodologies, mindfulness and wellbeing in higher education, planetary health, generous scholarship, and academic writing and publishing

I am looking for …
Research Collaborators

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« back to list of attendees

Attendees without Presentation

Associate Prof. Nana Ofori-Opoku

Field of Research
Materials Science

Topics of Interests
computational materials science, phase transformation, microstructure evolution, mesoscale modelling

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Attendees without Presentation

Nicole Ondrusch

Field of Research
Education & Innovation

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Attendees without Presentation

Prof. Nikolay Panikov

Field of Research
Systems biology, microbiology, ecology and environmental sciences

Topics of Interests
Extracellular vesicles in medical applications and basic science
Genome-scale modeling in biotechnology

CONTACT
Prof. Nikolay Panikov
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Northeastern university, CCB, USA
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Attendees without Presentation

Prof. Dr. Gia Khanh Pham

Field of Research
Materials Science

Topics of Interests
Material science (ceramics, metals, composites) and procesing technologies (e.g. 3D printing)

I am looking for …
colaboration with other universities

CONTACT
Prof. Dr. Gia Khanh Pham
gia-khanh.pham@hm.edu

Department of Applied Sciences and Mechatronics, Munich University of Applied Sciences, Germany, https://sci.hm.edu//fakultaet/personen/professoren/pham/prof__dr__gia_khanh_pham.de.html

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Attendees without Presentation

Dr. Dirk Pietruschka

Field of Research
smart cities, sustainable energy technologies

Topics of Interests
Integrated energy systems in smart cities, control and optimization of (decentralized) energy systems

I am looking for …
Network expansion, project initiation

CONTACT
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Attendees without Presentation

Roman Radtke

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Attendees without Presentation

Dr. Christine Radtki-Jansen

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Attendees without Presentation

Dr. Christina Rehm

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Attendees without Presentation

Dr. Peter Reiners

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Attendees without Presentation

Prof. Grant Richards

Field of Research
Manufacturing - ICS and Cybersecurity

Topics of Interests
IT/OT Convergence, ICS, OT Cybersecurity, IoT, Hybrid Edge/Cloud Architectures

I am looking for …
Research Collaborations including industry engagement/support.

CONTACT
Prof. Grant Richards
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Attendees without Presentation

Sebastian Riedel

Field of Research
Polyhydroxyalkanoate Biopolymers

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TU Berlin / Berliner Hoschule für Technik, Germany
https://www.tu.berlin/bioprocess/forschung/smart-bioproduction-grids/biopolymers

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Attendees without Presentation

Prof. Dr.-Ing. Ralf-Dieter Rogler

Field of Research
Electrical Power Engineering

Topics of Interests
Thermal Calculations and Testing of Switchgears in Case of Load and Short Circuit
Current
- Mechanical Calculations and Testing of Switchgears in Case of Peak Current
- Infrared Diagnosis on Electrical Contacts and Joints
- Determination of Residual Life of Switchgears
- Measuring Low Resistances with a Microohm Meter
- Long Term Testing of Electrical Contacts and Joints with ac dc
- Pressure Rise Calculation due to Internal Arcs
- Determination of Burning Through of Enclosures due to Internal Arcs
- Calculation and Measurements on Magnetic and Electrical Low-Frequency-Fields
- Dissolved Gas Analysis on Transformers
- Design of Heavy Current Parts in Big Transformers
- Design and Testing of Fuses
- Design of Current Transformers
- Measuring Low Resistances with a Microohm Meter
- Determination of BH Characteristics and Losses using an Epstein Frame
- Short Circuit Current and Selectivity Calculation
- Calculation and Measurement of Power Quality
- Testing and Evaluation of Earthing and Grounding Equipment
- Design of Disconnectors, Separator and Circuit Breakers in LV, MV and HV
- Evaluation of Protective Gear against Internal Arcs
- Heating of Grounded Cables
- Measurement of Thermal Conductivity of Sand and Soil near Cables
- Heating of Overhead Lines
- Heating of Busbar Systems
- Design of Fully Insulated Busbars
- Thermal Design of GIS and GIL
- Design and Implementation of Heat Pipes into Switchgears
- Determination of Skin and Proximity Effects
- Treatment of Shielding of Cables
- High Current Testing Ground for 10 kA (ac, dc) and 30 kA (peak)
- High Voltage Testing Ground for 300 kV (ac, switching and lightning voltage)
- Measurement of Partial Discharges
- Software Development
- Experting Activities

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https://www.htw-dresden.de/hochschule/fakultaeten/elektrotechnik/ueber-uns/personen/professoren/prof-ralf-dieter-rogler

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Attendees without Presentation

Dr. Michael Scholz

Field of Research
Data Analytics

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Attendees without Presentation

Jan Silberer

Field of Research
Technology Acceptance

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Attendees without Presentation

Dr. Katja Simons

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Attendees without Presentation

Prof. Jafar Soltan

Field of Research
environmental catalysis, indoor air quality and health

Topics of Interests
indoor air treatment,
oxidation of VOCs in indoor air
catalytic reactions with ozone

I am looking for …
developing familiarity
expanding network
identifying potential collaborators

CONTACT
Prof. Jafar Soltan
j.soltan@usask.ca

University of Saskatchewan, Canada
https://engineering.usask.ca/people/cbe/Soltan,Jafar.php

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Attendees without Presentation

Prof. Dr. Lutz Sommer

Field of Research
Digital Twins - Production / Energy

Topics of Interests
a) Implementation of digital twins in SMEs for production optimisation and energy efficiency
b) Use of AI approaches in SMEs
c) Production technologies in the field of fuel cell and battery manufacturing

I am looking for …
Search for cooperation partners interested in research with SMEs

CONTACT
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Albstadt-Sigmaringen University (Baden-Württemberg), Germany
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Attendees without Presentation

Dr. René Sonnenberg

Field of Research
Geotechnics

Topics of Interests
Soil liquefaction due to earthquakes
Soil shrinking problems

I am looking for …
Collaboration for data analysis of soil liquefaction data to estimate side susceptibility to soil liquefaction.

CONTACT
Dr. René Sonnenberg
rene.sonnenberg@h2.de
Magdeburg-Stendal University of Applied Sciences, Germany
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Attendees without Presentation

M.Sc. Christian Speckemeier

Field of Research
Health Economics

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« back to list of attendees

Attendees without Presentation

Prof. Kirsten Steinhausen

Field of Research
Health Sciences

Topics of Interests
Health promotion, Health policy, Health care management, Health care systems, Health education

I am looking for …
Networking, applied research projects, binational teaching programmes

CONTACT
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Attendees without Presentation

Prof. Dr. Sven Steinigeweg

Field of Research
Environmental Engineering

Topics of Interests
- Sustainable Energy Systems
- Environmental aspects in chemical engineering

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Attendees without Presentation

Prof. Dr. Martin Stiemerling

Field of Research
Data Networks

Topics of Interests
Telecommunication networks, data networks, transport protocols, network managment, SDN

I am looking for …
Collaboration partners for research.

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Attendees without Presentation

Prof. Dr. Katja Stoppenbrink

Field of Research
Ethics

Topics of Interests
Climate Ethics - Social Inclusion of Persons with Disabilities - Ethics of Technology including Artificial Intelligence

I am looking for ...
Research Partnerships in all three abovementioned areas

CONTACT
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Attendees without Presentation

Dr. Thomas Süße

Field of Research
Human-AI Interaction

I am looking for …
Research Partners

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« back to list of attendees

Attendees without Presentation

M.A. Eylem Tas

Field of Research
Collaboration and Value Co-creation between University and external Stakeholders for Smart Cities

Topics of Interests
Triple, quadruple, quintuple Helix Innovation Models
University - Industry - Society Collaboration
Co-Creation für sustainable innovation

I am looking for …
Project Partner, foundation, peers

CONTACT
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University of Hamburg, Germany

« back to list of attendees

Attendees without Presentation

Prof. Bastian Tenbergen

Field of Research
Software Engineering

Topics of Interests
collaborative systems
autonomous systems
requirememts engineering
software engineering
model-based development

I am looking for …
funding opportunities and collaboration partners

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Attendees without Presentation

Ashi Tyagi

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Attendees without Presentation

Daniela Ulber

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Attendees without Presentation

Prof. Reg Urbanowski

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Attendees without Presentation

Ayush Verma

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University of Rochester, USA

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Attendees without Presentation

Assistant Prof. Sudip Vhaduri

Field of Research
Human-Centered Computing, Mobile Computing (mHealth, Biometrics), AI (Machine Learning, Deep Learning)

Topics of Interests
Healthcare, Digital Health, mHealth, Respiratory Disease Monitoring, Audio Sensing, Mobile Health, Continuous and Implicit User Authentication, Machine Learning, Mobile and Wearable Sensing and Computing, AI, Human-Centered Computing

I am looking for ...
Collaboration, joint/individual grants and publications

CONTACT
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Attendees without Presentation

Prof. Pavlos Vlachos

Field of Research
flow, ECHO

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Attendees without Presentation

Prof. Dr. Mathias Walther

Field of Research
Business Comupting/Computer Science

Topics of Interests
Speech Technologies, Data Science, Software development,
IT Management

I am looking for …
Partners for teaching and research within the project „aphaDIGITAL“
(with Eugenia Rykova)

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« back to list of attendees

Attendees without Presentation

Dr. Charles Weatherford

Field of Research
High Energy Density Science, Quantum Chemistry

Topics of Interests
Energy, Materials, Computational Science

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Attendees without Presentation

Dr. Maryam Weil

Field of Research
(bio)chemical sensing

Topics of Interests
Diagnostik , Biosensors, Chemical sensors, Graphene based biosensors, Organ on the Chip, Lab on the chip, Multiparameter sensing, Enzyme based biosensors, miniaturized biosensors, Micro- and nano structuring, Impedimetric bio- chemicalsensors

I am looking for …
Collaboration partners in the field of Biology/Medicine/Biochemistry/ Nanomaterials for research and development of advanced biosensors e.g. for medical diagnostic.

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« back to list of attendees

Attendees without Presentation

Alexander Wirp

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Attendees without Presentation

Prof. Dr.-Ing. Pascal Witte

Field of Research
Microelectronics

Topics of Interests
Analog-to-Digital Converters, especially Delta-Sigma ADCs
Integrated Circuits

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« back to list of attendees

Attendees without Presentation

Liu Yongmin

Field of Research
nanophotonics, plasmonics, metamaterials/metasurfaces, machine learning (for photonic designs), ultrafast optomagnetism

CONTACT
Liu Yongmin
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« back to list of attendees

Attendees without Presentation

Prof. George Zhu

Field of Research
Space robotics, Spacecraft

Topics of Interests
Additive manufacturing in space

I am looking for …
Collaborators and projects to participate

CONTACT
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List of all Attendees

List of Attendees

List of Attendees

Attached Poster Files

aphaDIGITAL – Avatar-based digital speech therapy solution for aphasia patients: first evaluation

Eugenia Rykova[1,2] , Mathias Walther[1] , Elisabeth Zeuner[3]

[1] Technical University of Applied Sciences Wildau

[2] University of Eastern Finland

[3] Martin-Luther-Universität Halle-Wittenberg

eugeniia.rykova@th-wildau.de

Supported by: Federal Ministry of Education and Research

TDG Translationsregion für digitalisierte Gesundheitsversorgung

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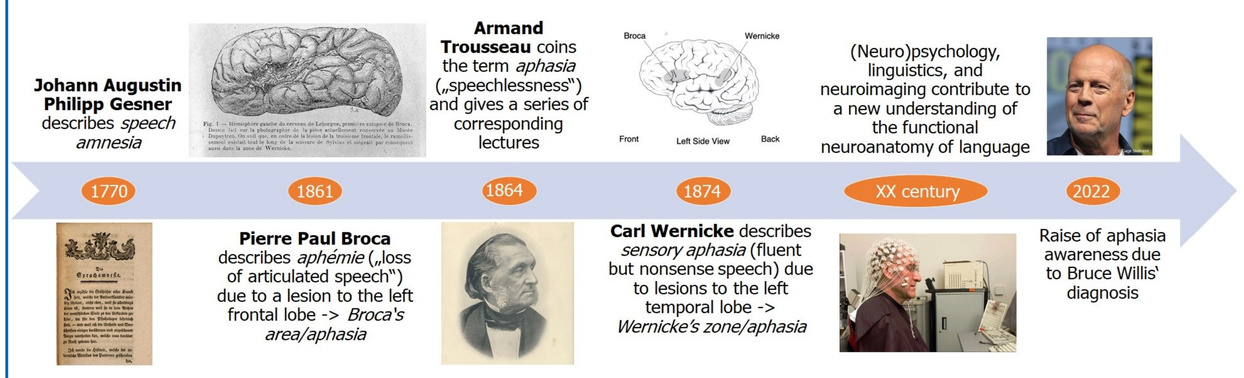
Aphasia

Aphasia facts

References

- Aphasia is an acquired language disorder due to focal brain injury
- Aphasia affects some or all language modalities
- Main reasons of aphasia: stroke (80%) and craniocerebral trauma (10%)
- Annually, 270.000 people suffer a stroke in Germany, and about 800.000 people - in the USA
- 30% of all stroke survivors experience initial aphasia, chronic deficits - in 20% of cases (stroke is the leading cause of disability in the USA)
- Predominant age group is 50-59 y.o.
- Generally affects more men than women (up to three times more)
- Significant benefits of high intensity and duration of speech and language therapy (SLT)



aphaDIGITAL

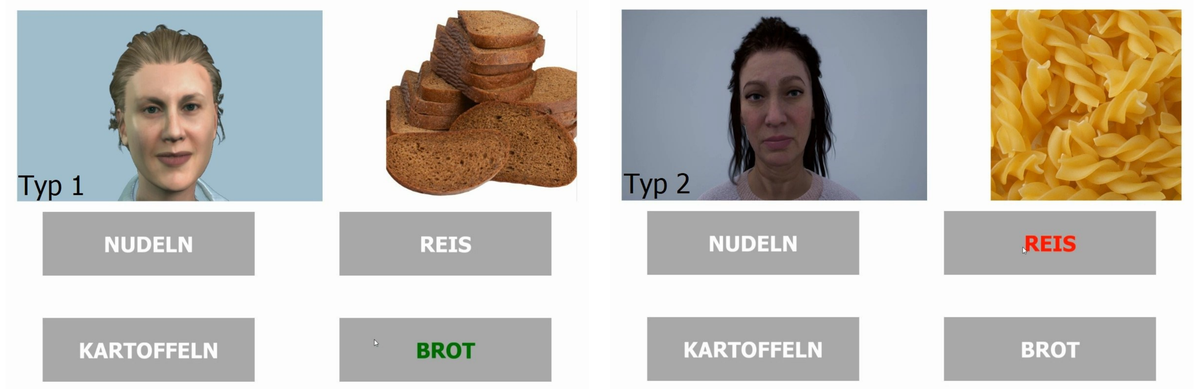
Project motivation

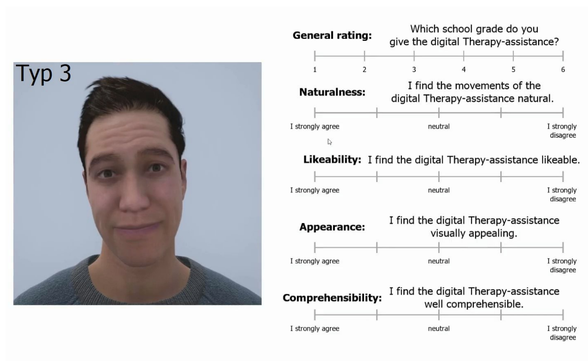
- Precarious situation in SLT care due to a shortage of specialists
- Patients with aphasia do not have access to sufficient SLT
- High-frequency exercise treatment is for the success of the therapy and promotes the communicative participation of the patients
- Efficiency of digital therapy solutions is proven
- Absence of apps with speech analysis and individual verbal feedback/avatar
- Closing the gap in care by developing digital applications is needed
- Digital applications ensure early high-frequency and individualized speech therapy care and thus therapy success in the long term
- App enables high-frequency self-training in the home environment with the support of the virtual exercise therapist (avatar) in an interactive and motivating setting

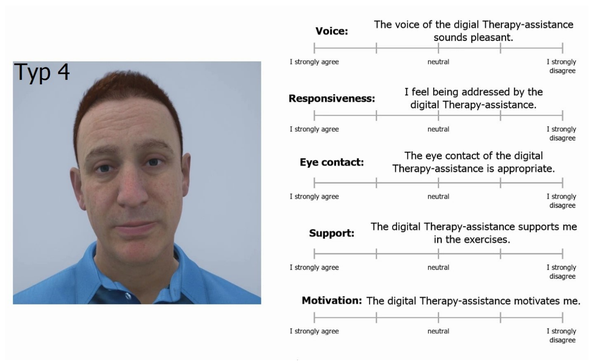
Main features

- Interactive exercise guidance by avatar (verbal instruction and feedback)
- Therapeutic avatar function (audition, mouth picture - initial and total word)
- Acquisition and integration of all production and reception modalities by the use of AI (e.g., speech recognition, handwriting recognition)
- Differentiated input modalities (keyboard, letter & word cards, handwriting via finger or writing aid)
- Exercise setting based on ICF (International Classification of Functioning, Disability and Health) dimensions
- Individualization of exercise setting, exercise material, task content and presentation options
- Low-threshold access to technology through intuitive usability and operation

Avatar Evaluation







Experiment

1. Introduction & Welcome
2. Five picture-naming tasks with feedback
3. Avatar evaluation scale (quantitative analysis)
4. Questionnaire (qualitative analysis)

Participants

- 11 non-brain-damaged adults (6 women), 55-86 y.o. (M = 68)
- Four adults with aphasia (1 woman), 57-62 y.o. (M = 59)

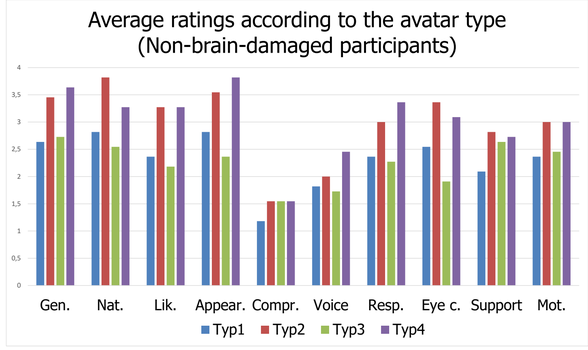
Results

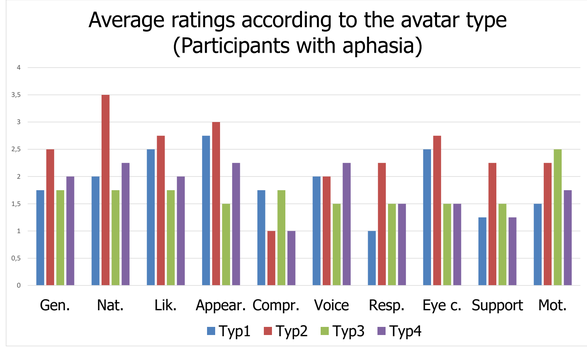
Correlation matrix of the evaluation criteria (NBD participants)

	Gen.	Nat.	Lik.	Appear.	Compr.	Voice	Resp.	Eye c.	Support	Mot.
Gen.	1,00									
Nat.	0,75	1,00								
Lik.	0,79	0,67	1,00							
Appear.	0,77	0,79	0,73	1,00						
Compr.	0,20	0,13	0,24	0,13	1,00					
Voice	0,66	0,66	0,54	0,61	0,31	1,00				
Resp.	0,79	0,86	0,71	0,77	0,27	0,74	1,00			
Eye c.	0,61	0,70	0,65	0,71	0,28	0,59	0,68	1,00		
Support	0,30	0,40	0,44	0,43	0,23	0,43	0,42	0,42	1,00	
Mot.	0,83	0,72	0,69	0,74	0,14	0,64	0,72	0,61	0,49	1,00

Correlation matrix of the evaluation criteria (participants w/aphasia)

	Gen.	Nat.	Lik.	Appear.	Compr.	Voice	Resp.	Eye c.	Support	Mot.
Gen.	1,00									
Nat.	0,84	1,00								
Lik.	0,57	0,53	1,00							
Appear.	0,64	0,56	0,80	1,00						
Compr.	-0,24	-0,43	0,11	-0,14	1,00					
Voice	0,53	0,44	0,63	0,54	0,28	1,00				
Resp.	0,26	0,22	0,34	0,06	-0,04	0,08	1,00			
Eye c.	0,49	0,67	0,76	0,69	-0,02	0,35	0,05	1,00		
Support	0,22	0,26	0,51	0,15	0,23	0,30	0,72	0,22	1,00	
Mot.	0,30	0,29	0,21	0,24	0,00	0,00	0,00	0,24	0,25	1,00





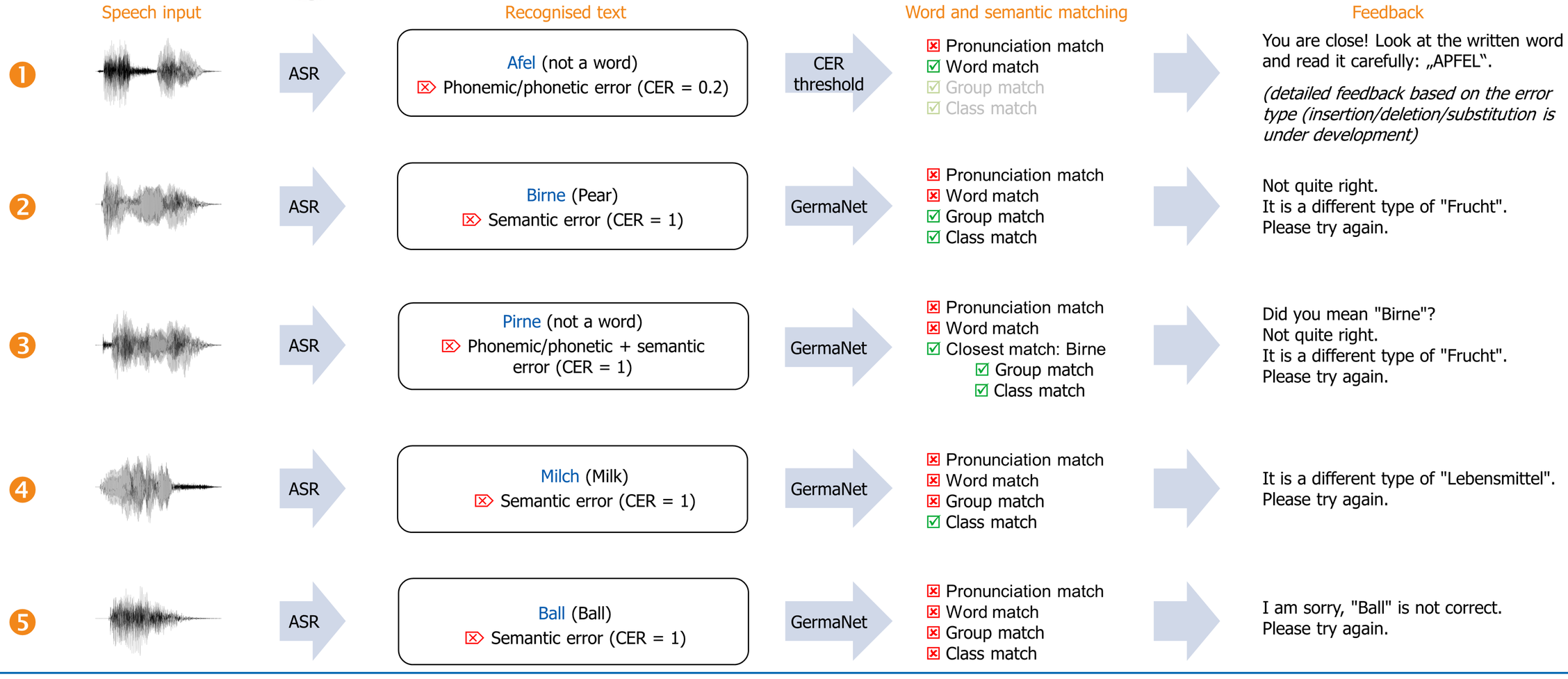
Take home:

- slow speech desired
- prominent facial expressions desired
- gender & age do not matter

Error Analysis and Feedback

Picture to name: 

Target word: Apfel (Apple), Semantic Group: Frucht (Fruit) Semantic Class: Lebensmittel (Food)



Dementia Buster Program for aging with a healthy brain

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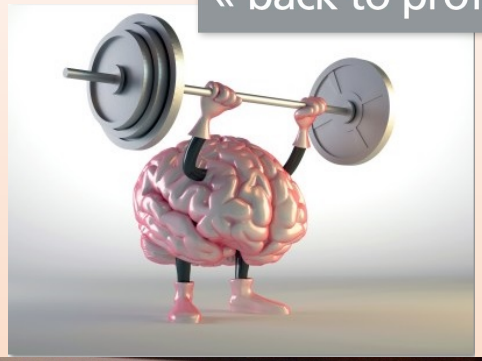


❖My pilot studies on >50 older adults using the current MindTriggers app in a regimen program show:

❖ All individuals with mild cognitive impairments improved significantly after a month of using the app regularly in our labs with a tutor.

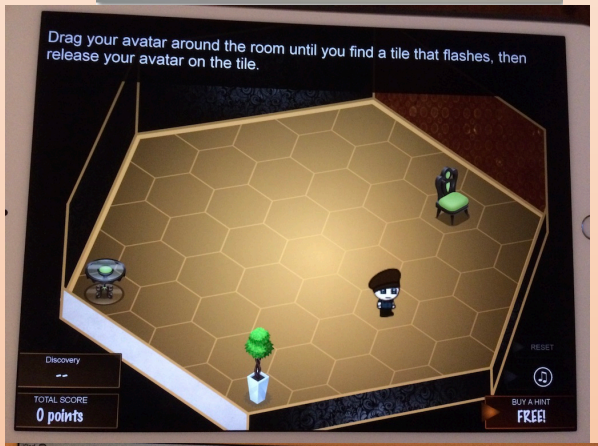
❖All healthy older adults using the app on their own at home with no supervision, improved significantly after a month.

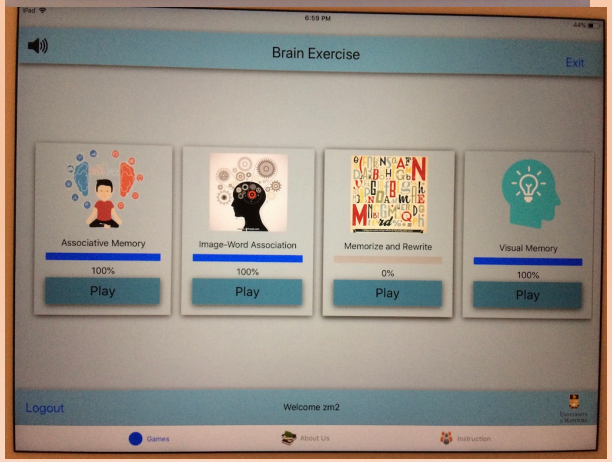
❖ >90% of individuals with Alzheimer's also improved after a month of practicing the cognitive exercises. No one decline.

❖All the assessments were completely intendent of the practiced exercises (showing the far-effect)

❖The app can monitor and analyze the performance of a user if they agree to data sharing.

❖ I propose to enhance the app and investigate its long-term effect on older adults in two groups: 1) those use it on their own, and 2) those with dementia use it in a virtual assisted program.





MORPHEUS

Non-invasive system for measuring parameters relevant to sleep quality

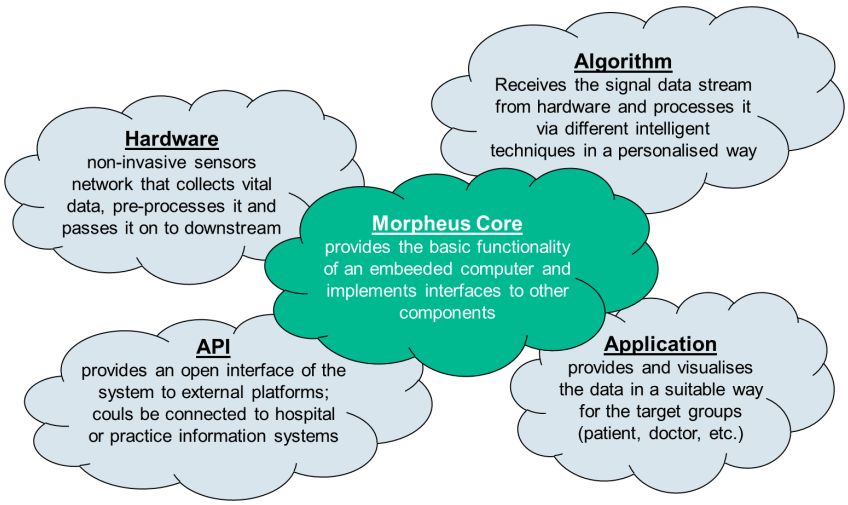
Main question

How can non invasive measurement of sleep quality support personalized therapy?

Innovation

- Non-invasive sleep quality measurement
- Reduced set of vital signs
- Measured sleep parameters are directly integrated into a CBT-i (cognitive behavioral therapy for insomnia)

Approach



Expected results

- Hardware and SW platform
- AI application for signal processing
- User application for data visualisation in a suitable way

Cooperation possibility

- Hardware- and software platform development, sensor selection, signal acquisition, signal extraction and signal analysis
- Development and application of AI algorithms tuned to support therapy
- Development of datasets for open data platforms
- Medical cooperation in the domain of sleep medicine studies

H T W G Hochschule Konstanz University of Applied Sciences
Ubiquitous Computing LABORATORY
Prof. Dr. Ralf Seepold
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Conditions of end-of-life care for people with intellectual disabilities - the impact of professional self-conceptions and organizational culture in disability services

PiCarDi
Palliative Care for People with Intellectual and Multiple Disabilities

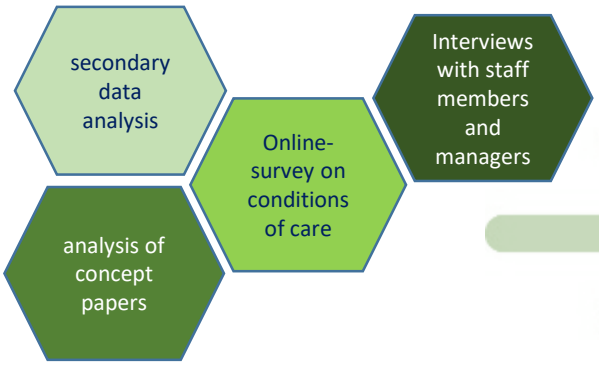
Background

Disability services face challenges in end-of-life care for residents increasingly. However, disability services are not prepared sufficiently and competences and attitudes towards palliative care differ widely within residential settings for people with disabilities.

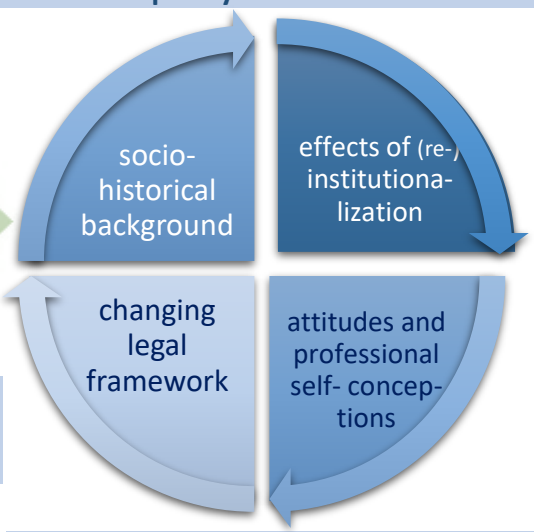
Aims of the research project

A study conducted in three German regions aimed at exploring the conditions of end-of-life care within disability services and the network lines linking to palliative and hospice care. A special focus was placed on professional self-conceptions, institutional traditions and attitudes as well as socio-political backgrounds.

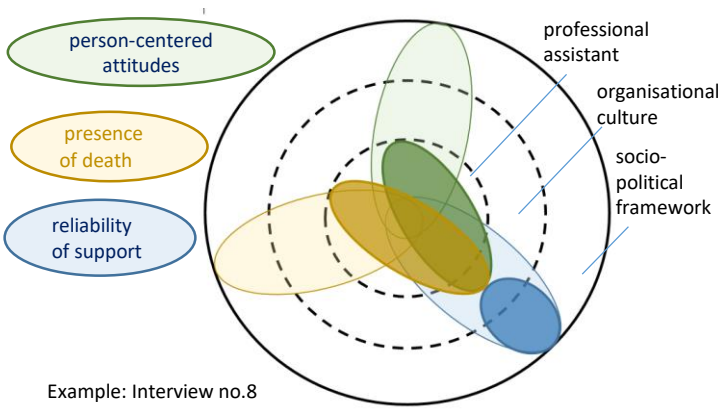
Methods



Results: influencing factors for the quality of end-of-life care



Specification (1): main characteristics of an end-of-life sensitive organizational culture (example)



Example: Interview no.8

Specification (2): types of end-of-life care

delegating paradigm	dichotomizing paradigm	functional paradigm	integrating paradigm
outsourcing of EoL-care (to nursing homes, hospitals)	contrasting individual attitudes vs. organizational culture	professional routines dominate individual perspectives	high level of reflection of attitudes and conditions of care
evaluation and revision of conditions	supervision and capacity building for staff members	awareness raising for individual rights perspective	cultivating sensitivity and enhancing competence

Recommendations

Conclusions

Sensitivity for the impact of organizational structures and professional attitudes is urgently needed to ensure a participatory and person-centered culture of palliative care in residential services for people with intellectual and multiple disabilities. At the same time, disability services have to build professional capacity to integrate end-of-life care as part of their conceptual framework and practice.

Selected References
Glasenapp J (2010): Im Spannungsfeld von Sicherheit und Freiheit. Über Deinstitutionalisieren in der Behindertenhilfe. Münster.
Hanses A et al. (2015): Konstruktionen des Sterbens – Analysen zu den Herstellungsweisen des Sterbens in organisationalen Kontexten. neue praxis 45:2, 160-177.
Ortmann G (2015): Moralverdrängung in und durch Organisationen, Kassel.
Schäper, S (2019): Teilhabe für Menschen am Lebensende - Einführung in ein komplexes Feld. In: Bessenich J/ Hinz, T (Ed.): Teilhabe am Lebensende. Freiburg, 14-25.

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Programming of Macrophages by Two-Photon-Release of mRNA in the Retina

Christoph Russmann[1,2,*], Ali Hafezi-Moghadam[1]

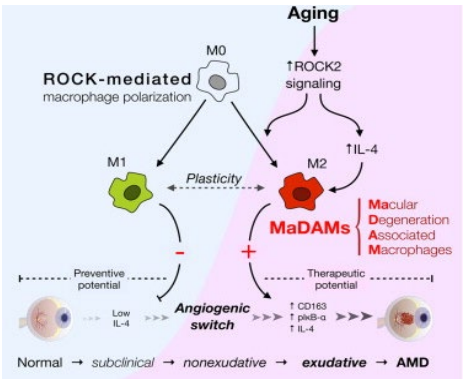
[1]Molecular-Biomarkers-Nanoimaging Laboratory (MBNI), Brigham & Women's Hospital/Harvard Medical School

[2]University of Applied Science and Arts, Faculty of Engineering and Health

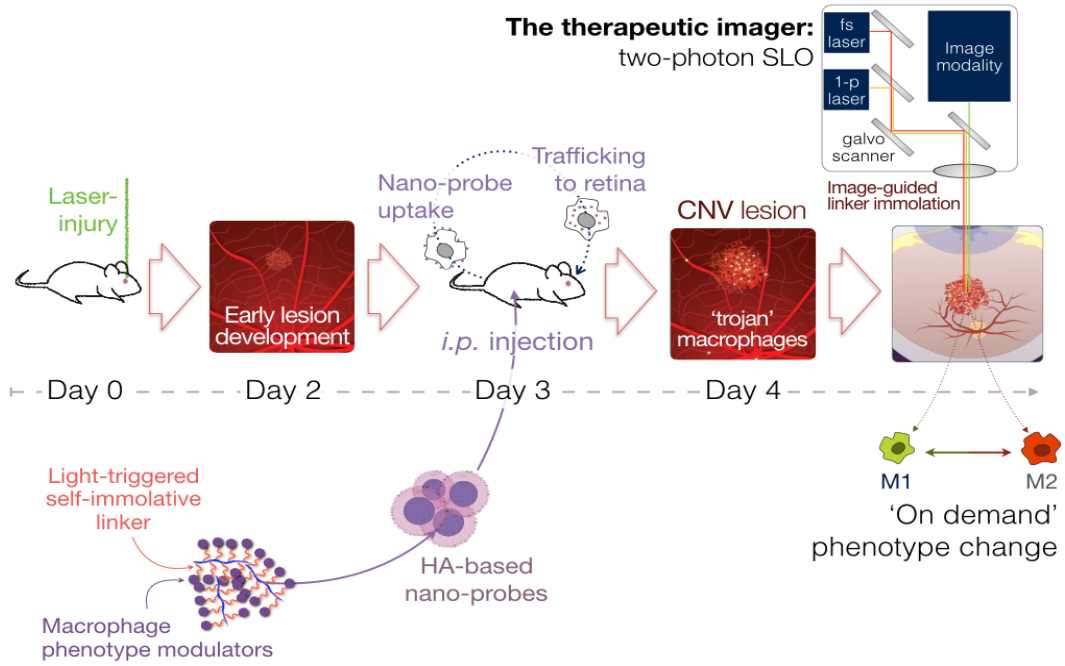
*christoph.russmann@hawk.de, crussmann@bwh.harvard.edu

Introduction

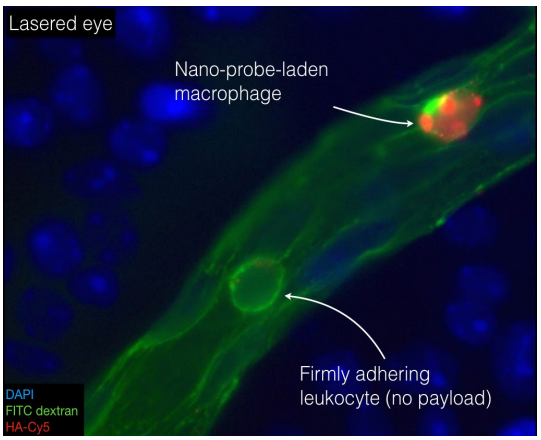
- ROCK-Isoform-specific polarization of macrophages are associated with Age-Related Macular Degeneration [Zandi et al., Cell Reports, 2015].
- Modulation of macrophage polarization offers an exciting new therapeutic option for the treatment of AMD, one of the leading causes of blindness in industrialized countries.

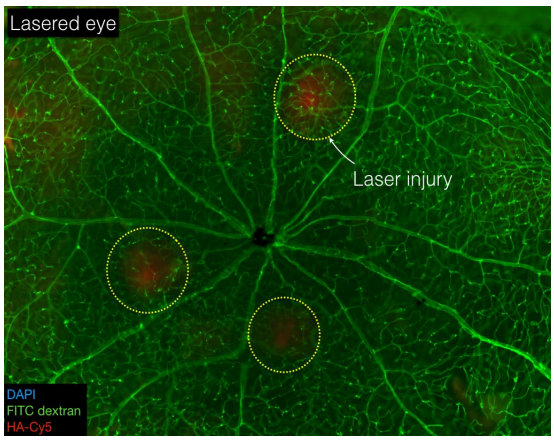


Research Strategy



First Results

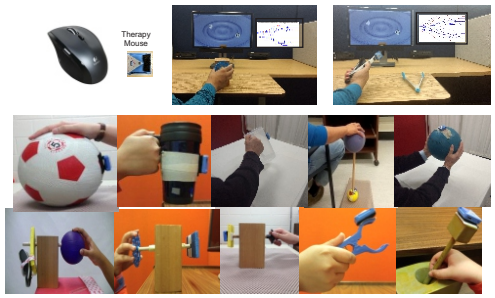




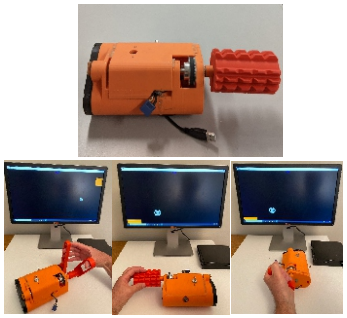
Evaluation of Affordable Technology-Assisted Rehab Systems. Digital media, wireless plug-n-play computer input devices, smart mechatronic devices and pressure mapping systems for use in rehabilitation and telerehabilitation (transition of rehab to home, community centers and rural/remote communities)

Research Team - Tony Szturm, Nariman Sepehri, Sanjay Parmar, Anuprita Kanitkar. University of Manitoba, Winnipeg, Manitoba, Canada

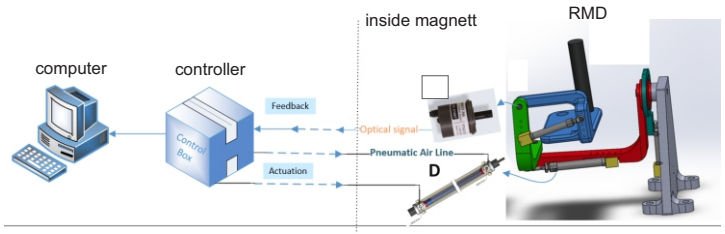
Miniature inertial-based (IB) mouse for wireless plug-n-play. Bottom are exercise objects, instrumented with IB mouse used for game-based repetitive task practices



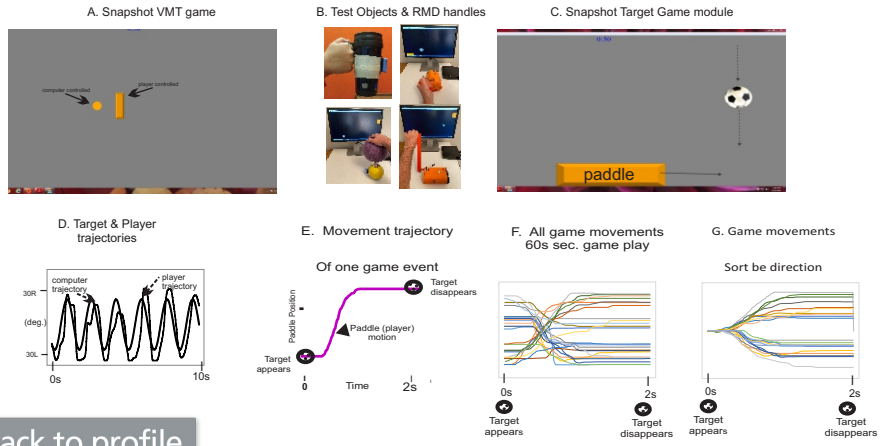
Robotic manipulandum Device (RMD); a smart monitoring and assistive technology to engage



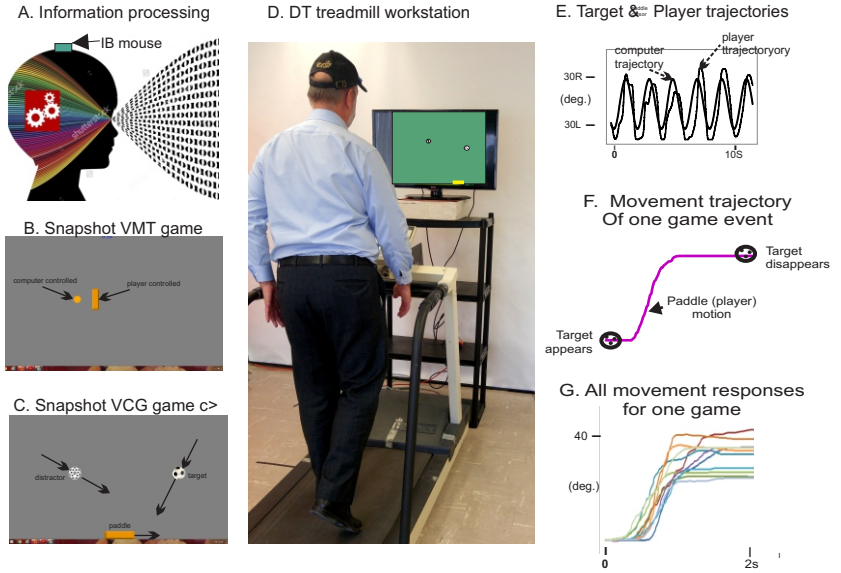
MRI compatible robotic manipulandum for multi-event task-based fMRI analysis



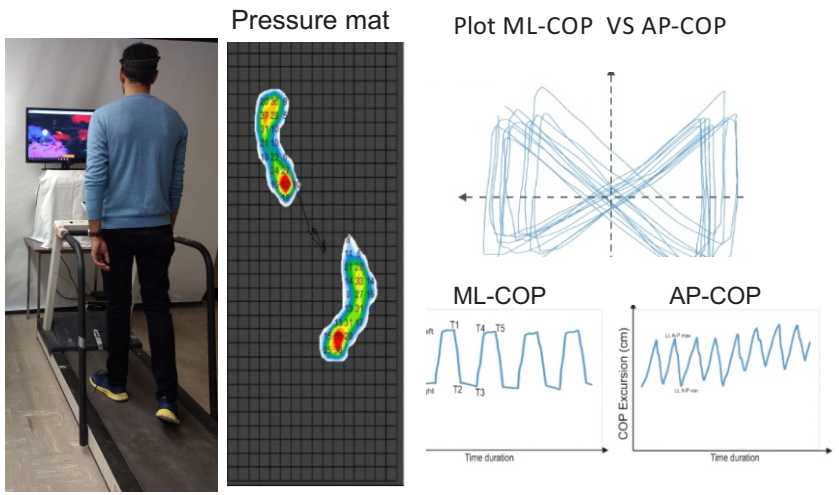
Panels A-C: Rehab tracking and target game modules used as both assessment and treatment GAMES, & equipped with automated monitoring. Panels D-G: Subjects game movement responses, coordinates of game paddle (object/handle movement trajectories) sampled at 100 Hz. Data are used to quantify manual dexterity & various visuomotor skills.



Computer game-based dual-task treadmill platform for an integrated approach to address the decline in mobility, balance, gait, vestibular and cognition (community-based screening and treatment). Rehab



Treadmill Instrumented with low-cost pressure mat. Foot contact force & CENTRE of foot pressure (COP) sampled AT 100 Hz. Single-dual-task analysis includes spatial-temporal gait parameters, entropy, frequency domain analysis and AI/Deep learning methods for fall thresholds



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GEFÖRDERT VOM
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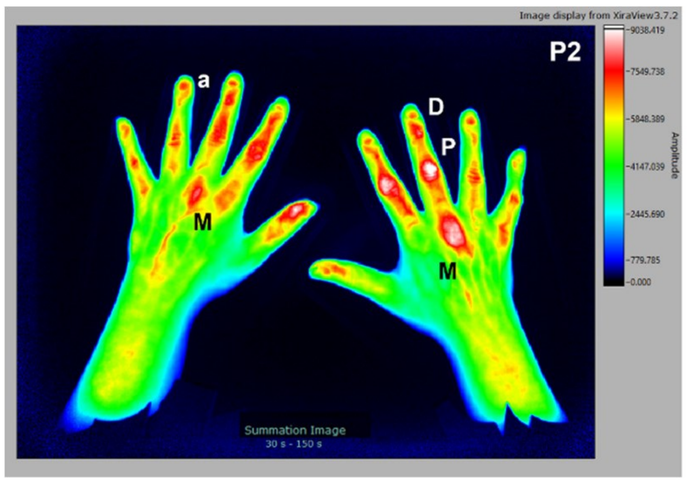
food4future

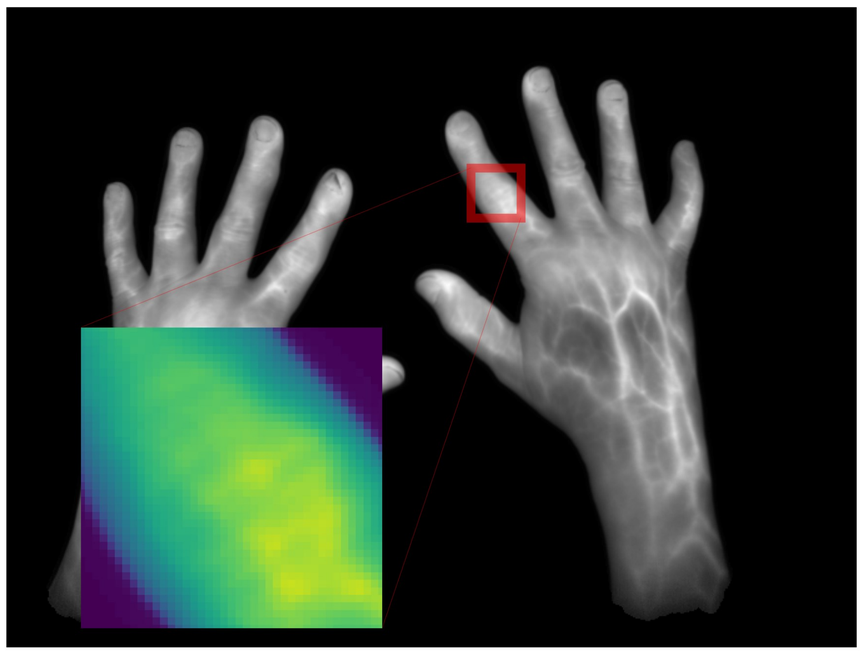
30 Jahre 1991 – 2021
Technische Hochschule Wildau
Technical University of Applied Sciences

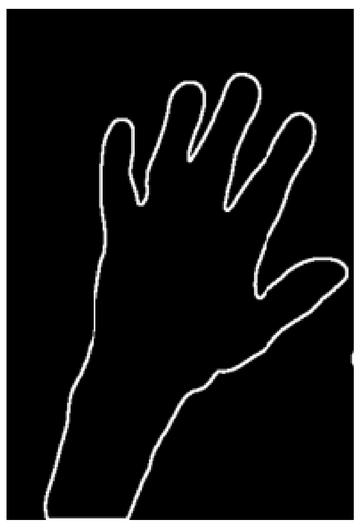
» Forschung in Wildau – innovativ und praxisnah «

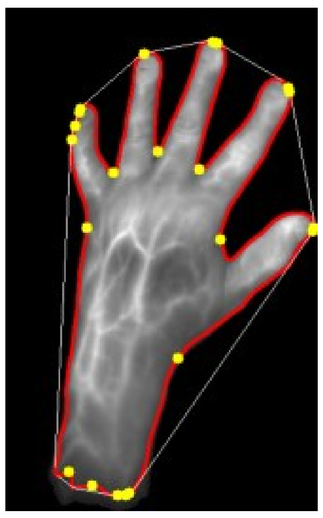
Scientific Research FG Telematics @ TH Wildau

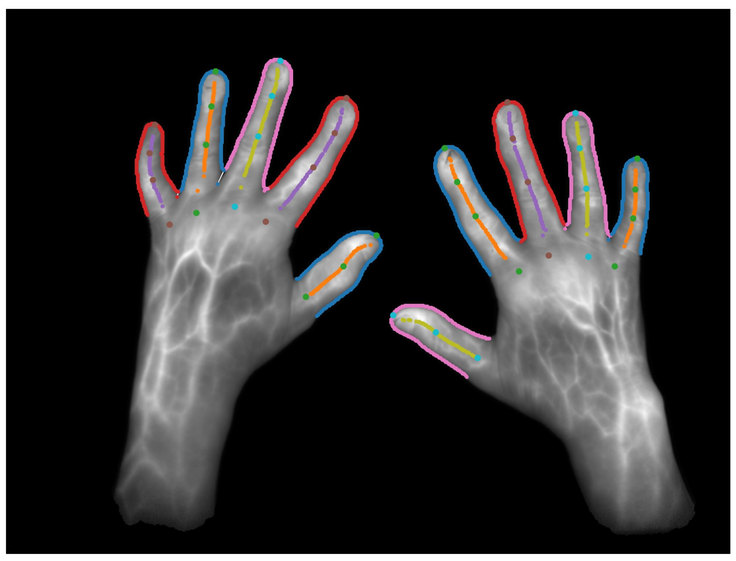
Communications Contact: stefan.kupper@th-wildau.de

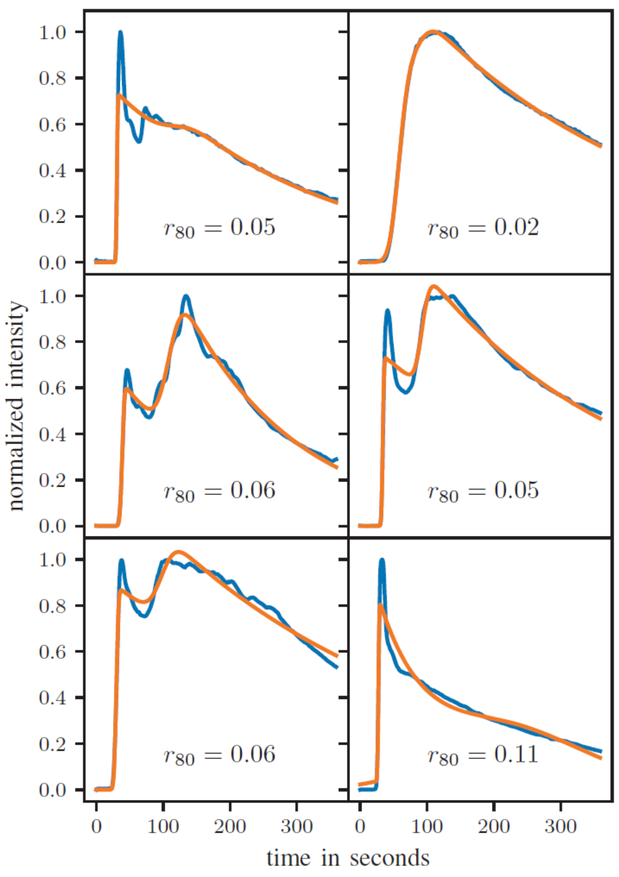


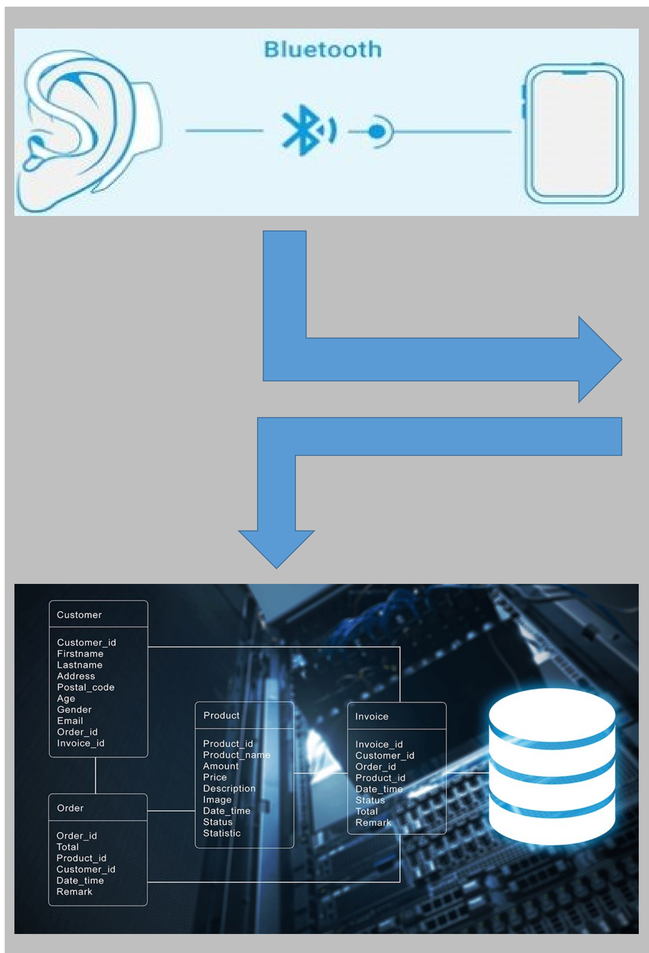


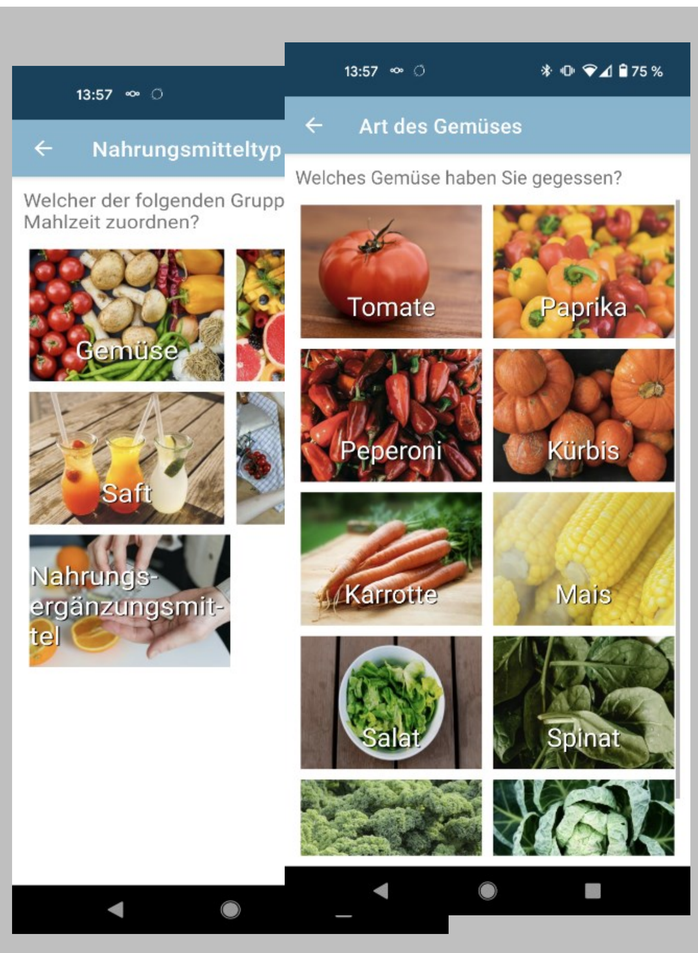


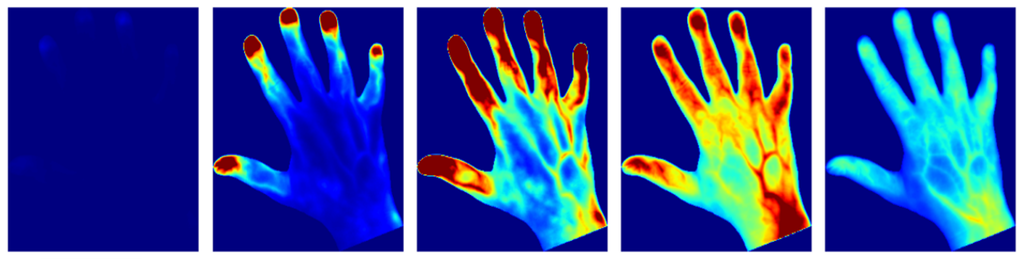


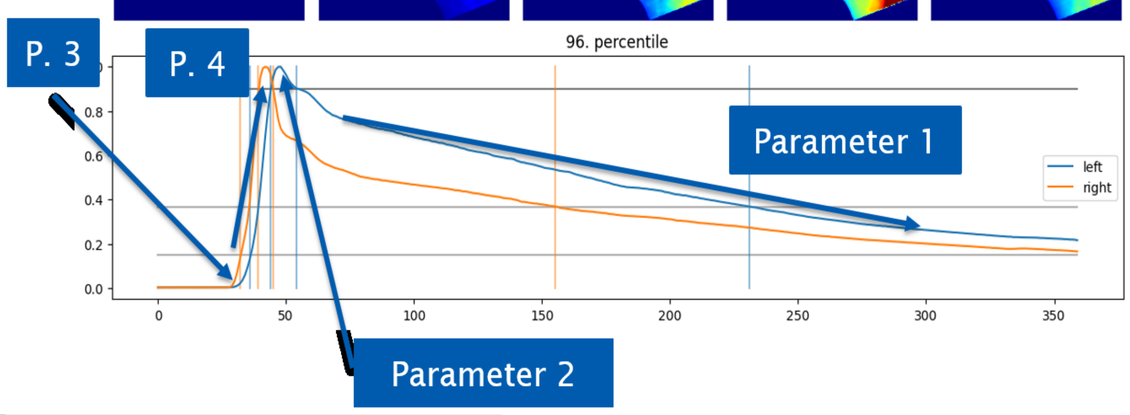


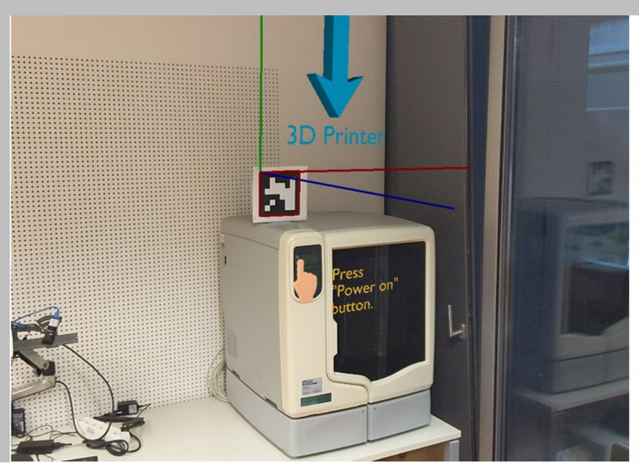


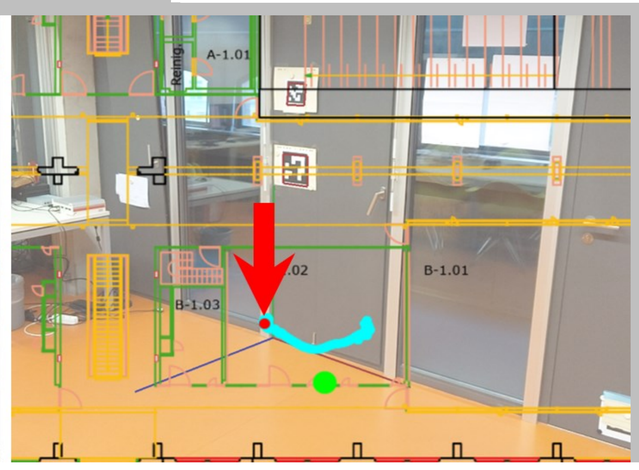












Communications Contact: stefan.kupper@th-wildau.de
https://en.th-wildau.de/research-transfer/telematics/

Energy-efficient thermal substrate processing through gray-box MPC

Lothar Berger and Stephan Scholz
RWU Ravensburg-Weingarten University of Applied Sciences

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Thermal processing in semiconductor fabrication, and biochemical engineering, consumes considerable electrical power for heating and cooling. We are working on improving thermal processing and control algorithms, aiming at enhanced stability, using less heating and cooling power. Already we developed an improved physical model and fast numerical simulation for multiple source heating plates. Now for this proposed project we intend to build upon our expertise and merge physical model and process data obtained from a test stand, to build a gray-box model of the process. This model shall then be used to develop a stable and fast model predictive embedded control algorithm on the test stand.

Concept

Goals

- Advance thermal process
- Reduce power consumption and improve yield

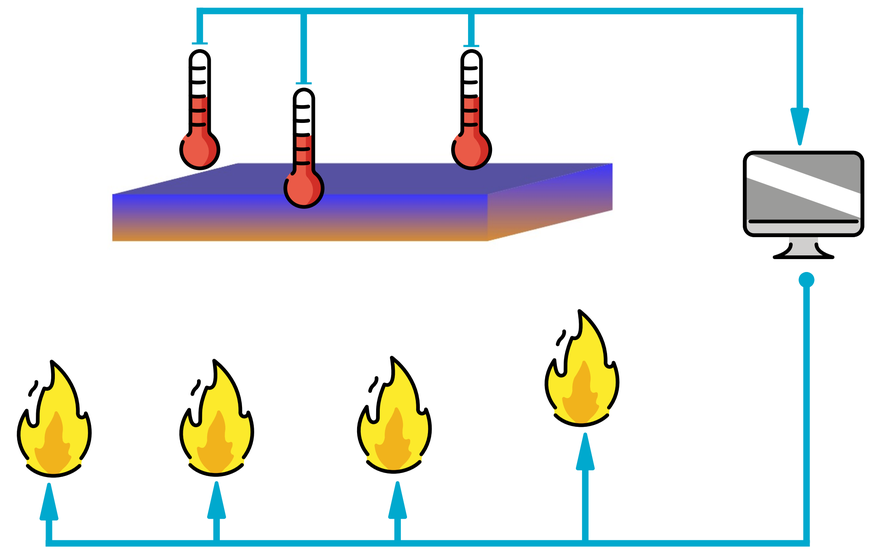
Methods

- Gray-box model: Thermal model + Process data
- Embedded model predictive control
- Software- and Hardware-in-the-loop

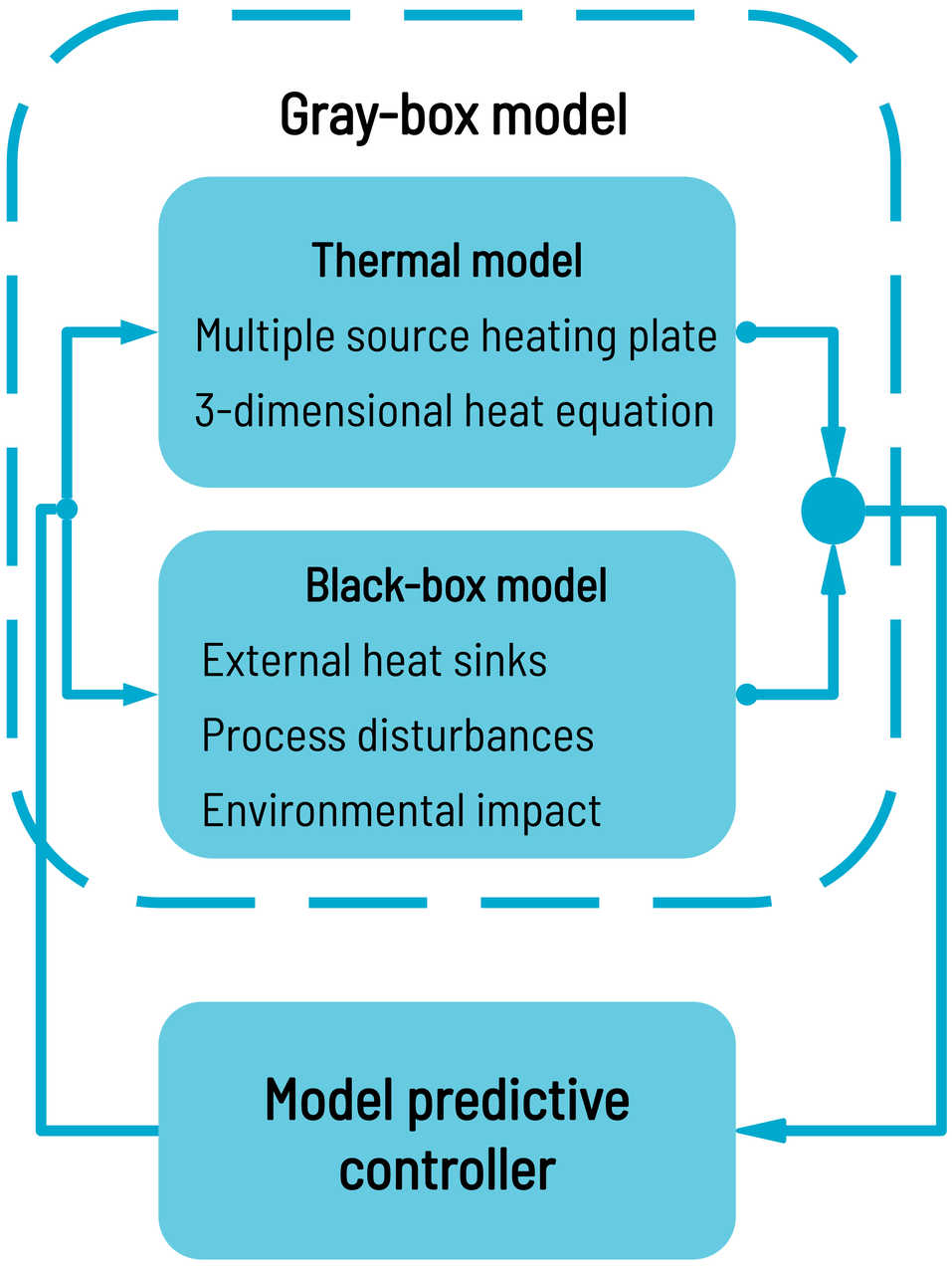
Applications

- Multiple source heating
- Semiconductor substrate thermal processing
- Biochemical engineering

Test Stand and Embedded MPC



Control System



Schedule

1. Modeling

- Setup test stand for multiple source heating plate
- Create simplified thermal model
- Build black-box model with knowledge base
- Gray-box model: unify thermal + black-box model

2. Controller Design

- Generation of reference trajectories
- Design of model predictive controller
- Stability analysis of control architecture
- Implementation of embedded controller

3. Validation

- Build + perform Hardware-in-the-loop tests
- Evaluate tests to find best controller
- Apply controller on heating plate
- Prove + optimize controller performance

Affiliation

Prof. Lothar Berger and Stephan Scholz

Control and Process Engineering Research Group

More about our research

S. Scholz, L. Berger: Modeling of a multiple source heating plate. ArXiv 2020. arxiv:2011.14939

S. Scholz, L. Berger: Hestia.jl: A Julia library for heat conduction modeling with boundary actuation. ASIM SST 2022 Proceedings

HOCHSCHULE RAVENSBURG-WEINGARTEN UNIVERSITY OF APPLIED SCIENCES

Thin Layered Ceramic Paper Product

Klaus Dölle, PhD

Department of Chemical Engineering (CHE), College of Environmental Science and Forestry (ESF),
State University of New York (SUNY), 1 Forestry Drive, Syracuse, New York, 13210, USA.

Project Description:

A Thin Layered Ceramic Paper (TLCP) products can be used for multiple applications such as; (i) high temperature ceramic insulation, catalytic & filtration applications, art applications, defense applications (hypersonic flight), and space travel.

The TLCP was originally developed for porcelain-based art applications and can be easily modified and or adopted to other technical applications as mentioned above.

Composition of the TLCP can be modified to the needs of the end product. The original TLCP composition was based on porcelain product and contained 32.0% Kaolin, 18.0% Feldspar, 18.0% Silica, 1.5% Ball Clay and 25.5% water.

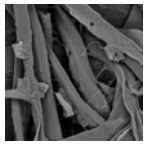
The produced TLCP on a 12-inch (304 mm) wide Fourdrinier laboratory paper machine had a ceramic filler level between 59.68% and 78.8% with a basis weight between 322.9 g/m² and 693.7 g/m² and can be converted into any shape needed. After conversion the TLCP is fired in gas kiln to produce its final shape and properties during bisque and glaze firing at cone 10 (1300°C/2380°F). The fiber material combusts, and the ceramic filler material mixture acts as common porcelain fusing together and holding the desired shape of the fired piece.

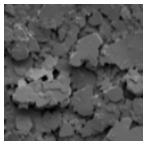
Project Reason:

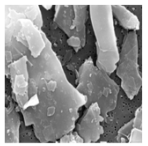
- Driven by the need of ceramic artists to work with thin layered materials
- Natural fiber materials are known for their sustainability, biodegradability, and its eco efficiency
- Clay material can not be pressed below 1 mm and formed easily
- Students and personal interest.

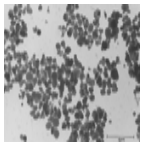
Investigator:

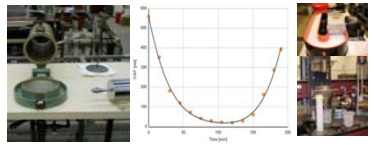
Materials:


Softwood Fiber


Kaolin/Ball Clay


Magnesium Silicate


Titanium dioxide, etc…

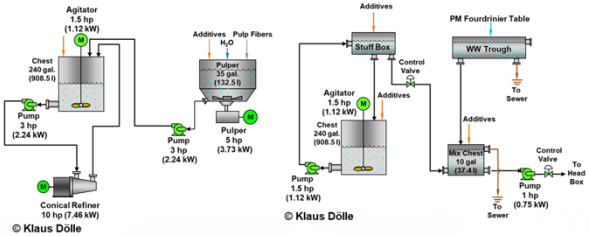

Laboratory Development & Handsheet making

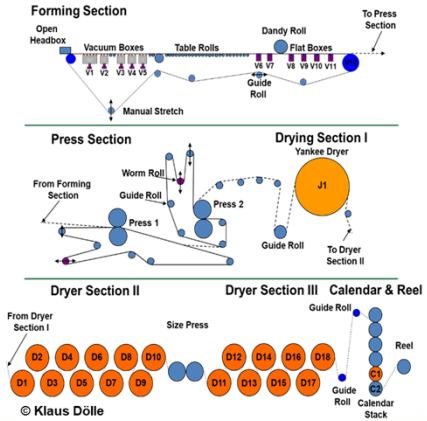
12” (304 mm) TLCP Paper Machine Run:

- Basis weight between <300 g/m²and >600 g/m²
- Fibers refined to CSF 400 m
- 48 lbs. of fiber needed to run for ≈6 hours
- PM speed of up to 6 ft/min (1.8 m/min)
- Dryer can temperatures at 160.0°C (320°F). to182.2°C (360°F)
- Retention of ceramic composite 80%
- Ceramic composite selected based on application

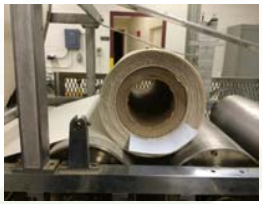
In Addition:

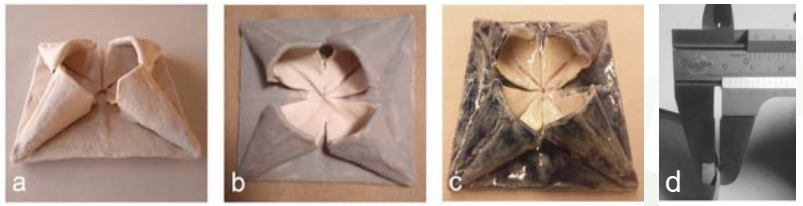
- TLCP can be produced on 48” (1,204 mm) wide ESF Pilot PM for large scale applications





12” Laboratory PM – TLCP Results:


Rolled up TLCP Paper Product



TLCP material converted; a) after 1st firing, b) glazed, c) ceramic paper origami after 2nd firing with glaze, d) thickness

Conclusion TLCP Material:

- Material can be produced on a 12” laboratory paper machine
- Basis weight can be lower then 300 g/m² and larger then 600 g/m²
- Material can be produced with thicknesses of <1 mm larger
- Composition can be adjusted to application needs
- Material can be fired at temperatures > 1300°C (2380°F)
- Material is heat resistant
- Material can be converted into any shape and form using common procedures

Other Possible TLCP Applications:

- Linings for rockets jet nozzles, turbine blades
- Aircraft parts that require high temperature reissuance
- Ballistic armor in any shape and thickness for projectiles and vehicles
- Body armor
- Air and space application
- Hypersonic flight applications
- Filtration applications
- Wear parts for heat resistance application such as breaks, exhaust systems, etc.

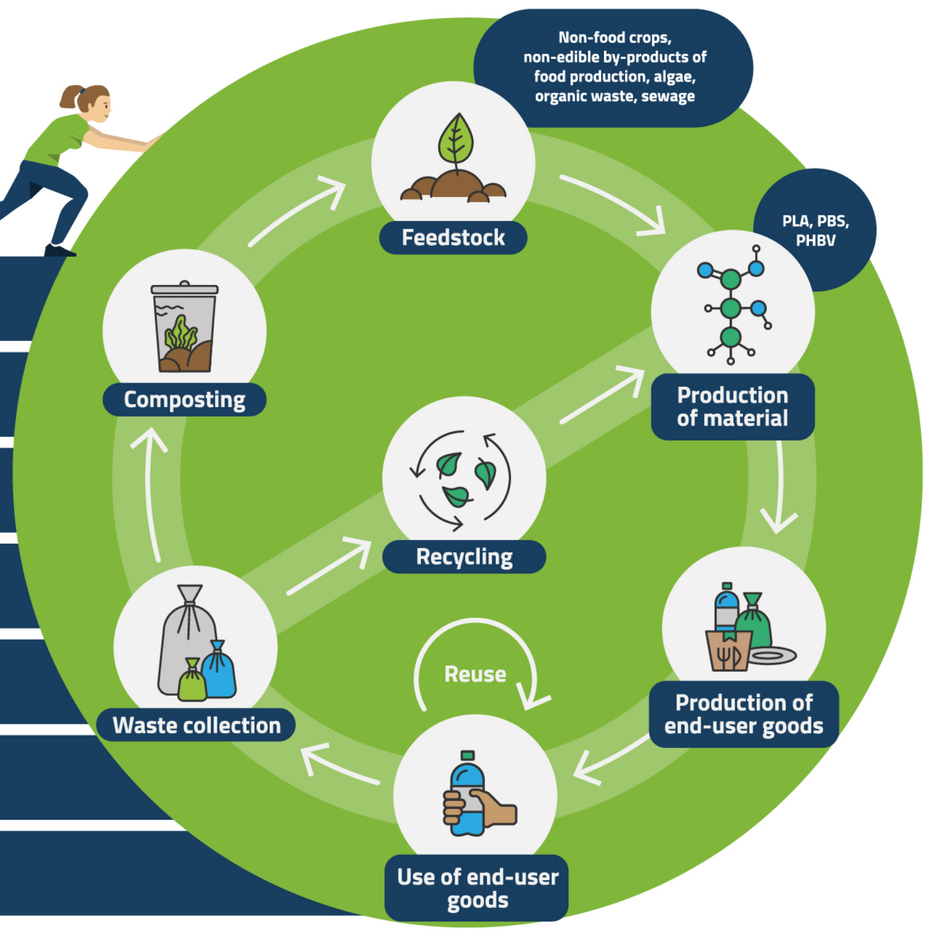
BIO PLASTICS EUROPE

COORDINATION: **HAW HAMBURG**
DURATION: **10/2019 - 09/2023**
BUDGET: **8.3 M EUR**
FUNDING: **EU HORIZON 2020**
PARTNERS: **22**

DEVELOPING AND IMPLEMENTING SUSTAINABILITY-BASED SOLUTIONS FOR BIO-BASED PLASTIC PRODUCTION AND USE TO PRESERVE LAND AND SEA ENVIRONMENTAL QUALITY IN EUROPE

BIO-PLASTICS EUROPE PUSHES TOWARDS CIRCULAR ECONOMY

- **WP3** Identification and test of innovative product design
- **WP4** waste collection, recycling and littering
- **WP5** Prenormative research and field tests
- **WP6** Health and environmental safety
- **WP7** Replication, policy-making, capacity-building and upscaling
- **WP8** Life cycle assessment environmental and economic
- **WP9** Information, communication, and dissemination of results



DEVELOPMENT OF INNOVATIVE MATERIALS

To foster and encourage deployment of five innovaite bio-based and biodegradable materials.

FOCUS

- 5 Applications on Land: Cutlery, Soft and Rigid Packaging, Agricultural Mulch Film and Toys
- 3 Applications on Sea: Geo-membrane, Fishing Baits and Crates

DEVELOPMENT OF BUSINESS MODELS

To experimente with innovative business models by incorporating circularity and sustainability to maximize the value of materials along the entire value chain.

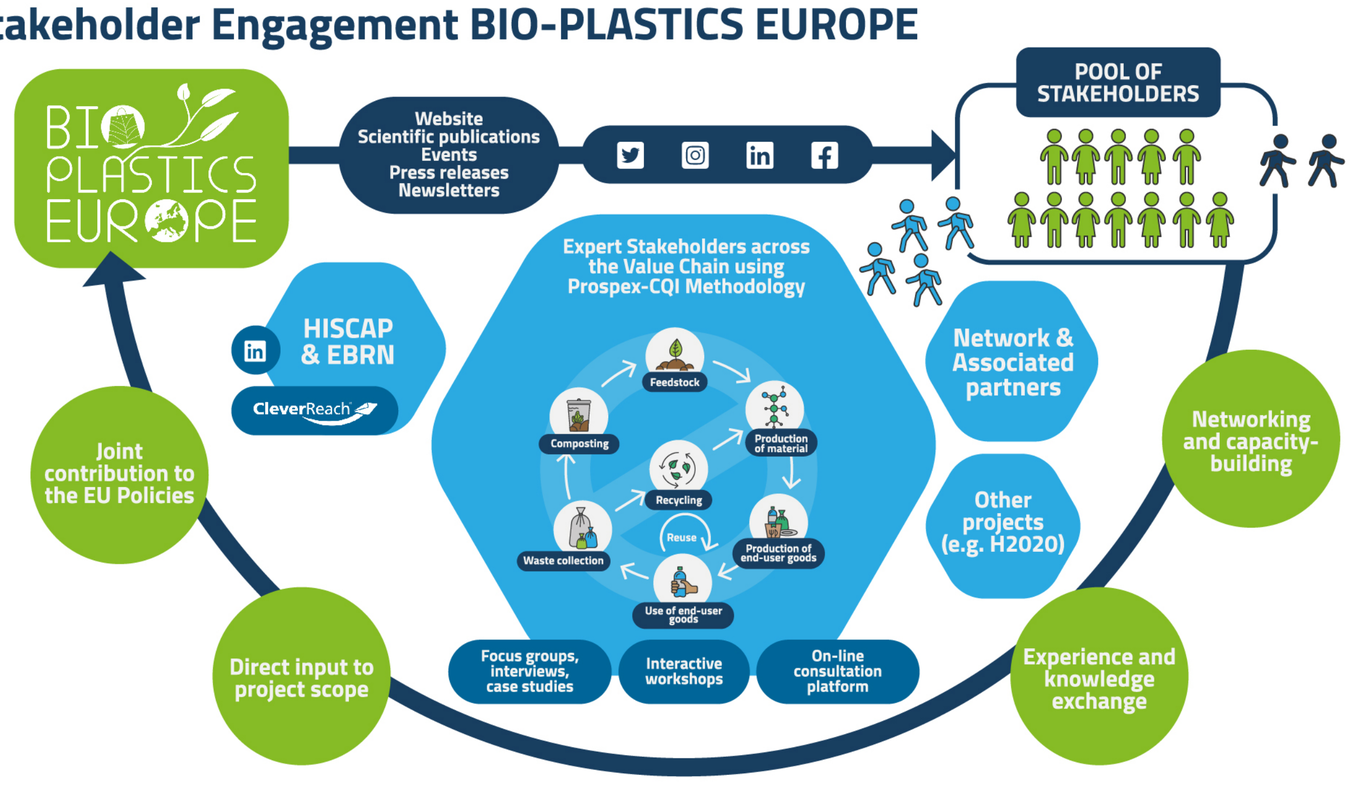
DEVELOPMENT OF SAFETY PROTOCOLS

To ensure the safe use and end-of-life management of innovative bio-based plastics.

STAKEHOLDER ENGAGEMENT

To ensure strong commitment of producers, politicians, industrial and private consumers.
Join us here:
https://bioplasticseurope.eu/stakeholderengagement

Stakeholder Engagement BIO-PLASTICS EUROPE



CONTACT INFO

HAMBURG UNIVERSITY OF APPLIED SCIENCES
Research and Transfer Centre
"Sustainability and Climate Change Management" (FTZ-NK)
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 860407

PARTNERS

Titanate nanotubes as catalyst support for PEM fuel cells

TECHNISCHE HOCHSCHULE NÜRNBERG
GEORG SIMON OHM

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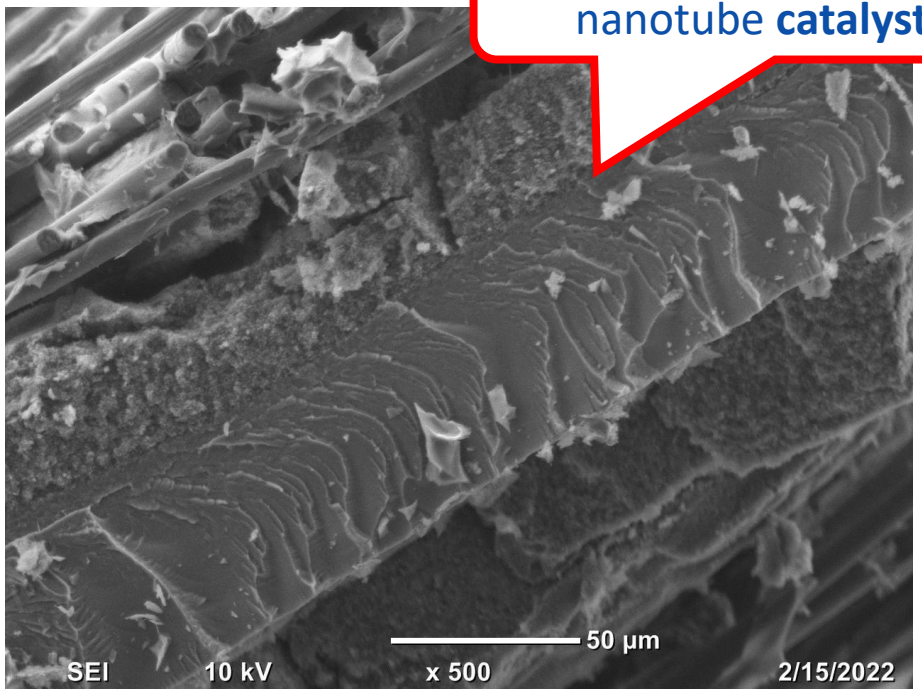
Our goal: We want to improve PEM fuel cell long term stability!

We offer:

- Development and lab-scale synthesis of novel **nanomaterials**
- Materials **characterization** (XRD, SEM, DRS, impedance spectroscopy)
- **Thin film** technologies (screen printing, doctor blade coating)



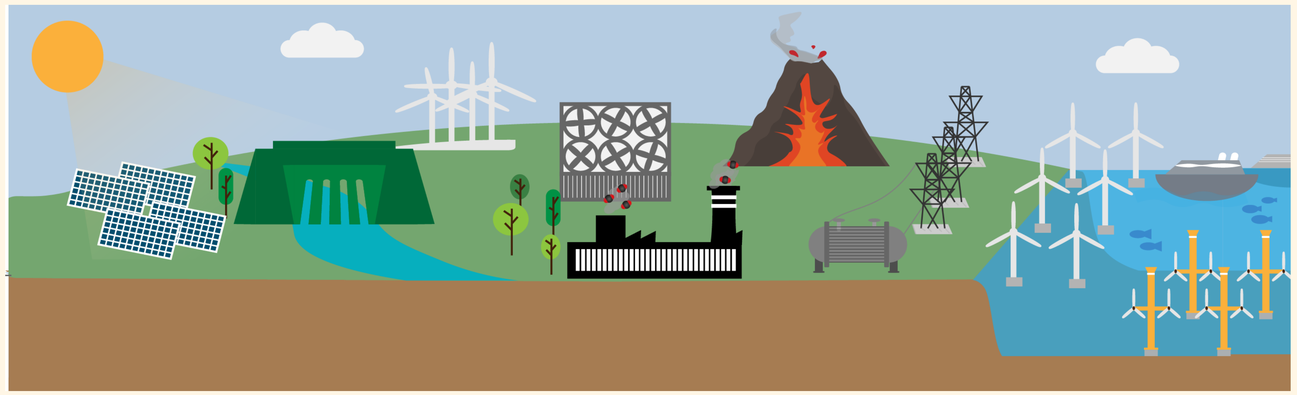
We seek cooperation on:

- **Scale-up** of nanomaterial synthesis and fuel cell fabrication
- Full characterization of complete **fuel cell systems**
- Advanced material characterization (e.g. **TEM, XPS**)

Prof. Dr. Uta Helbig
Technische Hochschule Nürnberg Georg Simon Ohm,
Department for Materials Technology
uta.helbig@th-nuernberg.de

Engineered Interfaces for Sustainable Energy (EISEn) Lab

Group Leader: Professor Sami Khan | Simon Fraser University | Surrey Campus

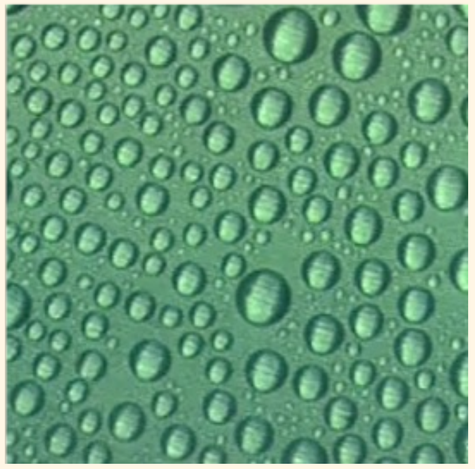


Sustainable energy systems around us are growing!

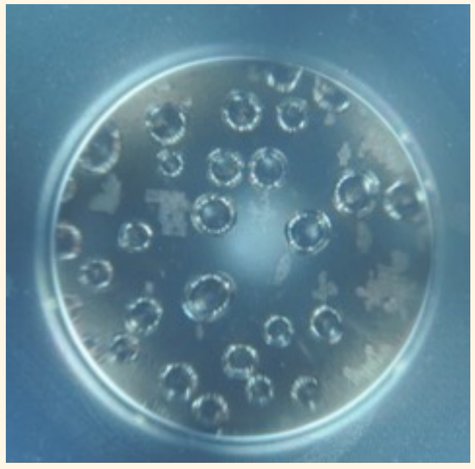
New School of Sustainable Energy Engineering @ SFU

The EISEn group @ SFU studies fundamental interfacial processes and develops smart materials to enhance **performance** and **longevity** of sustainable energy systems, particularly focusing on **hydrogen energy** and **carbon capture directly from air.**

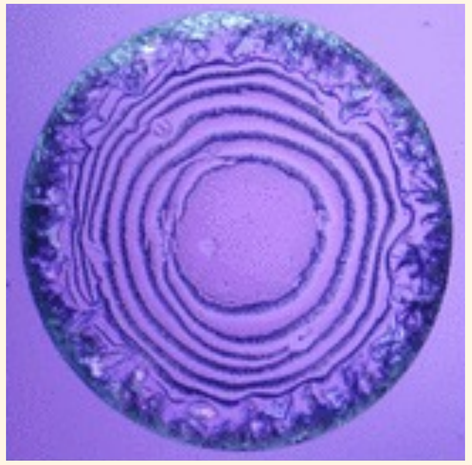
Enhancing CO_2 Capture + Conversion



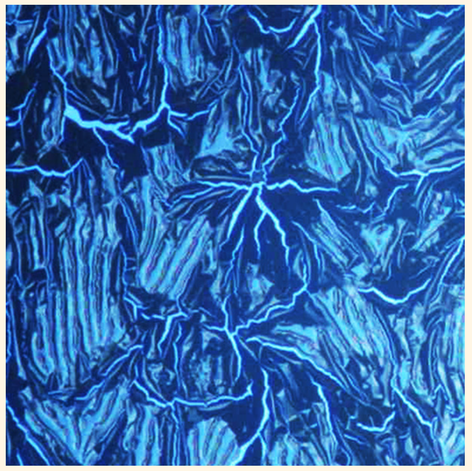
Developing New Water-repellent Materials



Expediting Hydrogen Evolution



Studying Crystals: Nucleation + Growth



Corrosion Reduction in Hydrogen Systems

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Visit our lab! SFU Surrey Campus | Building SRYE | Room 4046

Email: s_khan@sfu.ca | Tel: +1-778-782-7378 | Website: http://www.khanresearchlab.com

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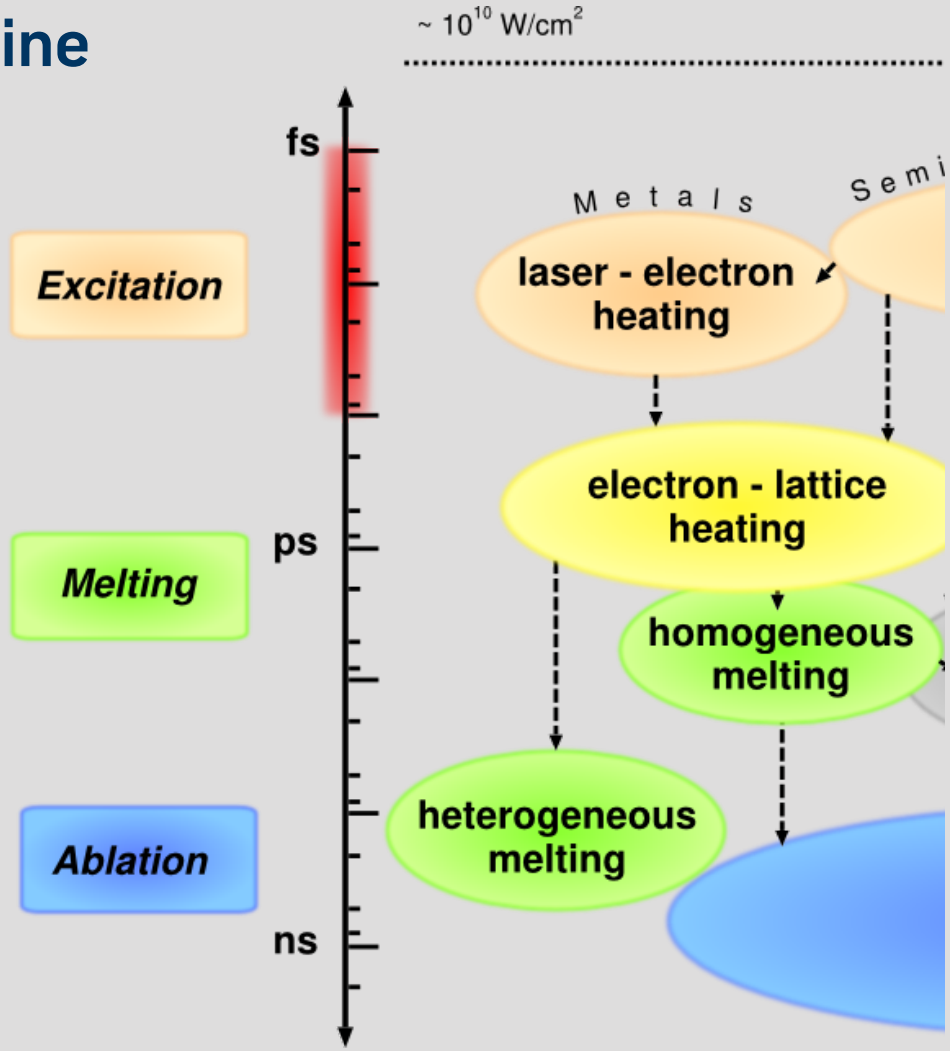
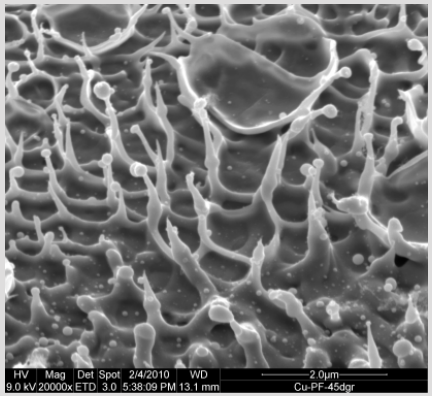
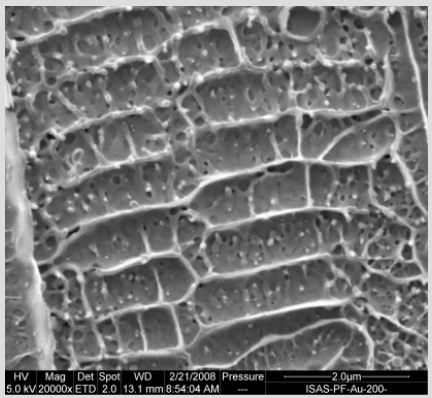
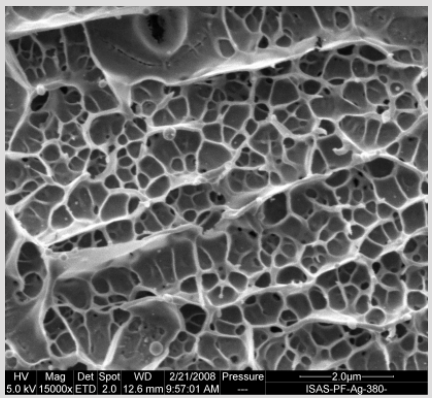
Outline

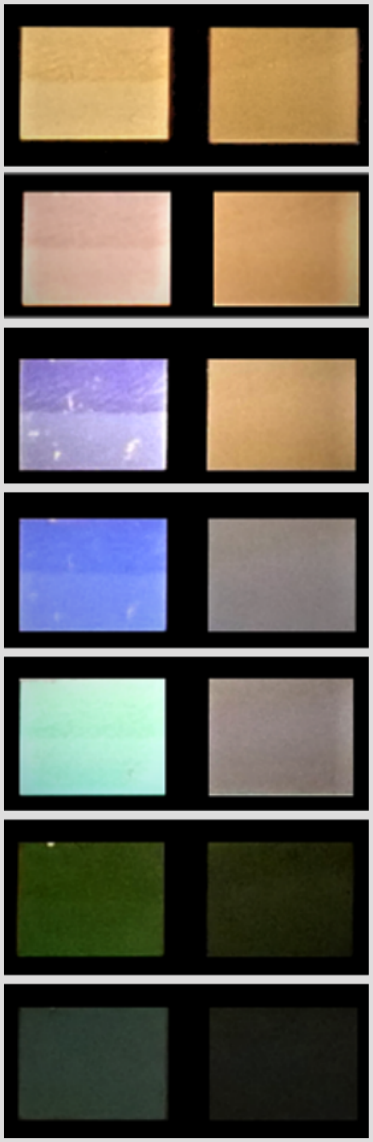


Retheld et al 2017 J. Phys. D: Appl. Phys. 50 193001









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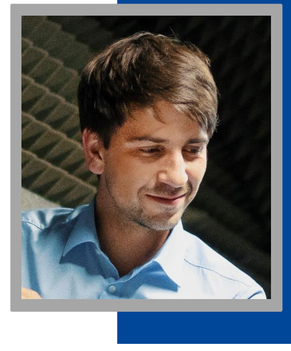
A Concept for the Assessment of End-of-Life (EoL) Composite Structures for a Circular Economy

Michael Kucher[1], Philipp Johst[1], Robert Böhm[1]

[1]Faculty of Engineering, Leipzig University of Applied Sciences, PF 30 11 66, 04251 Leipzig, Germany; michael.kucher@htwk-leipzig.de



Motivation

- A Large Amount of Waste from EoL Composite Parts
- Limited Resources
- High Emission during New Production and Disposal

Different Kinds of EoL Composite Waste:

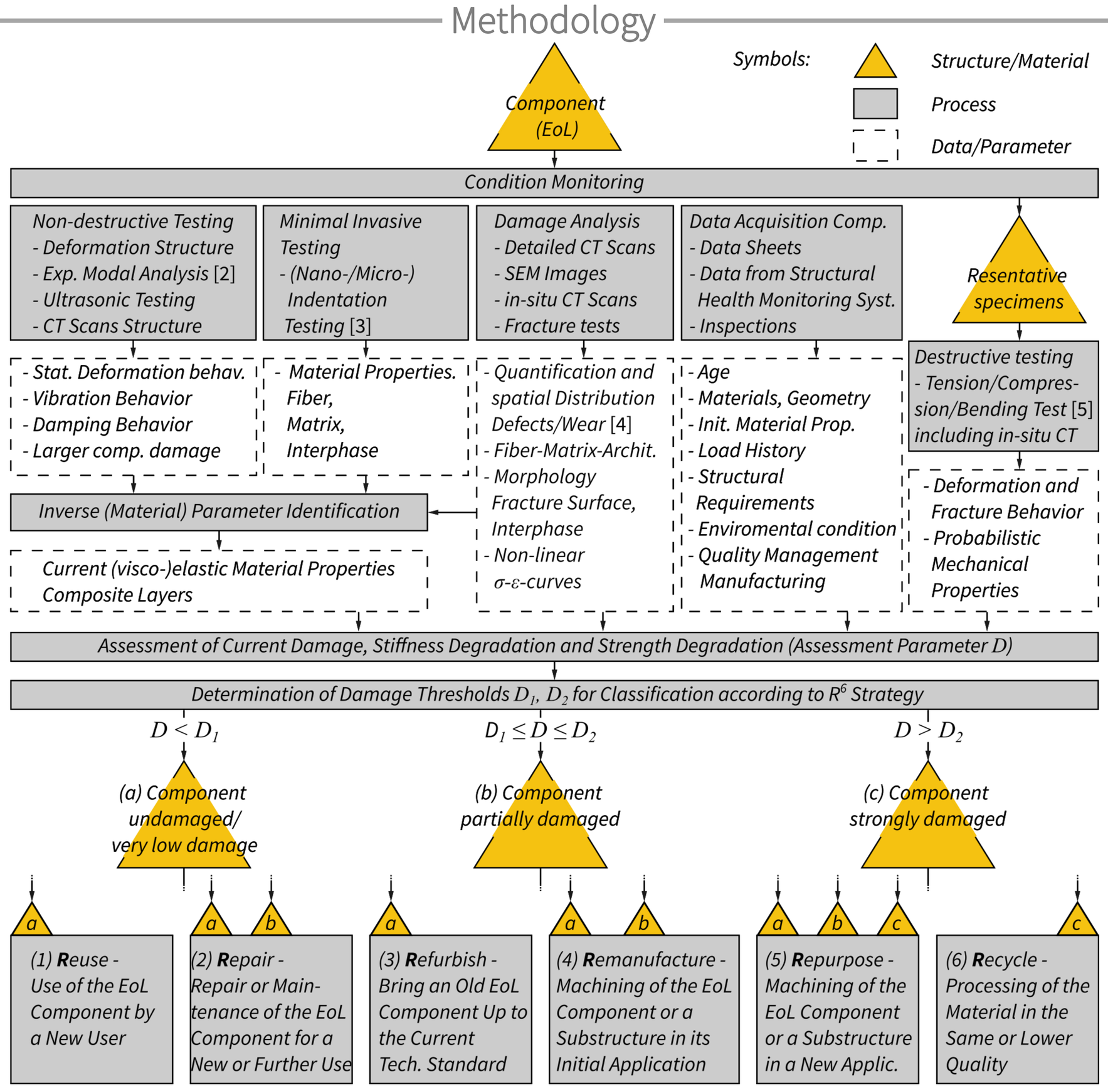
- Glass Fiber Boats

- Glass Fiber Rotor Blades

- Aircraft Components

- Semi-finished Products

Methodology



Conclusions

- A **large amount** of EoL **composite parts** will accumulate within the next decades.
- To **reduce emissions** and to ensure the **availability** of these composite materials, the use of a **circular economy** is targeted.
- This requires the **classification** of the EoL components (**R⁶ strategy** [1]).
- By using all **available component data** and properties, an **assessment** of the EoL state and thus a classification into these classes can be proceed.
- For this assessment, a **comprehensive condition monitoring** of the components is required.

Related Literature

[1] Johst, P.; Schulz, P.; Kucher, M.; et al.: Identification and critical assessment of circular eco-systems for aerospace composite components based on a novel R6-strategy. *12th EASN International Conference on Innovation in Aviation and Space for opening New Horizons*, Barcelona, Spain, 18.-21.10.2022

[2] Kucher, M.; Dannemann, M.; Böhm, R; Modler, N.: An experimental approach for the determination of the mechanical properties of base-excited polymeric specimens at higher frequency modes. *Vibration* 5 (2022), pp. 429-441, 10.3390/vibration5030024

[3] Kucher, M.; Dannemann, M.; Modler, N.; et al.: Mapping of the micro-mechanical properties of human root dentin by means of microindentation. *Materials* 14 (2021), 10.3390/ma14030505

[4] Kucher, M.; Dannemann, M.; Füßel, R.; et al.: Sliding friction and wear of human teeth against biocompatible polyether ether ketone (PEEK) under various wear conditions. *Wear* 486-487 (2021), pp. 204110, 10.1016/j.wear.2021.204110

[5] Kucher, M.; Dannemann, M.; Heide, A.; et al.: Miniaturised rod-shaped polymer structures with wire or fibre reinforcement – manufacturing and testing. *J Compos Sci* 4 (2020), pp. 84, 10.3390/jcs4030084

Acknowledgment

This research was funded by the EU HORIZON-CL4-2021-RESILIENCE-01 project “A Digitized, Resource-Efficient and Resilient Industry 2021” (HORIZON Research and Innovation Actions, Contract Number 101058089). Furthermore, the results obtained are partly due to funding by the German Research Foundation (grant no. DA 1701/1).

HTWK

ING Fakultät Ingenieurwissenschaften

INSTITUTE FOR FLOW IN ADDITIVELY MANUFACTURED POROUS MEDIA (ISAPS) PROJECTS AND RESEARCH

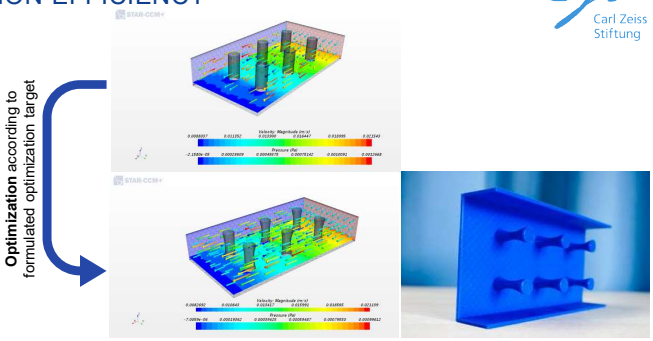
HEILBRONN UNIVERSITY OF APPLIED SCIENCES

Research group: Fluid mechanics

Natalie Jüngling*, Laura Bittel, Jennifer Niessner
Presenting author email: natalie.juengling@hs-heilbronn.de

RESEARCH COMPETENCE: TOPOLOGY OPTIMIZATION OF FILTER STRUCTURES W. R. T. PRESSURE DROP AND SEPARATION EFFICIENCY

- State of the art: Topology optimization with single cost function
  New: Optimizations with regard to various partially opposing properties
- After calculating the flow on an initial geometry, the adjoint solver is used to identify sensitivities on the surface with respect to one or more cost functions.
- The cost functions must be derivable and reflect the properties of interest such as pressure loss (state of the art) and separation efficiency.
- An algorithm combines several cost functions.
- The initial geometry is deformed w. r. t. the new combined cost function.
- Method is applied iteratively. At the end, an "optimal" geometry (local optimum) is created .
- The new geometry can be manufactured additively and functionalized by coating.



Juengling et al. (2021): Adjoint-based topology optimization of filter structures for gas–particle systems. In: AIP Advances 11, 065008 (2021) DOI: 10.1063/5.0052567

Figure 1: Topology optimization of a cylindrical structure (e.g. filter fiber) by simulation according to formulated optimization objective e.g. minimum c_w value

RESEARCH METHOD:
EXPERIMENTAL AND NUMERICAL APPROACH OF OPTIMIZING FILTERS

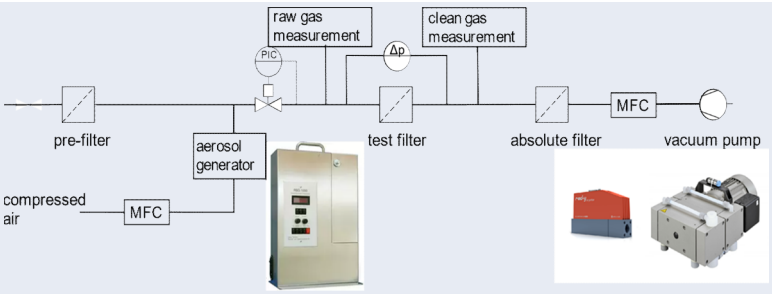


Figure 2: Test rig for Aerosol filtration (pressure drop and filtrations efficiency of existing filter material and additive manufactured samples)

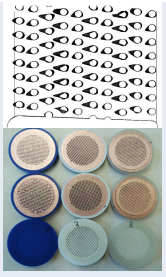


Figure 3: Section through the optimized deformed structure (flow direction from left to right; additively manufactured and coated samples of filter material (photo U. Gleiter)

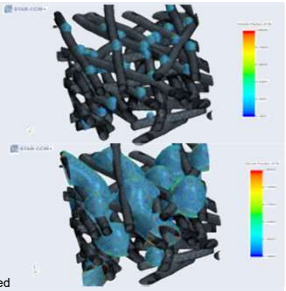


Figure 4: CFD micro-scale simulation of the liquid phase of a coalescing fiber in a filter medium. (volume of fluid simulation)

FURTHER RESEARCH COMPETENCES: THE DEVELOPMENT OF A WORKFLOW FOR THE OPTIMIZATION OF A FILTER MEDIUM BASED ON EXPERIMENTATION AND SIMULATION

- Generating a real geometry of a filter material via µCT-Scan.
- Creation of a geometry mesh for CFD micro-scale simulation and implementation of the physics for the droplets in the air and for the liquid/separated phase (continuous and disperse phase).
- Application of the implemented models to real filter geometries (special oil filters/coalescence filters or other new developed material).
- Comparison of simulated and real measured fractional separation efficiency and transfer of the constitutive relationships to the macro-scale.
- The macro-scale allows the CFD simulation of complete filters to determine the pressure drop across the entire filter as a function of the loading.
- The aim is to couple the macroscale with the results of the simulation from the microscale, e.g. separation efficiency as a function of flow velocity and saturation.

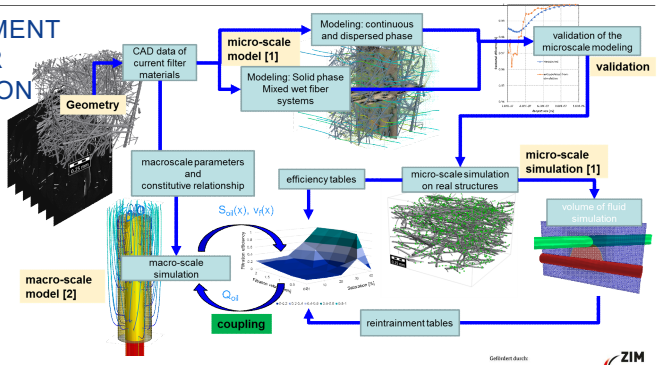


Figure 5: Workflow for the optimization of a filter.

[1] Hoch et al. (2020): Comparison of Voxel-Based and Mesh-Based CFD Models for Aerosol Deposition on Complex Fibrous Filters. In: *Chem. Eng. Technol.* 43 (12), S. 2538–2547. DOI: 10.1002/ceat.202000318
[2] Baumann et al. (2020) Macro-scale modeling and simulation of two-phase flow in fibrous liquid aerosol filters, Engineering Applications of Computational Fluid Mechanics, 14:1, 1325-1336, DOI: 10.1080/19942060.2020.1828174

AN EXCERPT FROM THE KNOW-HOW OF THE RESEARCH GROUP FOR FLUID MECHANICS

- CFD simulations with the software StarCCM+, ANSYS Fluent, GeoDict and OpenFOAM
- Thermal comfort measurements and evaluation according to DIN EN ISO 7730
- Setup of sensor networks and evaluation of flow velocity and environmental parameters (e.g. aerosol particle concentration, CO2 concentration, temperature etc.)
- Numerical methods to reduce the complexity of computational fluid dynamics CFD simulations
- Topology optimization of e.g. filter structures, etc. (experimental and simulative development)
- Experimental and simulative investigation of indoor air filters and purifiers
- Investigation of filter media and filters (e.g. microplastic test rig, aerosol mist test rig, etc.)
- Bio-aerosol protection by ready-to-use and optimized protective masks (mask test rig)
- Analysis: ISPAPS has its own µCT-Scanner (Bruker micro CT SkyScan 1271 with a resolution up to < 0,45 µm/px)

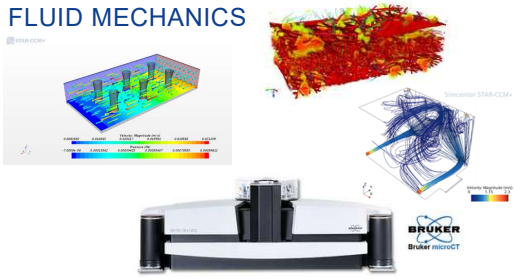


Figure 6: CFD-Simulation of flow through a mask; CFD-Simulation of a filter structure after topology optimization; Streamlines from a CFD simulation in an indoor environment; Buker micro CT (SkyScan 1271)

Institute for Flow in Additively Manufactured Porous Media (ISAPS), Heilbronn University of Applied Sciences, Max-Planck-Straße 39, 74081 Heilbronn, Germany

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BIfAM
Bielefeld Institute for Applied Materials Research

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Aims of the institute

- interdisciplinary research in cooperation with universities and industry
- facing the great societal challenges with innovative approaches – from fundamental research on novel materials, via material and technology development towards product and process development

What we do

- national and international research projects in the field of materials science & engineering
- developing novel, application-oriented solutions for all sort of materials-oriented challenges

Members

PROF. DR. CHRISTIAN SCHRÖDER

Head of Institute

Computational Materials Research
Multiphysics simulations
Simulation based optimization

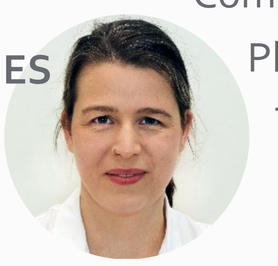
PROF. DR. BRUNO HÜSGEN

Vice Head of Institute

Plastics technology/analytics
Compounding

PROF. DR. ANGELA RIES

Plastic hybrid composites
Thermoplastic fiber composites
Hot compaction
Injection molding



Thermal and energy efficient systems
Inductive energy transmission
Sensor systems

PROF. DR. SONJA SCHÖNING

Thin film technology
CVD/PVD coatings
Surface analysis
Photovoltaics

PROF. DR. FRANK HAMELMANN

PROF. DR. CHRISTOPH JAROSCHEK

Sustainable use of plastics
Tool technology and temperature control

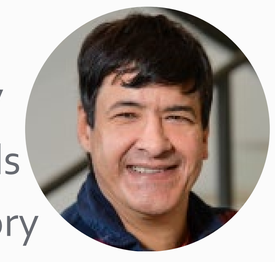
MEMS and sensor systems
Printed circuit board
SMD technology
Microsystems technology

PROF. DR. DIRK ZIELKE

PROF. DR. THOMAS KORDISCH

Lightweight materials
Composite materials
Materials testing
Failure analysis
Material characterization
Fatigue behavior

Formulation technology
Application specific biomaterials
Synthesis and analytics laboratory



PROF. DR. ANANT PATEL

PROF. DR. EM. WOLF-BEREND BUSCH

Selection of current research equipment

(1) Twin-screw extruder: development of novel materials and formulations in engineering plastics, bioplastics and polymer composites
(2) Hybrid-3D-printer: for printing combination of several different materials
(3) SEM with in-situ bending module

Contact| Dr. Julia Pieper | julia.pieper@fh-bielefeld.de

Center for interdisciplinary materials research and technology development
CiMT

CiMT – in cooperation with Bielefeld University and local industry

FH Bielefeld
University of Applied Sciences

Intelligent Natural Fiber Composites
Carl-Zeiss Project / University of Applied Science Trier

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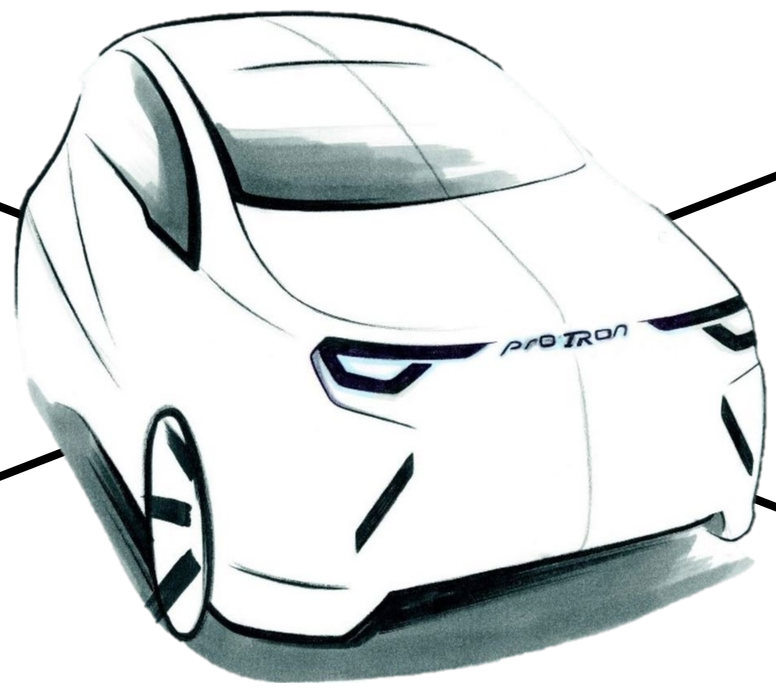
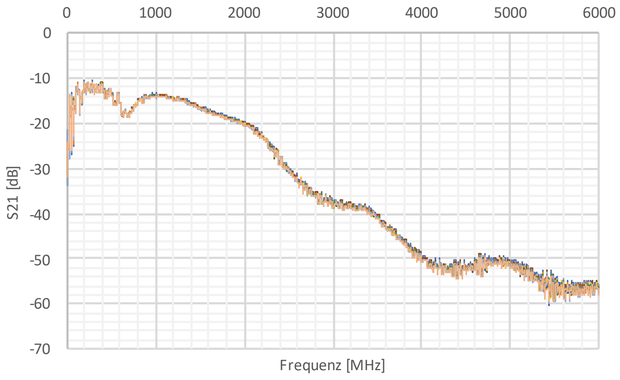
Prof. Dr-Ing. Klaus Peter Koch
Head of Medical Engineering (B.Sc.) | Head of Interdisciplinary Engineering (M.Sc.)
Department of Engineering, Trier University of Applied Sciences, Germany

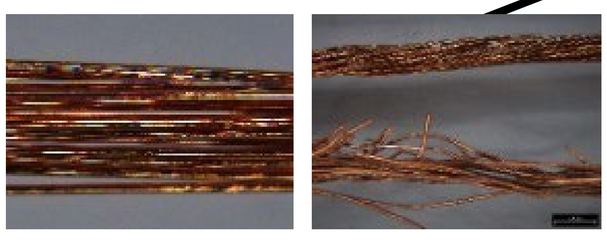
We are the University of Applied Sciene Trier, and we are engaged in the monitoring of structural components made of natural fiber composite material using integrated conductor materials with high-frequency alternating currents, as well as cable microphonics.

Natural Fibre Composite

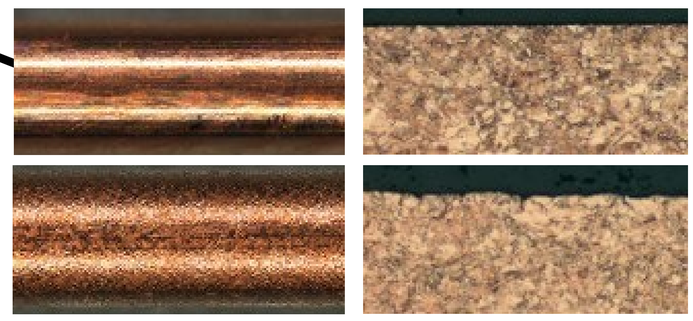




Life cycle indicators



electrical wires



Aging characteristics

Figure 1: Project outline, Carl-Zeiss Projekt

Cable Microphonic

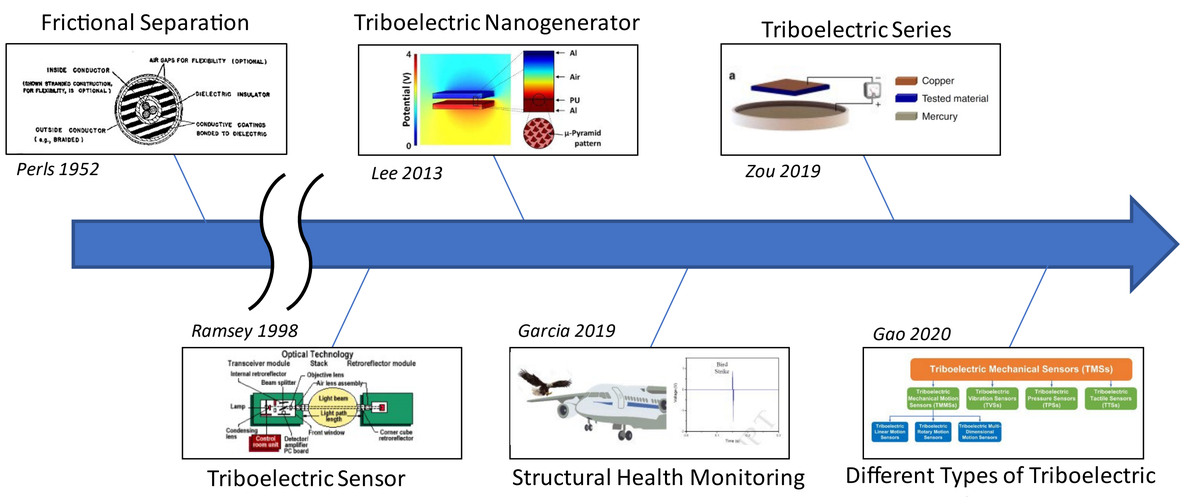


Figure 2: Historical development cable microphonic

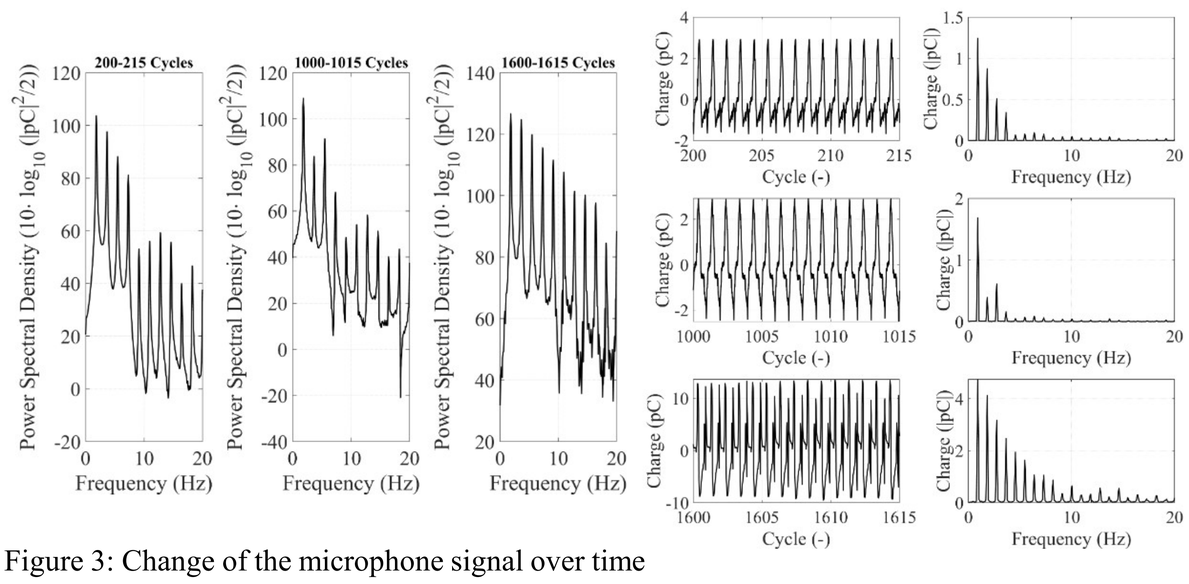


Figure 3: Change of the microphone signal over time

High-Frequency alternating current

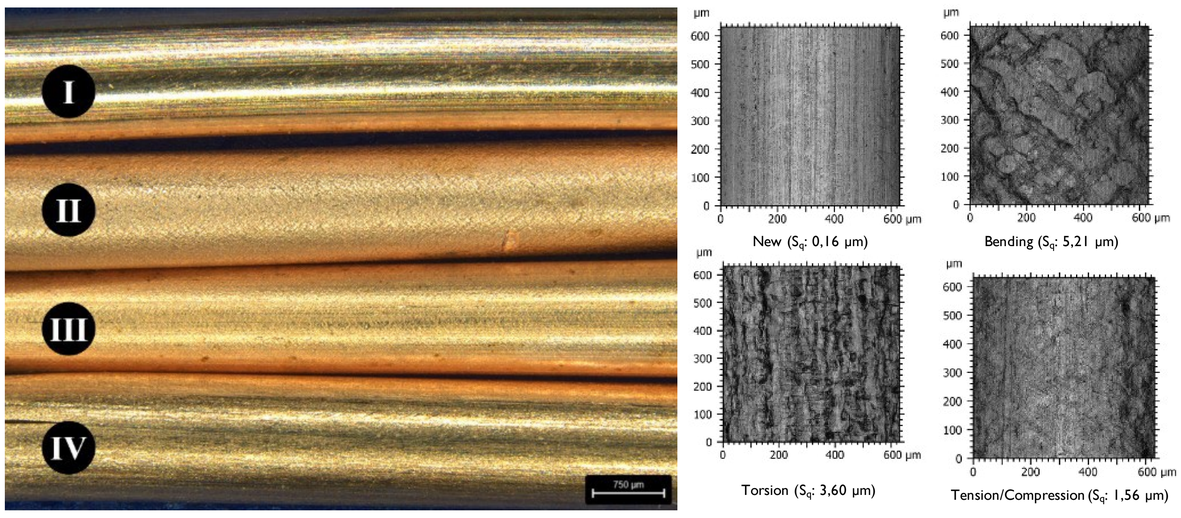


Figure 4: Surface roughness on copper conductors (H07V-U 1,5 mm²) due to mechanical stress. (I) untreated, (II) bending, (III) tension/compression and (IV) torsion.

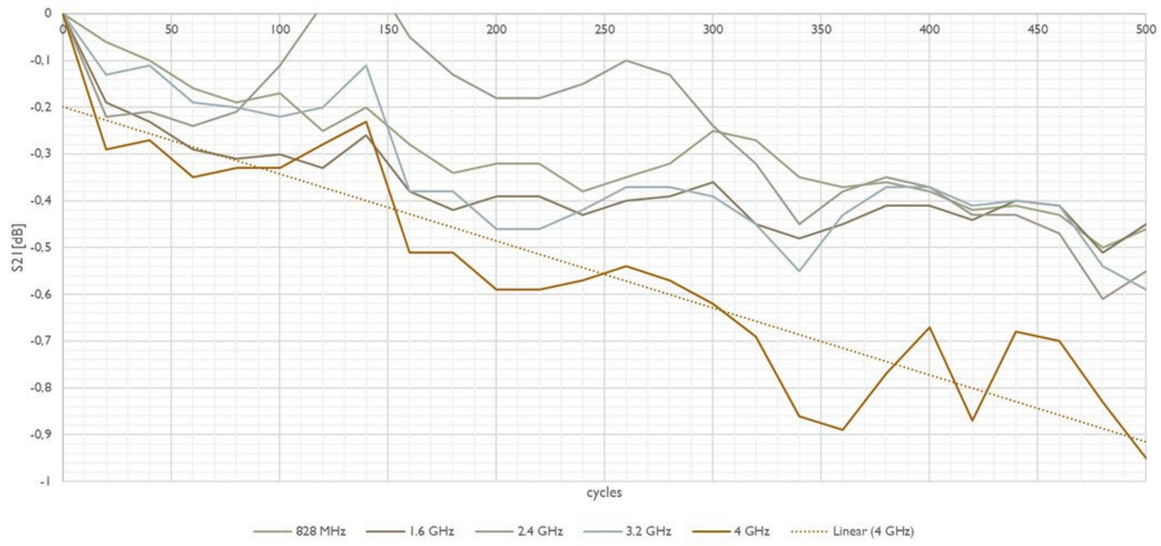


Figure 5: Change in damping over the lifetime at different frequencies

Technik Hauptcampus | HOCHSCHULE TRIER

INTELLIGENTE NATURFASER VERBUND WERKSTOFFE
Carl-Zeiss Stiftung

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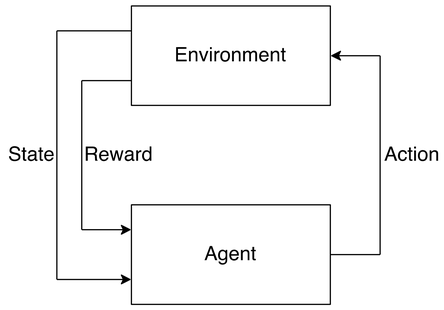
Control Invariant Set Based Reinforcement Learning for Process Control

Song Bo, Jinfeng Liu
Department of Chemical and Materials Engineering
University of Alberta

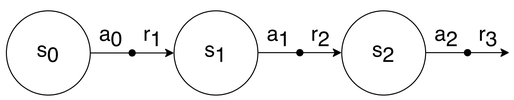
Abstract

- Reinforcement learning (RL) provides an alternative to model predictive control (MPC) for optimal process control and can shift the complex MPC calculations to offline training and offers fast online calculation
- Offline RL training requires lots of data and the trained RL does not provide guaranteed closed-loop stability
- Control invariant sets (CIS) can be used to significantly reduce the amount of data needed in RL training and to ensure closed-loop stability in online application

Reinforcement Learning



- Environment (Markov Decision Process)



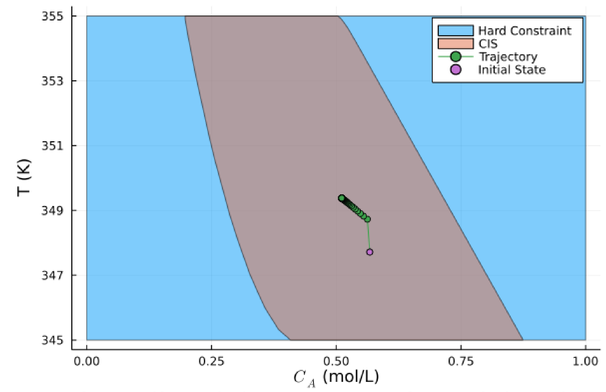
- RL agent
  - Value based methods
  - Policy gradient methods

Challenges

- The exploration nature of RL algorithms requires a significant amount of data (including data representing the desired and undesired behavior and consequence), hence hindering the sampling efficiency
- The trained RL agent cannot ensure the closed-loop stability since it is impossible to include every information within the training dataset

Our Solution: Control Invariant Set

- The control invariant set (CIS) of a system characterizes the feasible operating region of the system under control (Blanchini, 1999, Decardi-Nelson and Liu, 2021)
- The CIS provides a more accurate description of the feasibility operating region than the often used physical constraints



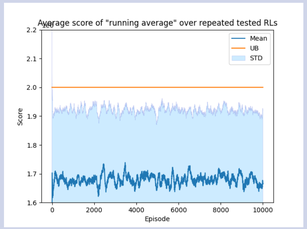
- Narrow down the state space, reduce dataset size, and provide guidance on exploration, hence improving the training efficiency
- The CIS also provides a way to verify the stability of the actions from the trained RL in online application

Offline RL Training
- Sample initial state from CIS
- Reward states within CIS

Online RL Application
- Simulate the process and update policy if states are out of CIS
- Implement actions that result in a stable process

Illustrating Example

- To study the sampling efficiency in RL training
- RL1 is trained with the knowledge of the physical constraints
- RL2 is trained with the CIS information
- Using same number of data, RL2 is able to achieve higher performance than RL1

RL 1	RL 2
	

Next Steps

- Representation of CIS
  - Graph theory based approaches have been developed to determine the CISs of nonlinear systems (Decardi-Nelson and Liu, 2021)
  - How to represent the CIS for higher dimensional systems so that it can be used in control applications needs further investigation
- Construction of CIS
  - Centralized graph theory based CIS construction approach works for small to medium scale systems. Distributed computing provides a promising way to handle larger scale systems (Decardi-Nelson and Liu, 2022). Further research is needed to make the distributed computing approach work for general nonlinear systems
  - RL also provides a potential approach to find the CIS of a system. It may provides a reduced computational complexity
  - Data-driven CIS construction
- Robustness of CIS-based RL
  - Model uncertainty is unavoidable. How to ensure robustness of CIS-based RL is also an open problem

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References

1. Blanchini, F. (1999). Set invariance in control. Automatica, 35(11), 1747-1767.
2. Decardi-Nelson, B., & Liu, J. (2021). Computing robust control invariant sets of constrained nonlinear systems: A graph algorithm approach. Computers & Chemical Engineering, 145, 107177.
3. Decardi-Nelson, B., & Liu, J. (2022). Computing control invariant sets of nonlinear systems: decomposition and distributed computing, arXiv:2205.05622.

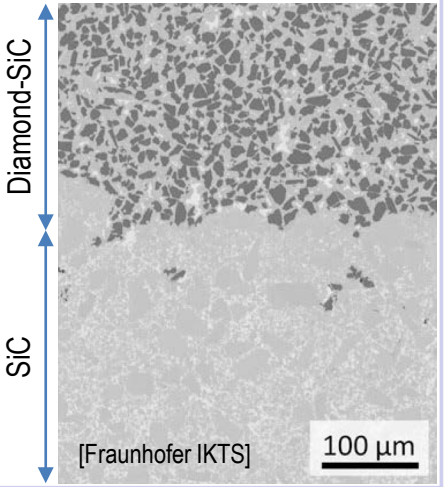
« back to profile

Laser-assisted Machining of Diamond-SiC Materials

« back to profile

Motivation

SiC-bonded diamond:
- Hardness
- Wear-resistance
- Thermo-mechanical stability
- Unique tribology



Challenges and Solution

Extremely low machinability:
- Crack-sensitivity
- Low material removal rate and high tool wear (Grinding-ratio < 0.01)

Hybrid process (laser-assisted machining)
- Laser ablation with short-pulsed lasers (high bulk removal rate and small heat affected zone)
- High efficiency grinding with diamond tools (high surface quality and precision)

Fabrication

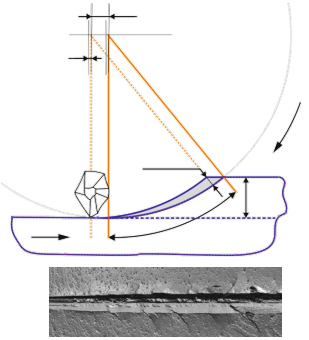
Pressure-less infiltration of shaped green forms of diamond with liquid silicon
- Up to 50 Vol.% diamond content
- Diamond grain size: 10 to 500 µm

- Large and complex shapes are possible
- Low dimensional accuracy

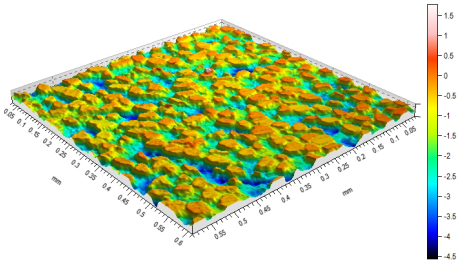
Mixture: Diamond / organic additives
→ Shaping
→ Pyrolysis (~1000°C under Ar)
→ Reactive infiltration with liquid silicon

Proposed methodology

Investigating the material removal and wear mechanisms



1. Single grain scratch tests



2. Grinding experiments

Institute of Precision Machining (KSF)

Prof. Dr.-Ing. Bahman Azarhoushang
Jakob-Kienzle-Str. 17
78054 Villingen-Schwenningen

Tel: 07720 307 4215
Fax: 07720 307 4208
Email: aza@hs-furtwangen.de
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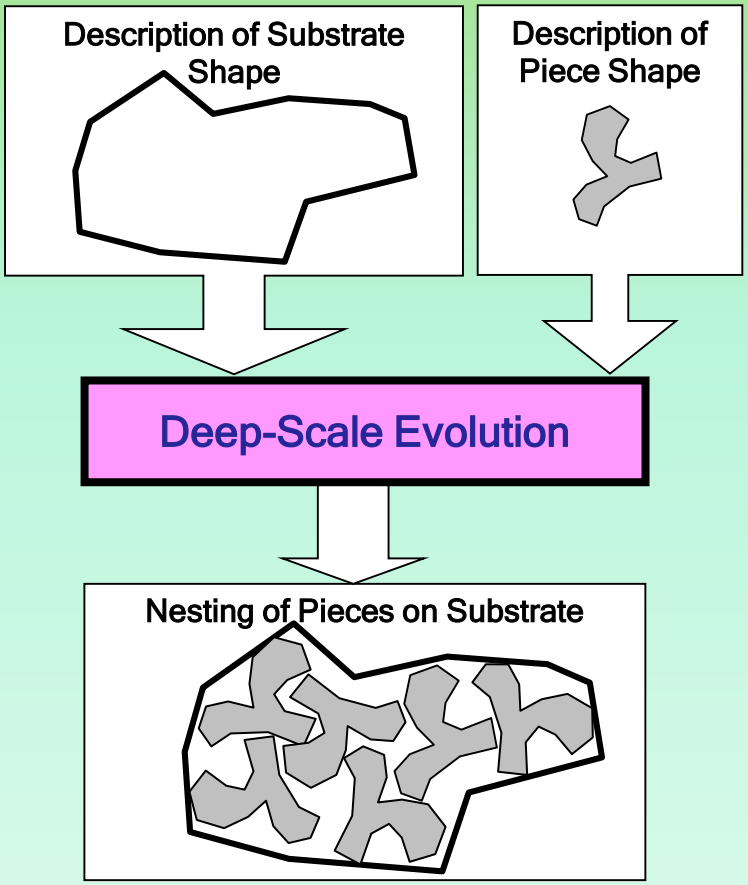
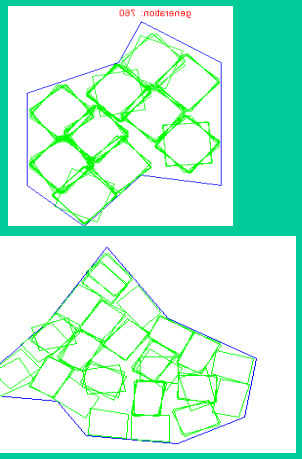
Deep-Scale Evolution for Shape Nesting

Dr. Jeffrey Horn
Northern Michigan University
Department of Mathematics and Computer Science
Marquette, MI USA
jhorn@nmu.edu
http://euclid.nmu.edu/~jeffhorn

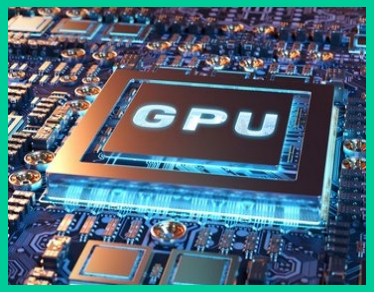


Irregular, Complex Shapes Handled automatically

Pieces Placed Using Global Info

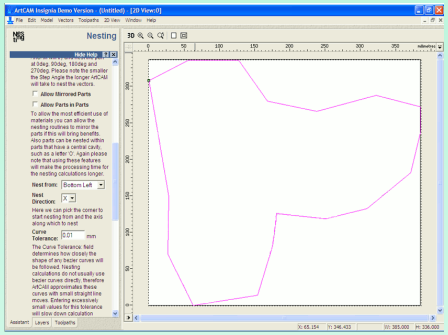


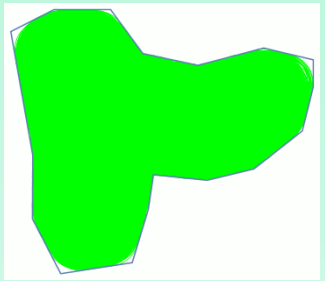
Naturally, Massively Parallel



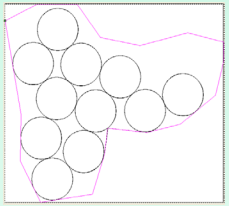
End of Moore's Law Future of High-performance Computing is on GPUs

Commercial Software (ArtCam Insignia) **vs.** **Deep Scale Evolution (DSE)**





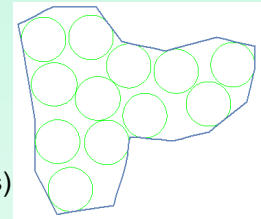
11 disks nested



IMPROVEMENT:

- **Utilization: 59% → 65%**
- **Waste: 15% reduction**
- **$40 saved* per sheet**
- **x 100s of sheets/day**

*(of ½ " aluminum and 9" dia. disks)



12 disks nested

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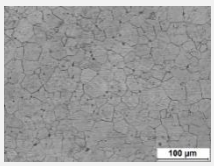
University of Applied Sciences Stralsund
School of Mechanical Engineering, Materials Science

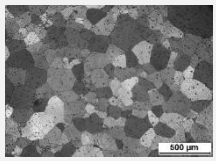
Petra Maier

School of Mechanical Engineering – Materials Science

Topic of Interests

- bioresorbable metals (Mg, Zn) for biomedical applications, fracture behavior of materials
- materials characterization (mechanical, corrosion)
- influence of the microstructure on mechanical and corrosion properties (static, quasi-static, dynamic)





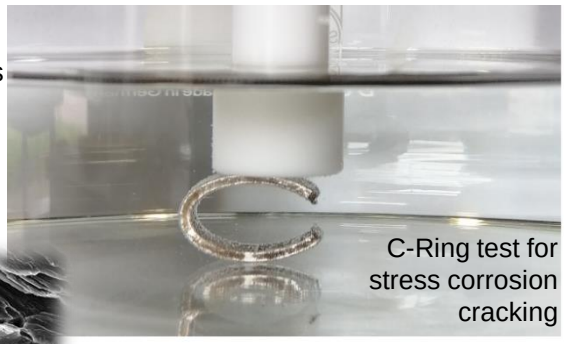
Corrosion morphology after polarization

Maier, P., Lauth, N., Mendis, C.L. *et al.* Mechanical and Corrosion Properties of Two Precipitation-Hardened Mg-Y-Nd-Gd-Dy Alloys with Small Changes in Chemical Composition. *JOM* 71, 1426–1435 (2019)

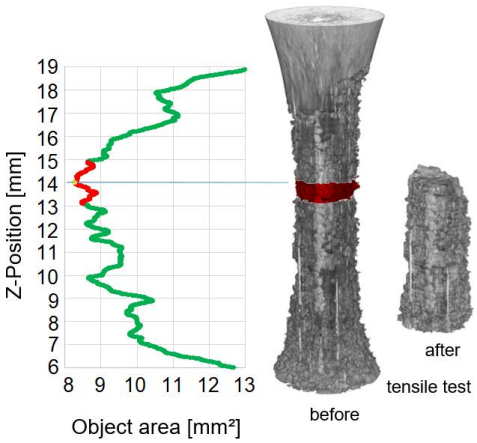
Mg-RE in extruded and precipitation heat treated condition

Research focus

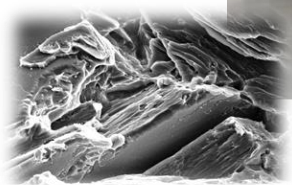
- stress corrosion cracking and fatigue behavior of Mg alloys
- correlation of microstructure and fracture behavior
- effect of non-uniform corrosion on remaining strength
- microstructural changes by post heat treatment



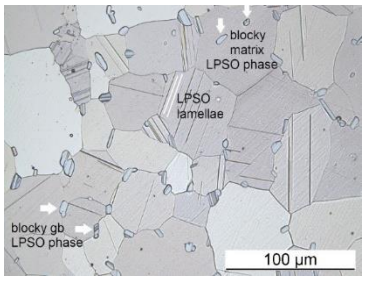
C-Ring test for stress corrosion cracking



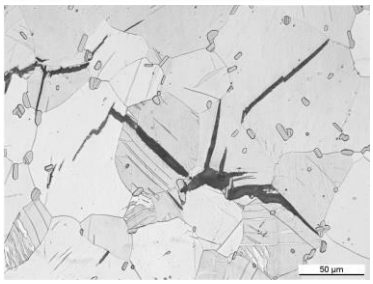
µCT analysis on remaining cross-sectional area (green curve) after corrosion of Mg-3Y-3RE tensile sample, red curve section indicates fracture area



cleavage fracture on Mg10Gd



Microstructural features in Resoloy®



Interaction crack and microstructure

Maier, P.; Clausius, B.; Richter, A.; Bittner, B.; Hort, N.; Menze, R. Crack Propagation in As-Extruded and Heat-Treated Mg-Dy-Nd-Zn-Zr Alloy Explained by the Effect of LPSO Structures and Their Micro- and Nanohardness. Materials 2021, 14, 3686.

My background

- degree in “Physical Technologies” (Dipl.-Ing. FH)
- Ph.D Materials Science from Loughborough University, UK, topic: grain boundary segregation in steel
- postdoctoral fellow at University of Applied Sciences Wildau, Germany, focus on mechanical properties by nanoindentation
- research associate in Helmholtz-Zentrum Geesthacht, Germany, Institute of Materials Research – Magnesium group Magnesium Recycling, Metal Matrix Composites, Mg-Biometal
- research associate at Technical University Berlin, Germany, Institute of Material Sciences and Technologies, Department of Materials Engineering research focus on corrosion fatigue on Magnesium alloys
- since 2008 Professor of Materials and Production Engineering School of Mechanical Engineering, University of Applied Sciences Stralsund

Laboratory equipment

- micro-Computer-Tomography, Bruker SKYSCAN 2214
- light and electron scanning microscopy (TESCAN VEGA4)
- Keyence 3D digital microscope
- test equipment for mech. properties and hardness (quasi-static, dynamic, low and high temperature)
- test equipment for corrosion behavior immersion, 3-electrode-cell system
- ARAMIS system for DIC
- Confocal Laser-Scanning Microscopy
- Thermography, Dilatometry

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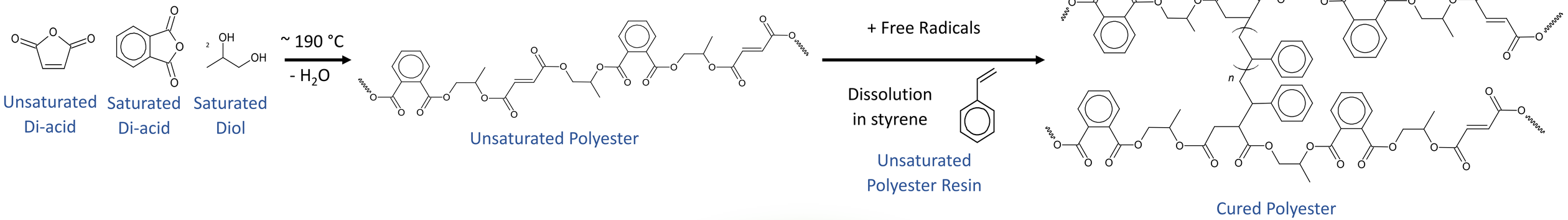
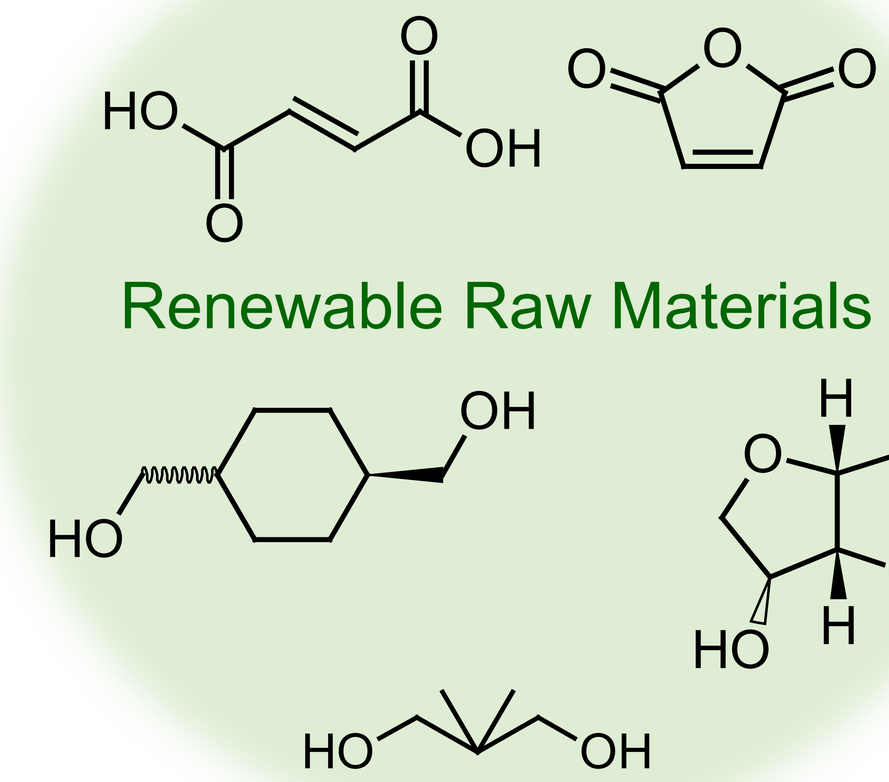
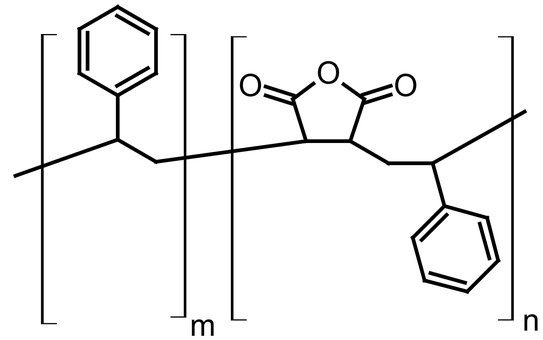
High Temperature Unsaturated Polyester Resins



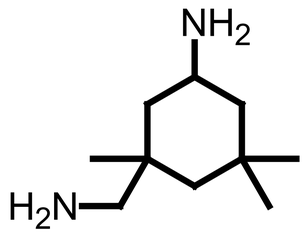
Styrene-free High Temperature Unsaturated Polyester Resin with odorless and non-toxic reactive diluent

- **Excellent mechanical properties at 160°C**
- **T_G > 200°C**





Increasing toughness at high temperatures with maleic anhydride and styrene copolymers



Styrene solubility improvement with Isophorone Diamine

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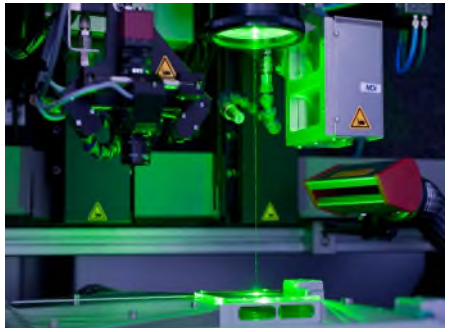
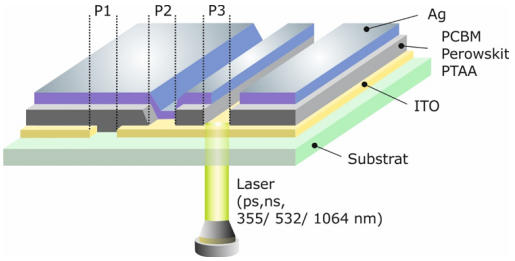
FH Münster - University of Applied Sciences

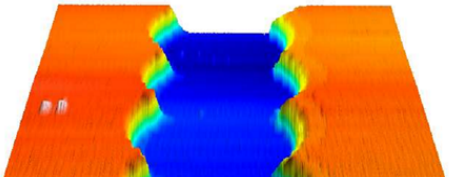
Hochschule für Technik
und Wirtschaft Berlin
University of Applied Sciences

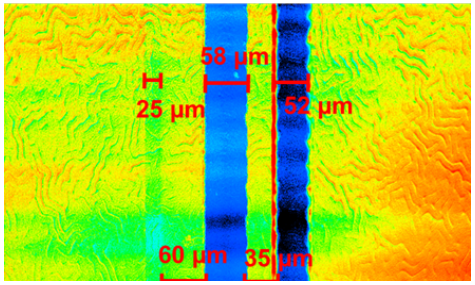
Laser Patterning for Photovoltaics

Prof. Dr. Bert Stegemann
University of Applied Sciences (HTW) Berlin, Germany









Laboratory Equipment

- Laser patterning tool for sample sizes up to 30 × 30 cm^2
- Nanosecond laser (532 nm), picosecond laser (1064 nm, 532 nm, 355 nm)
- High-precision x-y sample translation (velocity <1.2 m/s, positioning accuracy < 5 µm)
- Sample preparation and characterization of the patterned samples and solar cells in cooperation with Helmholtz-Zentrum Berlin (HZB)

Research Topics and Expertise

- Development of laser-based patterning processes for CIGSe and perovskite solar cells
- Development of series interconnection schemes for perovskite tandem solar cells
- Understanding of laser – matter interaction, revealing and analyzing laser-induced material modifications
- Selective layer ablation in layer stacks
- Comparison of ns and ps laser pulses for laser patterning
- Minimizing the interconnection width and electrical interconnection losses in laser-patterned solar cells
- Laser annealing and crystallization of thin films
- Patterning of back contact silicon heterojunction solar cells

Looking for ….

- Cooperation in fundamental and applied research projects
- Preparation and exchange of solar cell samples
- Analysis and characterization of laser-patterned solar cell and thin-film samples: Electrical losses, morphology, chemical and structural modifications, stability
- Spectroscopy, plasma diagnostics
- Femtosecond laser patterning
- Laser pulse shaping
- Applications of laser material processing in other technologies

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24.08.2022

Prof. Dr. Dennis-Kenji Kipker

Research proposal: More Privacy through Cloud Anonymity (MORPY)

The German and European pioneering spirit in the IT sector, from IoT to Industry 4.0, is often countered by concerns about data security and data protection, which impede or sometimes even stop the implementation of solutions and thus of innovation. At the same time, it has become clear that, in a practical sense, complete technology sovereignty is not yet possible, at least not at present. A large proportion of German and European companies continue to use IT solutions from abroad, in some cases to the extent that new innovations and products are being developed. In this context, one example that is currently highly relevant economically, politically and legally is the use of scalable computing power, the so-called cloud. In view of their diversity and rapid availability, clouds offer considerable advantages in day-to-day business life, so that the operation of in-house data centers is increasingly taking a back seat. At the same time, the largest and thus most frequently used cloud providers face the problem that their data centers are located abroad and in particular in the USA (e.g. AWS). Under data protection law, the transfer of personal data to third countries has always been associated with increased requirements. This is particularly true for the USA since the ECJ, in view of the comprehensive surveillance legislation there, declared the so-called EU-US Privacy Shield invalid in its Schrems II decision, which most recently allowed the transfer of data to the United States. At the same time, there is still a technological dependence on U.S. services, as previously noted, to adequately operate European and national business models as well. Moreover, regulations with extraterritorial effect, such as the U.S. CLOUD Act, ensure that even if a U.S. company's server is not located in the U.S., U.S. authorities are still permitted access to the personal data stored there under certain conditions. Appropriate technical and organizational measures, such as transport encryption for data transfers, can only provide a very limited solution to this problem, since the data must regularly be (further) processed abroad, which in turn makes it necessary to decrypt the data from a technical perspective. The current data protection requirements in conjunction with insufficient technical capacities to achieve appropriate, "state of the art" data security present companies of all sectors and sizes with almost insurmountable challenges. This often results in the omission of data transfers and, as a result, the development of innovative projects and the use of central resources, or in the transfer of data to the USA, which may be illegal and thus subject to fines. Even if the USA alone is often mentioned in this context due to the media-effective Schrems II decision, this problem also arises for other technology service providers from countries outside the EU that are not considered securely recognized third countries within the meaning of the GDPR, such as the People's Republic of China, which has extensive regulatory monitoring powers despite new data protection legislation in that state actors are essentially exempt from the data protection regulatory framework.

It is therefore essential to develop pragmatic technical solutions that are capable of maximizing data sovereignty even when foreign technology is used in „legally insecure“ third countries from EU perspective. In this context, it is desirable to ensure technically that data is consistently anonymous for third parties. The basic idea should be the interface openness of such a solution: for example, a large number of cloud computing offerings require the trust of their users for market success, especially if they are also to be used for applications that process sensitive personal data or are particularly risky in terms of data protection impact assessment (e.g., health and fitness apps), or sustainable applications from the areas of smart home, smart living, smart energy grids, or those that process users' financial information.

In terms of the problems described, the research project "More Privacy through Cloud Anonymity" (MORPY) aims to develop a cross-domain technical-legal solution in which data is consistently anonymous, at least for third parties. From a technical point of view, the use of "confidential computing technology" establishes the processing of data in a secure execution environment, the so-called enclave, which, according to relative theory, eliminates any reference to individuals.

Personal information:

Dennis-Kenji Kipker is one of the leading minds in cybersecurity in Germany and works as a Professor of IT security law at the University of Applied Sciences Bremen at the interface of law and technology in information security and data protection. He is also active as Legal Advisor of the German technology association VDE, CERT@VDE in Frankfurt a.M. and, as a Member of the Board of Directors of the European Academy for Freedom of Information and Data Protection (EAID) in Berlin, he plays a key role in shaping future European and German cyber policy. As Managing Director of the private consultancy agency Certavo in Bremen, he is also committed to the development and implementation of pragmatic solutions for the digital compliance of companies internationally.

Contact:

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+49 151 40223163

Session title: A partnership initiative of Industry and Academia

At present time, Cybercrime is not limited to any particular industry.

Academia and industries partnership should be formed to protect everyone from Cyberattacks.

This project idea covers the hacks of Academia and Industry partnerships to address Cybersecurity solutions.

The key takeaways from this project idea are as follows

- Collaboration Strategies between Academia and Industry to address Cybercrime challenges
- Mitigation Strategies to address Cybersecurity skill gaps
- Strategies of community involvement to mitigate cyber attacks

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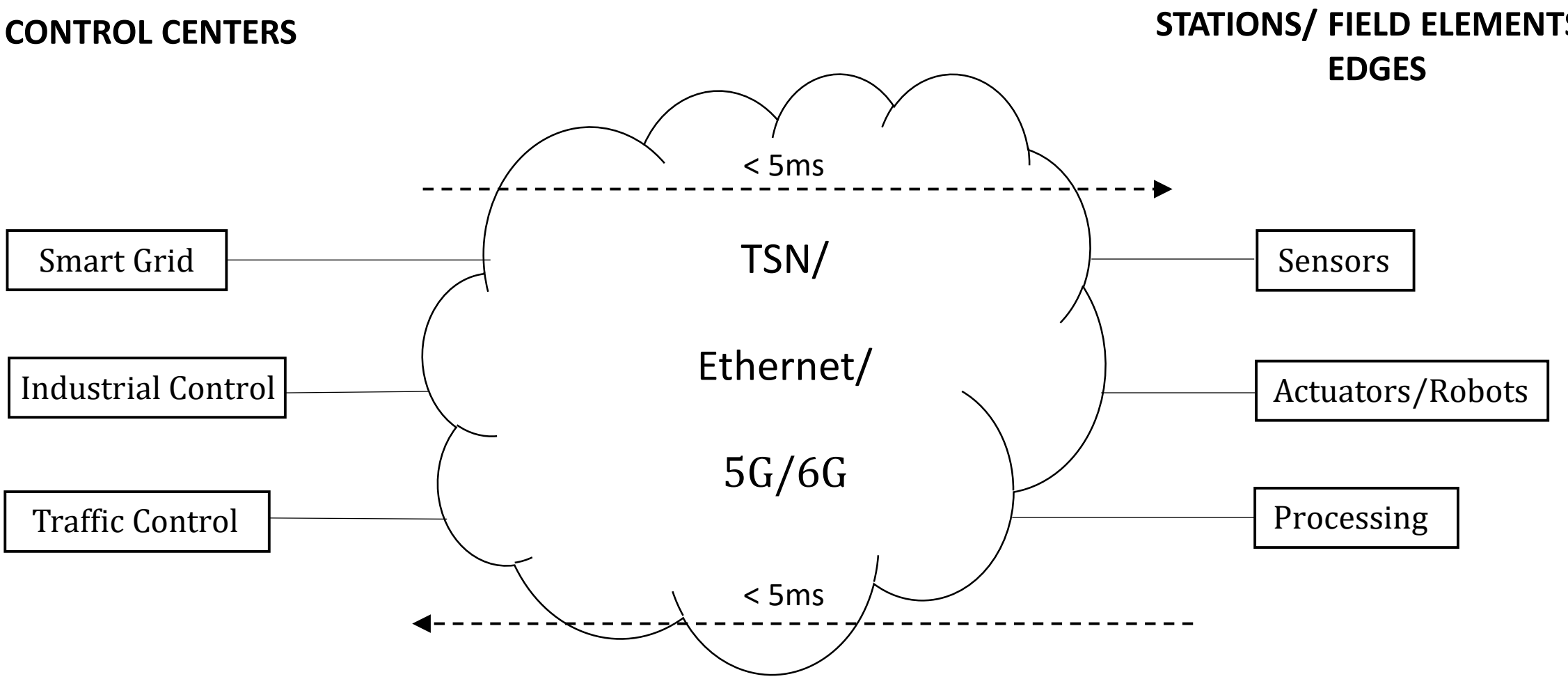
AI based correction mechanisms for time and security critical applications



Highest demand for safety: Reliability ->
based on autonomous Error Correction and cryptographic Verification

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▲ Hochschule Harz

Harz University of Applied Sciences

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Security for Configurable Software Systems in Industrial Environments

Background

- Requirements for industrial software are becoming increasingly individual
- Emergence of highly-configurable software to fulfill requirements

Problem Statement

- System complexity and uniqueness based on features and resulting systems variants leads to high risks regarding systems‘ cyber security
- Underexploration and insufficient understanding of security for configurable systems in industrial environments, especially those based on product-line engineering

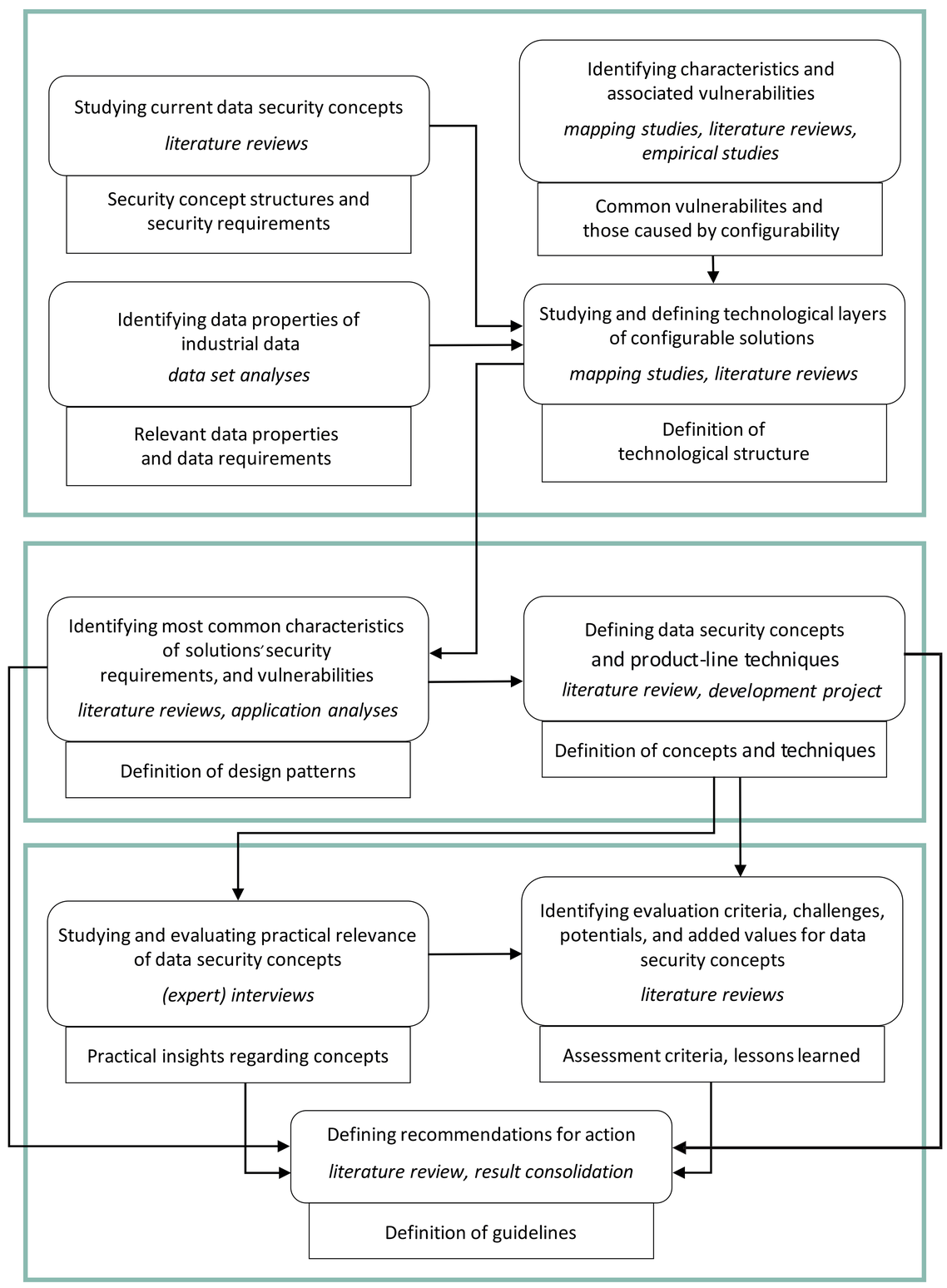
Preliminary Work

- A. Kenner, S. Dassow, C. Lausberger, J. Krüger, and T. Leich. 2020. *Using Variability Modeling to Support Security Evaluations: Virtualizing the Right Attack Scenarios.* In VaMoS. ACM, pp. 101–109.
- G. Schuh, P. Scholz, T. Leich, and R. May. 2020. *Identifying and Analyzing Data Model Requirements and Technology Potentials of Machine Learning Systems in the Manufacturing Industry of the Future*. In ITMS. IEEE, pp. 1–10.
- A. Kenner, R. May, J. Krüger, G. Saake, and T. Leich. 2021. *Safety, Security, and Configurable Software Systems: A Systematic Mapping Study*. In SPLC. ACM, pp. 148–159.
- R. May, C. Biermann, J. Krüger, G. Saake, and T. Leich. 2022. *A Systematic Mapping Study of Security Concepts for Configurable Data Storages*. In SPLC. ACM, accepted.

Project Objective

- Development of scalable and variable data security concepts for configurable industrial software systems, including security-related product-line techniques

Selection of possible project objectives



Prof. Dr.-Ing. Thomas Leich
tleich@hs-harz.de

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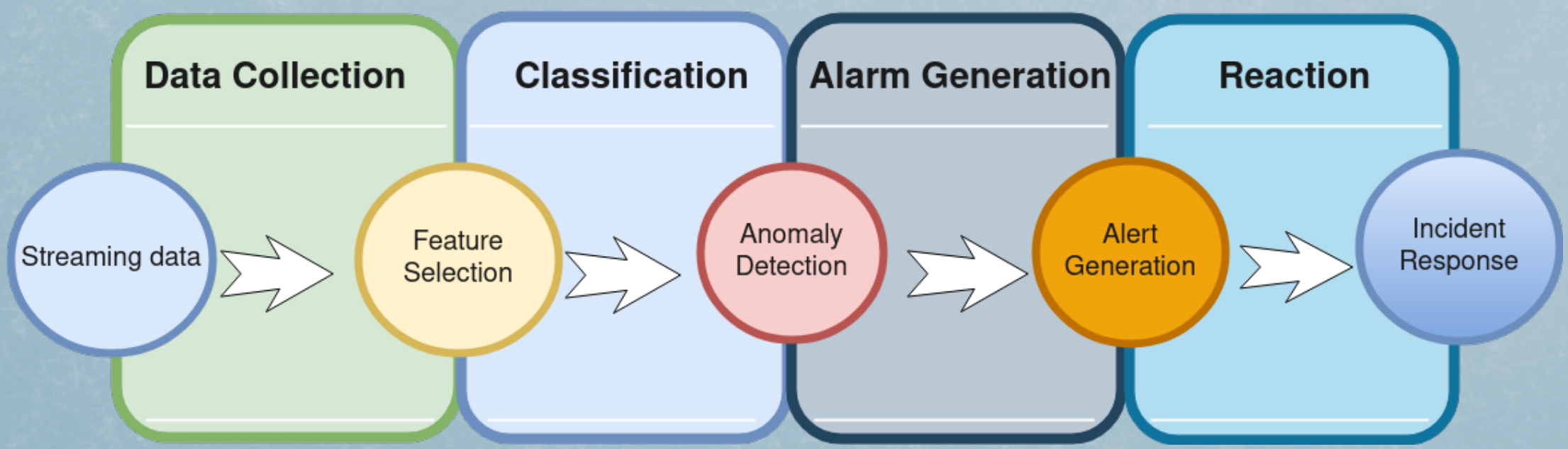
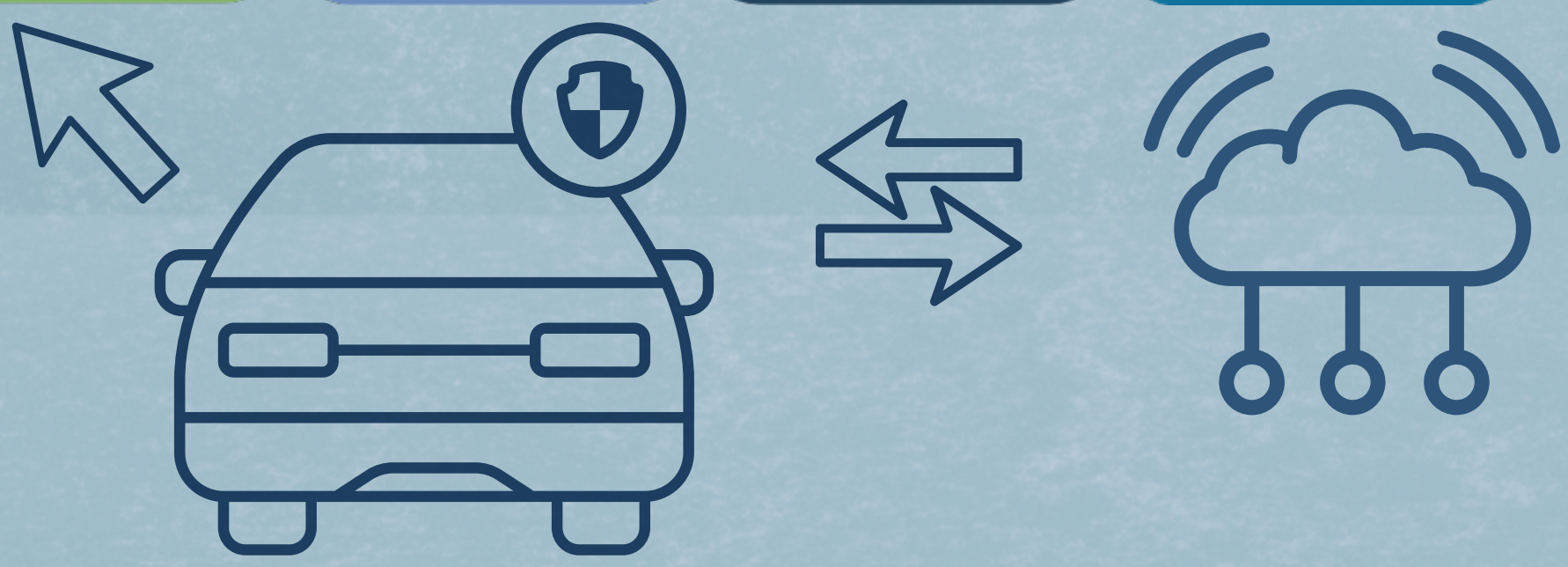
AI

RESEARCH AREAS

- Embedded Security
- Applied Cryptography
- Security For AI
- AI for Security

AI for Security





About Us:
https://www.th-deg.de/en/research/institutes/protect-it

Contact:
Prof. Dr. Michael Heigl(michael.heigl@th-deg.de)
Kumar Ashutosh Anand(kumar.anand@th-deg.de)

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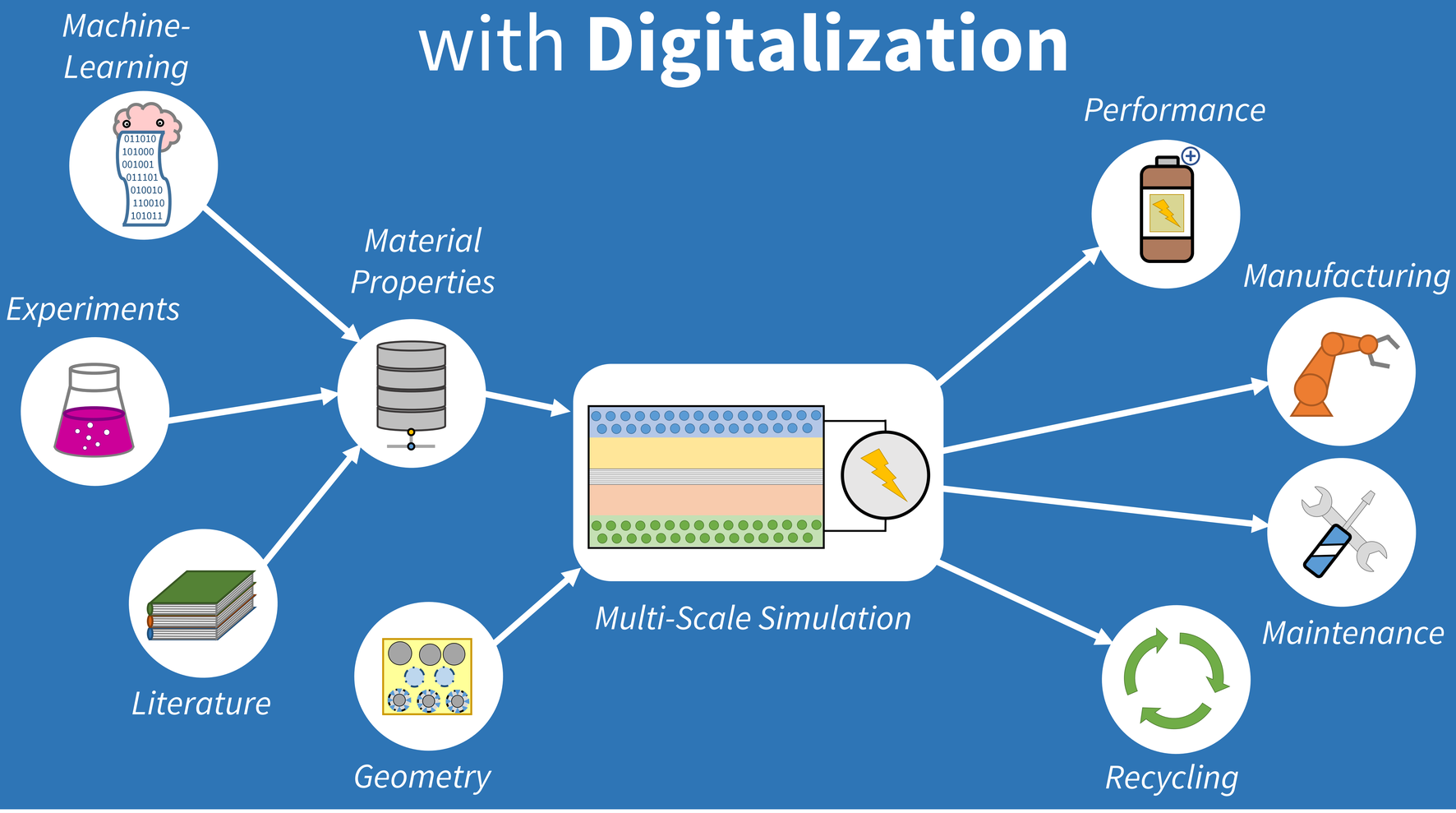
Fast and **Efficient** Research and Development of **High-Performance** Structures with **Digitalization**

PhD-Thesis:
"Development of a digital Methodology to automate the Design, Development and Optimization Process of High-Performance Products"

Challenges:
- Long lasting and Expensive Research and Development Process
- High Amount of Optimization Iteration Loops

Approach:
- Multi-Physics Simulation
- Maschine Learning for Optimization
- Automated Inclusion of Experimental Results
- High Degree of Automatization

Goal:
- Identification of Promising Configurations
- Generating Faster, Better Product Properties
- Resource Reduction



Supervisors:
Prof. Dr.-Ing. Niels Modler
Prof. habil. Dr.-Ing. Robert Böhm
Dr.-Ing. Angelos Filippatos

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Willi Zschiebsch
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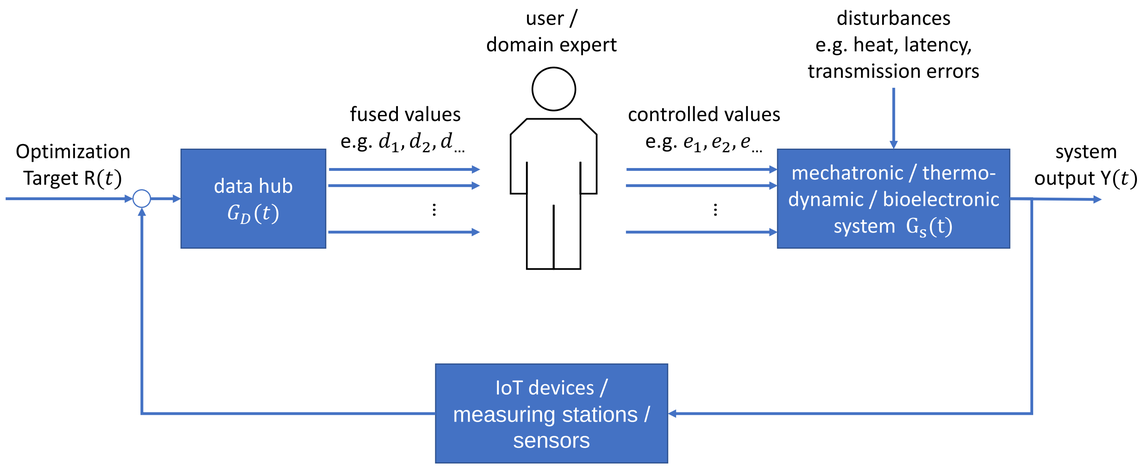
Project Idea: AI-In-the-Loop

Julius Schöning

j.schoening@hs-osnabrueck.de
Faculty of Engineering and Computer Science, Osnabrück University of Applied Sciences, Osnabrück, Germany;

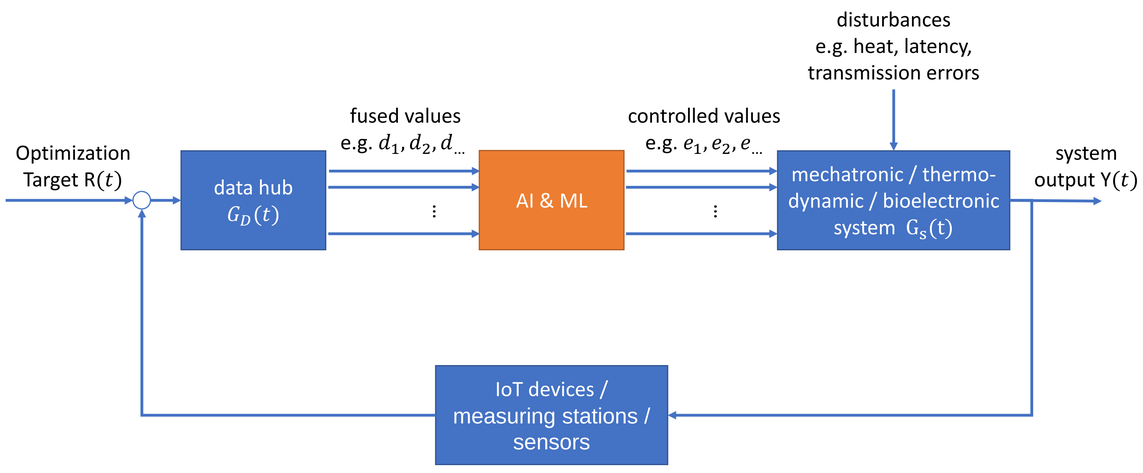
Abstract

A fundamental paradigm in developing interactive AI systems is the ”human-in-the-loop” as a trainer and evaluator during machine learning. While this paradigm is prevalent, it does not represent all approaches to AI. What is not yet prominent in the debate are alternative HCI paradigms in AI development, i.e., the option of using AI primarily and only asking the users in case the AI is unsure about solving the task. The new paradigm, ”ai-in-the-loop”, will combine ideas of how AI and human analyses relate. Thus, AI might become available in many applications soon since HCI will make AI even more reliable and explainable. With ”ai-in-the-loop” even AI-based closed-loop control systems might be viable, and AI algorithms can be run on the smartphone without a mainframe.



Examples of Applications:

- interactive 3D reconstruction [1,2]
- visual analytics for video applications [3,4]
- crop rotation and management tools [5]
- . . .



Examples of Applications:

- automated driving [6]
- greenhouse farming [7]
- autoML / adaptive optimization of CNN architectures [8]
- . . .

Limitations:

currently (and in the upcoming years)

- AI will not yet explainable
- AI will not 100% accurate
- AI will not yet reliable on rare events
- . . .

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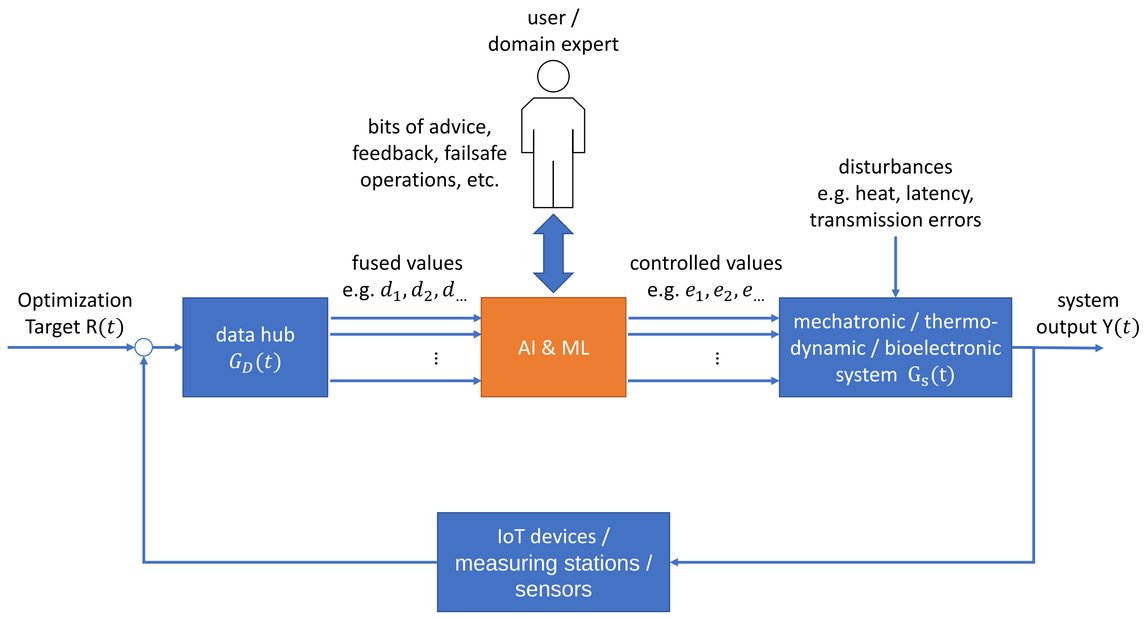
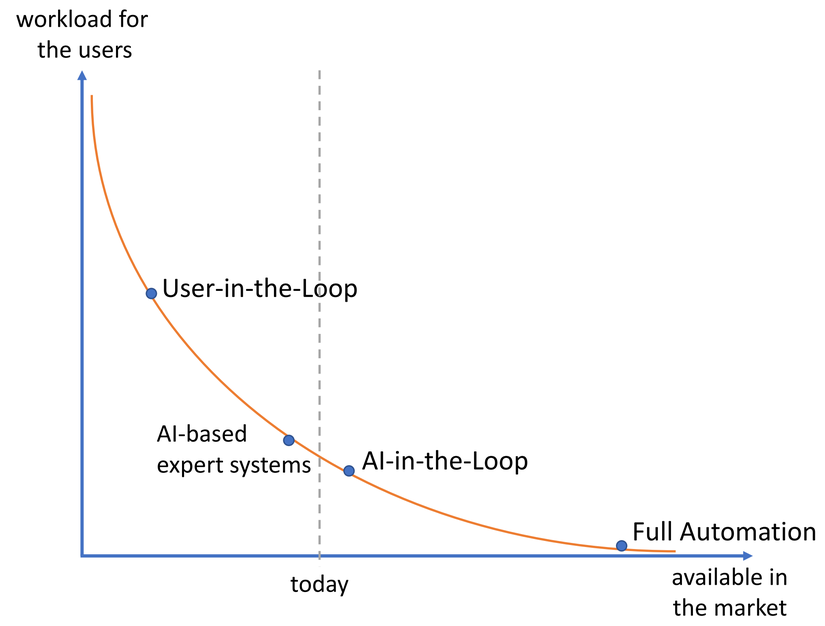
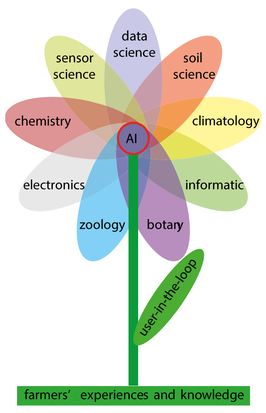
Ai-In-the-Loop



Machine



Possible Application Domain [9]



Publications

[1] J. Schöning. *Interactive 3D Reconstruction*. PhD thesis, Universität Osnabrück, Institute of Cognitive Science, 2018.
[2] J. Schöning & G. Heidemann *Interactive 3D Modeling - A Survey-based Perspective on Interactive 3D Reconstruction*. nternational Conference on Pattern Recognition Applications and Methods (ICPRAM), 2015.
[3] P. Tanisaro, J. Schöning, K. Kurzhals, G. Heidemann & D. Weiskopf *Visual analytics for video applications*. it-Information Technology, 57 : 30-36, 2015. De Gruyter.
[4] J. Schöning, C. Gundler, G. Heidemann, P. König & U. Krumnack. *Visual Analytics of Gaze Data with Standard Multimedia Players*. Journal of Eye Movement Research, 10(5) : 1-14, 2017. European Group for Eye Movement Research.
[5] J. Schöning, P. Wachter & D. Trautz. *Crop rotation and management tools for every farmer?*. Smart Agricultural Technology, 3 2023. Elsevier BV.
[6] J. Schöning, A. Riechmann & H.J. Pfisterer. *AI for Closed-Loop Control Systems*. In 14th International Conference on Machine Learning and Computing (ICMLC) 2022. ACM.
[7] D. Walczuch, T. Nitzsche, T. Seidel & J. Schöning. *Overview of Closed-Loop Control Systems and Artificial Intelligence Utilization in Greenhouse Farming*. In 2022 IEEE International Conference on Omni-Layer Intelligent Systems (COINS) 2022. IEEE
[8] M.L. Richter, J. Schöning, A. Wiedenroth & U. Krumnack. *Receptive Field Analysis for OptimizingConvolutional Neural Network ArchitecturesWithout Training*. In Deep Learning Applications 2022. Springer (InPress).
[9] J. Schöning & M.L. Richter. *AI-Based Crop Rotation for Sustainable Agriculture Worldwide*. In Global Humanitarian Technology Conference 2021. IEEE.

DFG Networking Research Event
US / Canadian Researchers and Germany UAS researchers

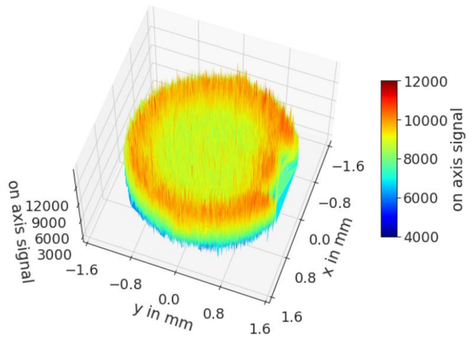
TH Aschaffenburg
university of applied sciences

Data Science, Machine Learning, Artificial Intelligence for Process Monitoring & Control

Additive Manufacturing

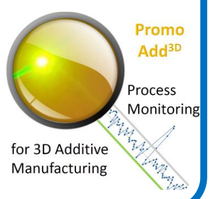
PromoAdd3D
(260,000 EUR)
3D Printing of metallic items
Observing new edge effects

Bavarian State Secretary for Science and the Arts 2018



Multi-layer data analysis for noisy on axis laser signal
[1] Voigt et al., J Add. Manuf. 57, 102798 (2022)

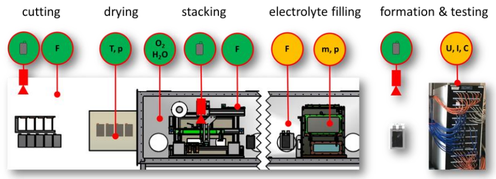
Multivariate statistics and **machine learning** for
- monitoring of operational states
- error detection
- process control



Battery Cell Production

KIproBatt
(260,000 EUR)
Federal Ministry of Education and Research

Digitalization of battery cell production line at Fraunhofer ISC

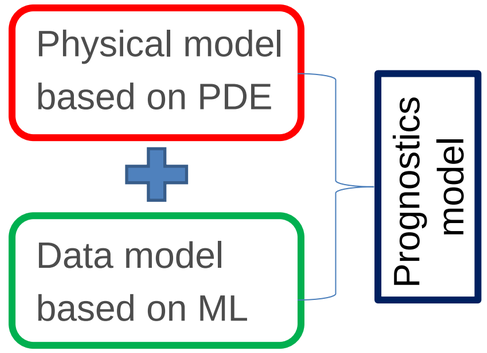


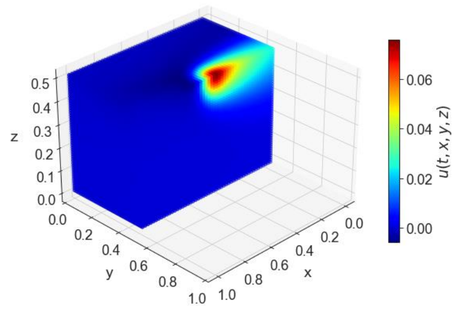
[2] Xu et al., IPCP Proceedings (2021)

- Process defined semantic data space
- Feature engineering based on process knowledge
- Early indicators for in-process quality control

Hybrid Modelling

Physics informed neural networks for heat transport





Goal: improved modeling AM

Predictive Maintenance for Industrial Forklift Trucks

KANIS Industry cooperation
(120,000 EUR)
Bavarian State Secretary for Economic Affairs

Linde

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University of Applied Sciences – Aschaffenburg

Faculty for Engineering
Laboratory for Hybrid Modeling
Prof. Dr. Michael J Moeckel

Laboratory Staff (Aug 2022):
1 permanent lab IT engineer (E10)
1 PhD student (TU DD) & 2 postdocs
2 Research Master students

International experience:
- PostDoc @ Cambridge University, UK (EPSRC for 3 years)
- EU-COST Action „Thermodynamics in the quantum regime“
- Part of Organizing Committee for IEEE AITEST Athens 2023

Interest in new international collaborations / joint grant applications

Contact Details

Prof. Dr. Michael J Moeckel

Phone: +49 (0) 6021 4206 - 507
Mobile: +49 (0) 1523 7986479
Michael.Moeckel@th-ab.de

INSTITUTE FOR FLOW IN ADDITIVELY MANUFACTURED POROUS MEDIA (ISAPS) PROJECTS AND RESEARCH

HEILBRONN UNIVERSITY OF APPLIED SCIENCES

Research group: Fluid mechanics

Laura Bittel*, Natalie Jüngling, Jennifer Niessner

Presenting author email: laura.bittel@hs-heilbronn.de

RESEARCH COMPETENCE: INDOOR AIR QUALITY AND INFECTION RISK VS. ENERGY EFFICIENCY

- Due to the pandemic, aerosol pollution has come to the fore as an indicator of indoor air quality.
- In current projects, possibilities for reducing the particle concentration with regard to their energy efficiency are examined and combined to the greatest possible extent.
- Measures are developed and profitably combined with one another based on digital technologies such as sensor networks (Figure 2), artificial intelligence, flow simulation and cloud-based data analysis.
- The aim is to predict and control HVAC systems, e.g. in a lecture hall, an office spaces or public transport vehicle, and to adapt it in an energy-efficient and health-oriented manner using an artificial intelligence.
- Thermal comfort (DIN EN ISO 7730) and air quality are evaluated simulatively and experimentally.
- To reduce the time required to generate a large number of data sets for an AI, a numerical model (POD) is used. (Substitute Model, Figure 3)

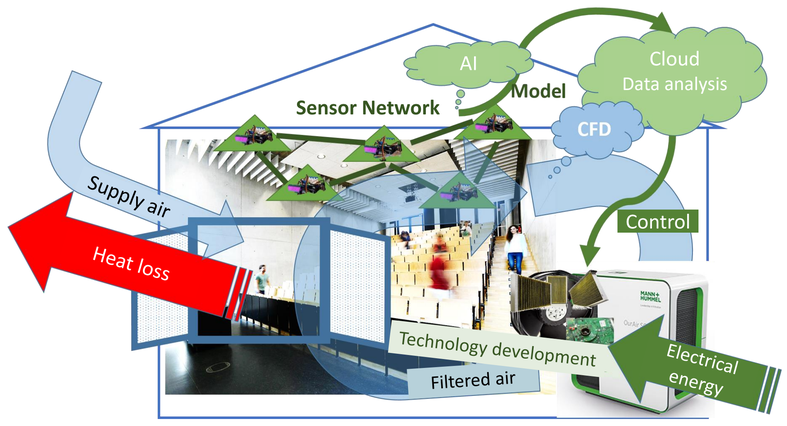

Figure 1: Presentation of the project for an energy efficient HVAC system and air purifier focused on infection risk and thermal comfort.

Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg

Federal Ministry for Economic Affairs and Climate Action

RESEARCH METHOD: EXPERIMENTAL AND NUMERICAL APPROACH

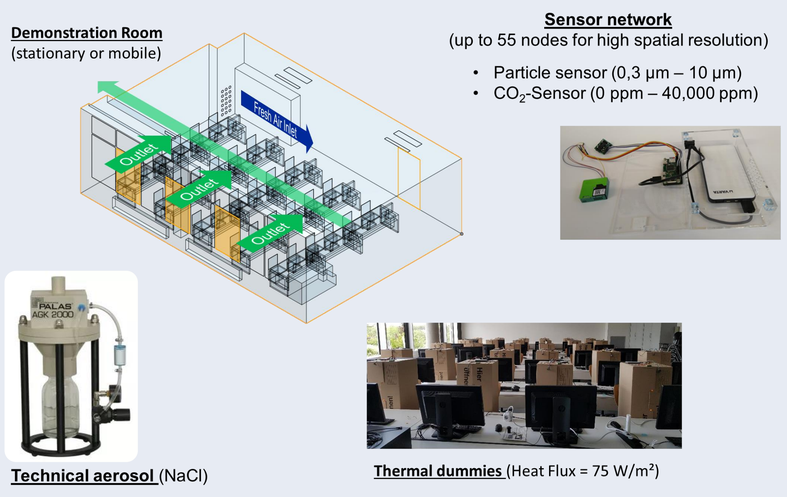

Figure 2: Experimental setup for measuring air quality parameters in an indoor environment using the example of a lecture hall with computers.

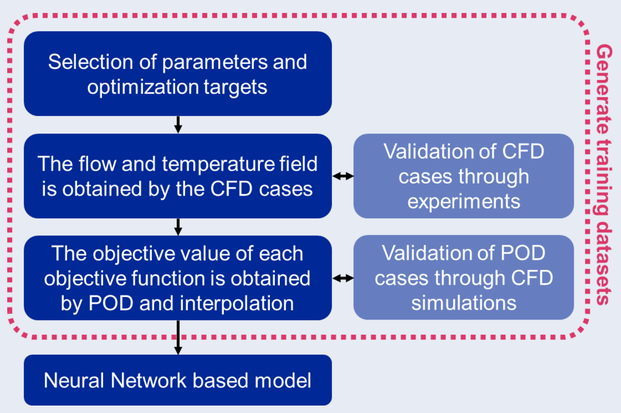

Figure 3. Substitute Model - Procedure for generating data for an ANN to optimize a HVAC system.

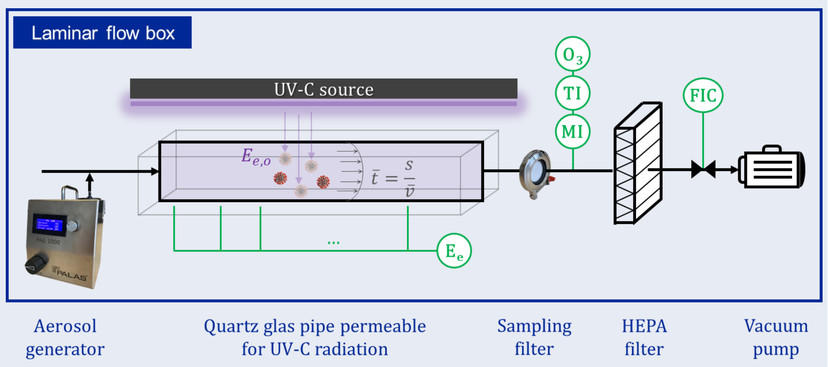

Figure 4: Experimental setup of UV-C inactivation

FURTHER RESEARCH COMPETENCES: DEVELOPMENT OF NUMERICAL AND EXPERIMENTAL METHODS FOR INVESTIGATIONS ON MASKS AND TEST BENCHES FOR VIRUS INACTIVATION USING UV-C

- Competence test aerosols (UV-C inactivation of Sars-CoV-2)

(Test aerosols and methods for testing the effectiveness of air purification technologies against Sars-CoV-2)

In order to master the possible risk of infection via highly pathogenic aerosol-borne viral pathogens (SARS-CoV-2, influenza etc.), air purification and inactivation technologies more and more are coming onto the market. In the absence of established test and evaluation procedures, however, no statements can currently be made about the effectiveness and comparability of such devices for inactivating SARS-CoV-2 and other aerosol-borne pathogens, so that an evidence-based assessment is not possible. This lack of procedures begins with the selection of suitable test aerosols depending on the technology to be tested, their application, characterization and sampling, the selection and comparability of surrogate viruses with regard to the original pathogen and extends to the definition of suitable test arrangements and procedures to the necessary ones accompanying investigations, such as the proof of by-products or the sound power. (Figure 4)

- Competence masks

A finished project focuses on bio-aerosol protection through ready-to-use and optimized respiratory masks. The focus is on the development of optimized masks for high- and low-risk patients with the help of micro- and macroscale flow simulations, experimental trials, and clinical patient tests. (Figure 5)

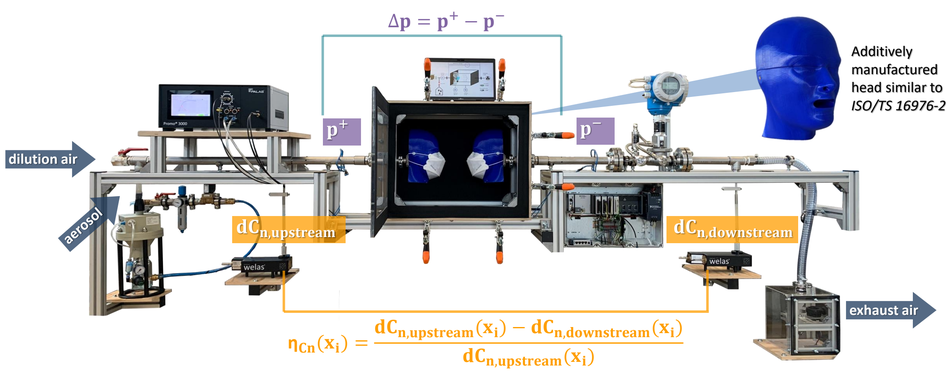

Figure 5: Test bench for masks

Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg

Federal Ministry of Education and Research

AN EXCERPT FROM THE KNOW-HOW OF THE RESEARCH GROUP FOR FLUID MECHANICS

- CFD simulations with the software StarCCM+, ANSYS Fluent, GeoDict and OpenFOAM
- Thermal comfort measurements and evaluation according to DIN EN ISO 7730
- Setup of sensor networks and evaluation of flow velocity and environmental parameters (e.g. aerosol particle concentration, CO2 concentration, temperature etc.)
- Numerical methods to reduce the complexity of computational fluid dynamics CFD simulations
- Topology optimization of e.g. filter structures, etc. (experimental and simulative development)
- Experimental and simulative investigation of indoor air filters and purifiers
- Investigation of filter media and filters (e.g. microplastic test rig, aerosol mist test rig, etc.)
- Bio-aerosol protection by ready-to-use and optimized protective masks (mask test rig)
- Analysis: ISPAPS has its own µCT-Scanner (Bruker micro CT SkyScan 1271 with a resolution up to < 0,45 µm/px)

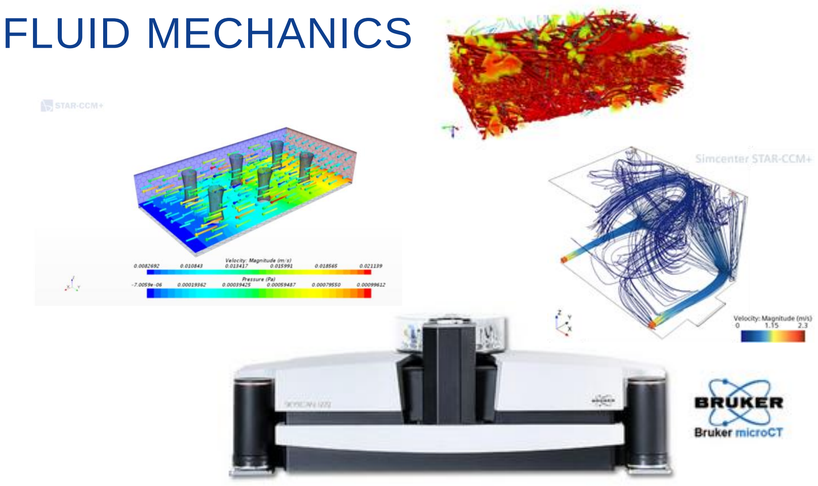

Figure 6: CFD-Simulation of flow through a mask; CFD-Simulation of a filter structure after topology optimization; Streamlines from a CFD simulation in an indoor environment; Buker micro CT (SkyScan 1271)

Institute for Flow in Additively Manufactured Porous Media (ISAPS), Heilbronn University of Applied Sciences, Max-Planck-Straße 39, 74081 Heilbronn, Germany

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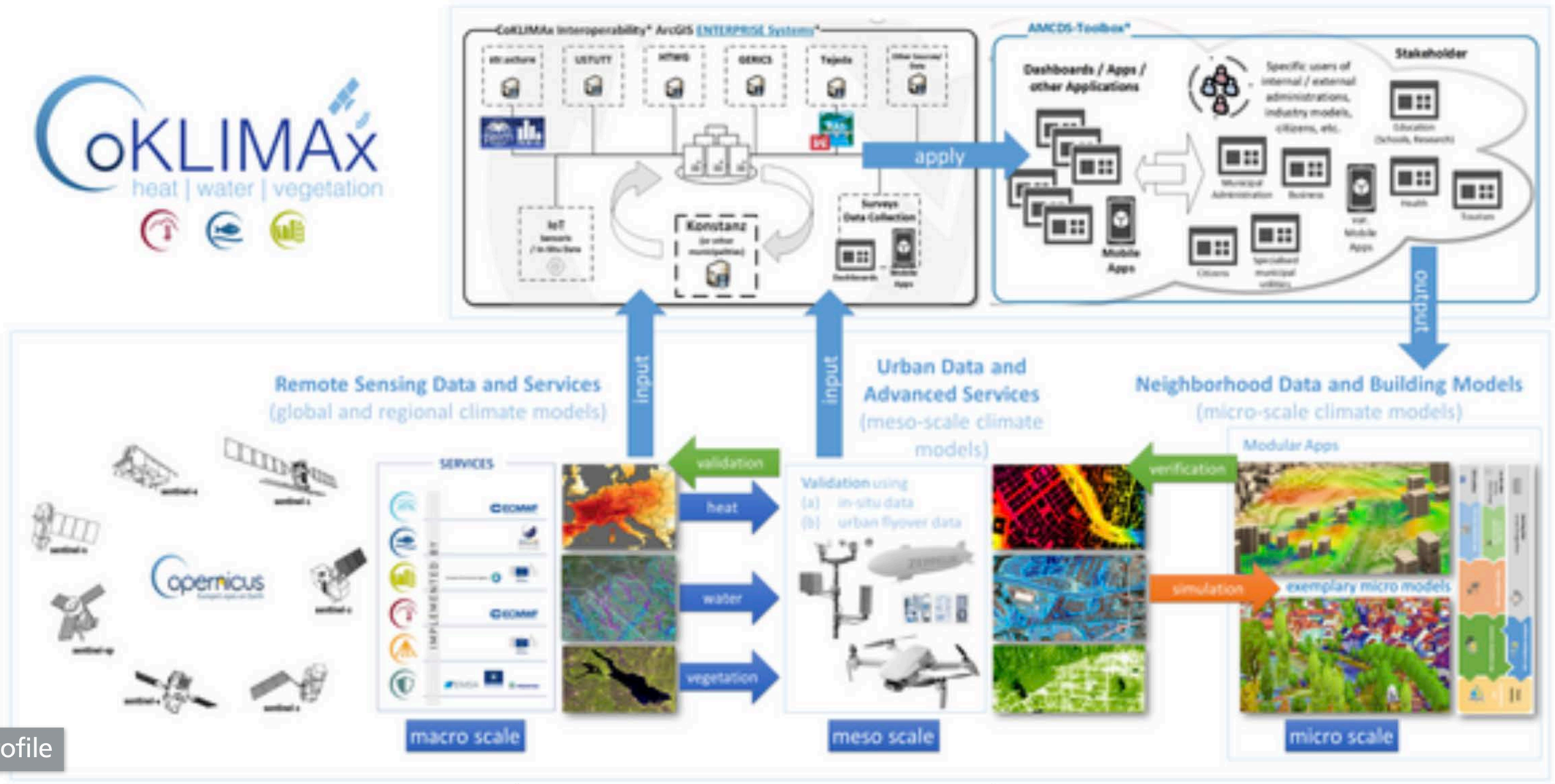

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UDIF-HAW: A matchmaking initiative by the German Research Foundation (DFG)
Networking research Canada – Germany – USA

International exploration of stakeholder involvement in urban transport policy and planning

Organization as theoretical construct

The term organization in various desciplines

ECONOMY
- Structuring of workflows
- Arrangement of departments in companies and their cooperation

SOCIOLOGY
- Characterization of a social system
- Flow of social processes

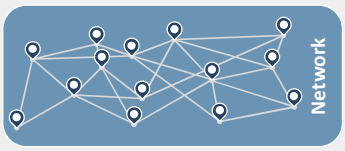
Organization

Research context

In addition to the previously economically influenced explanations of **urban logistics projects**, a conceptual processing and a theoretical recording of **social processes** is carried out within the framework of this research project by means of a social **scientific network analysis**.
By focusing on the ongoing social processes, aspects can be examined that are otherwise neglected, such as the importance of **physical proximity** for the networking of organizations, **power relations** in networks, etc.

Levels of analysis in organizational sociology

ECOLOGICAL
- Relation to the environment
- Intercompany relationships
- Development of the organizational population in an area



STRUCTURAL
- Consideration of working groups/ departments
- Conflicts, organizational change

SOCIOPSYCHOLOGICAL
- Individual behavior in the context of organizations
- Individual opinions and values

Urban logistics in the systematics of interorganizational relationship structures

Methodological approach

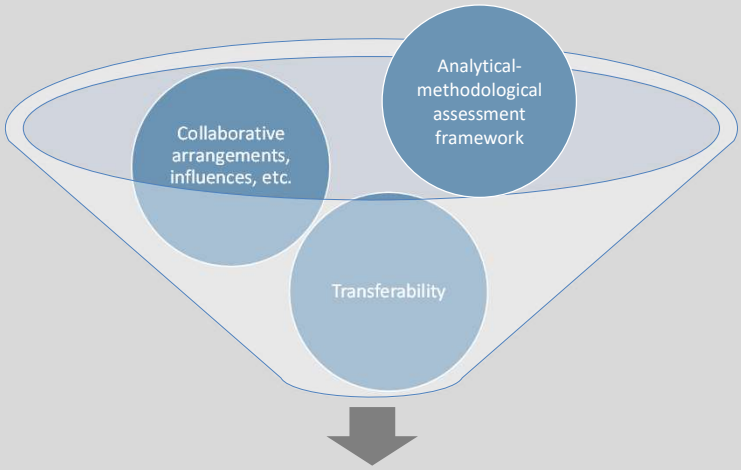
Development of an analytical-methodological concept
- Literature review of network theoretical approaches and sustainability assessment

Selection of case studies and comparative analysis
- Document analysis
- Expert interviews

Reconstruction of networks
- Application of the developed network analytical concept

Cross-case definition of criteria
- Identification of success criteria of the investigated collaborative arrangements

Objective and desired results



Fields of action for long-term collaboration in urban transport planning

Research questions

- How do the **visions**, **interests** and **expectations** of actors involved in urban logistics projects differ regarding their relationships?
- What roles do individual actors play within the **collaborative relationships** and what **influence** do they have on each other?
- How do **collaborative arrangements** and **constellations of actors** develop during project implementation?
- How can existing **structures** and **processes** within urban logistics projects be represented by means of a social science network analysis?
- What influence does stakeholder involvement have on **sustainability implications** of key decisions in urban transport policy and planning?

References (selection)

Preisendörfer, P. (2005): Organisationssoziologie. *Grundlagen, Theorien und Problemstellungen*. Wiesbaden: VS.
Stegbauer, C. (2010): *Netzwerkanalyse und Netzwerktheorie*. Springer Fachmedien.
Stegbauer, C., & Häußling, R. (2010): *Handbuch Netzwerkforschung*. Wiesbaden: VS Verlag für Sozialwissenschaften.
Weyer, J. (2012): *Soziale Netzwerke: Konzepte und Methoden der sozialwissenschaftlichen Netzwerkforschung*. Oldenbourg Verlag.

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CAIUS

Consequences of **A**rtificial **I**ntelligence on **U**rban **S**ocieties

We are:

- Computer scientists at Stuttgart Media University working in the CAIUS research project:
  - Kai Eckert, Professor
  - Florian Rupp, PhD Student

We do:

- Application of AI
- Investigation of AI proceedings and lifecycle
- Data management

We are interested in:

- Smart city domain experts
- AI use cases in smart city context
- Smart city data for research

What is the CAIUS research project?

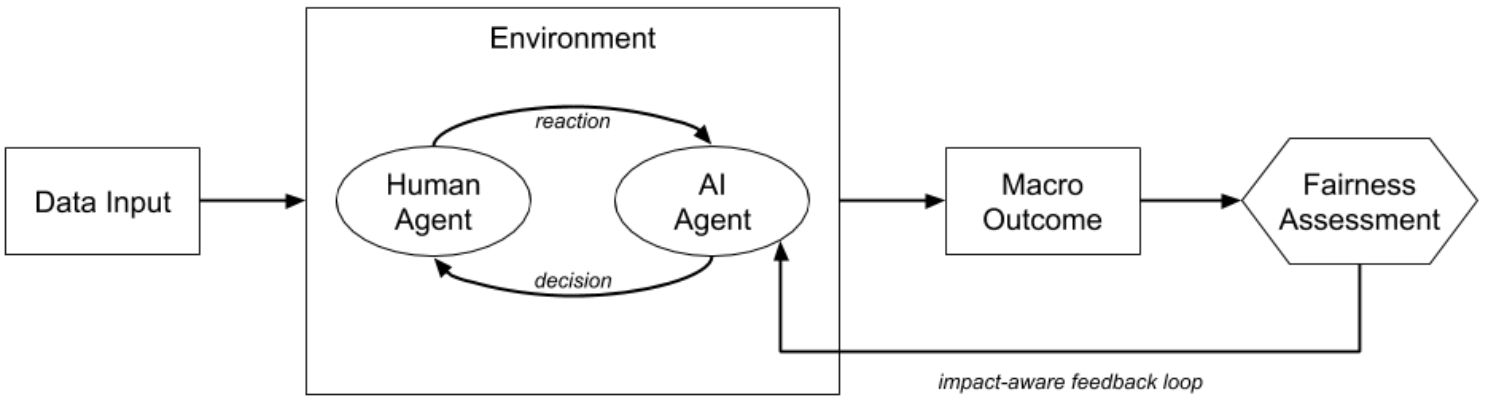
- Research has shown AI is prown to make unfair decisions.

→ Investigation on how AI-based systems interact with the social environment („Impact Aware AI“, see flow chart below).

→ As a use case create agent-based models to simulate citizens´ urban car traffic behaviour in context of AI-based pricing stategies.

→ Creating a knowledge graph of open government data.

Impact aware AI in agent based modelling



- Interdisciplinar research project
  - Computer-, Social- and Information Science
- Mannheim, Stuttgart and Munich, Germany
- Funding by Volkswagen foundation

Ongoing research

- Simulations on dynamic pricing strategies:
  - How are agents affected?
  - Does the system reinforce social inequalities?

UNIVERSITÄT MANNHEIM
HOCHSCHULE DER MEDIEN
LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN
VolkswagenStiftung

AI for Automated Driving

HOCHSCHULE RUHR WEST
UNIVERSITY OF APPLIED SCIENCES

Prof. Dr. Anne Stockem Novo

Institute of Computer Science
University of Applied Sciences Ruhr West
anne.stockem-novo@hs-ruhrwest.de

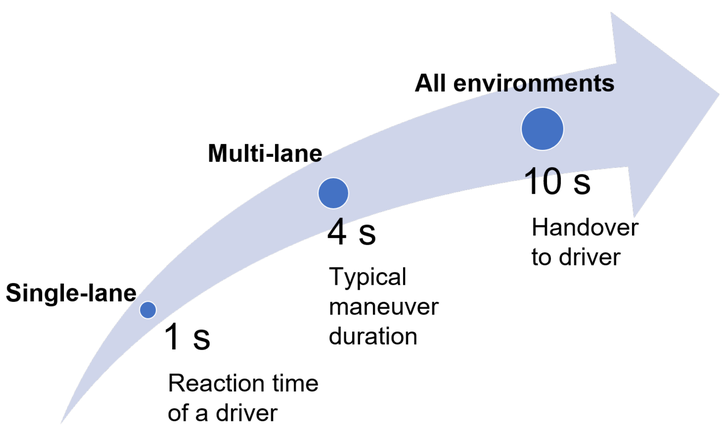
DFG Deutsche Forschungsgemeinschaft
German Research Foundation

Motivation

Automated Vehicles shall drive safely in challenging traffic situations (Image source: Argoverse [1]).

Challenges

- Safe steering of Automated Vehicles
- Highest comfort for passengers
- ▸ Anticipate traffic evolution: **Scene prediction**

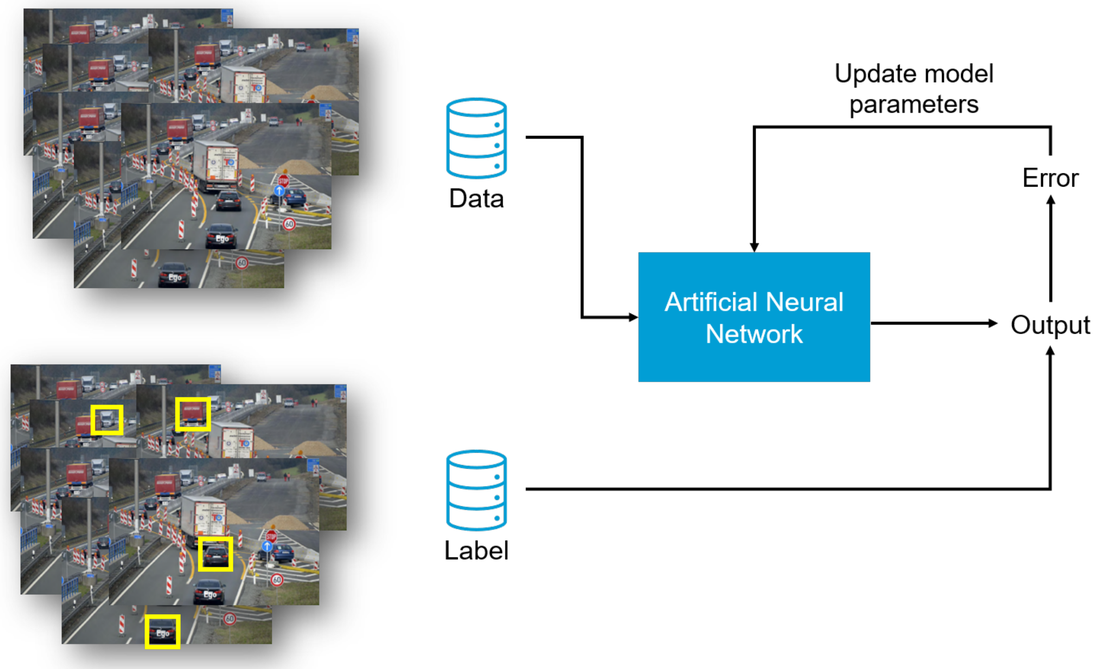


- ▸ Prediction horizon increases for wider function scope [3]

Why Artificial Intelligence?

- ▸ Designing rules (model-driven) is too complicated for all different situations
- ▸ Data contains typical patterns
- ▸ Learn from experience (data-driven)

Supervised learning



Prediction

Anticipation of future situation:

Image source: Argoverse [1]

- Learn from past observations
- Train model to predict trajectory
- Multi-agent prediction

Role of data

Research aspects:

- How to make such a system safe?
- Model performance depends on specific dataset (no standard)
- Data-centric approach
- Identification of feature importance
- Out-out-domain analysis
- Get understanding of data relevance
- How to select relevant data for model updates?

Informed Neural Networks

Research aspects:

- Insert expert knowledge
- Physics-constrained deep learning
- Consider physical equations in loss function
- Requires lower number of labels

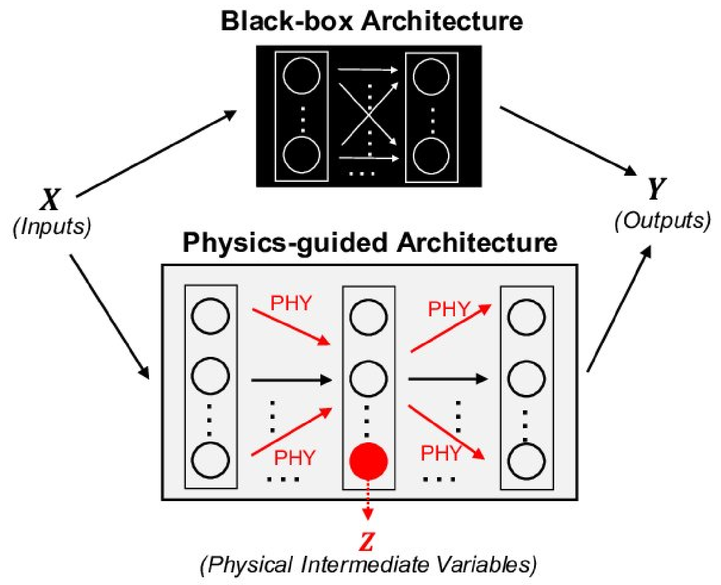


Image source: [2]

Further research activities

- NLP: Near-duplicate identification of online newspaper articles
- Explanations: Evaluate feature importance with SHAP

References

[1] B. Wilson et al., NeurIPS Datasets and Benchmarks 2021.
[2] A. Daw et al., siam international conference on data mining 2020.
[3] A. Stockem Novo et al., “A review on scene prediction for automated driving”, Physics (2022).

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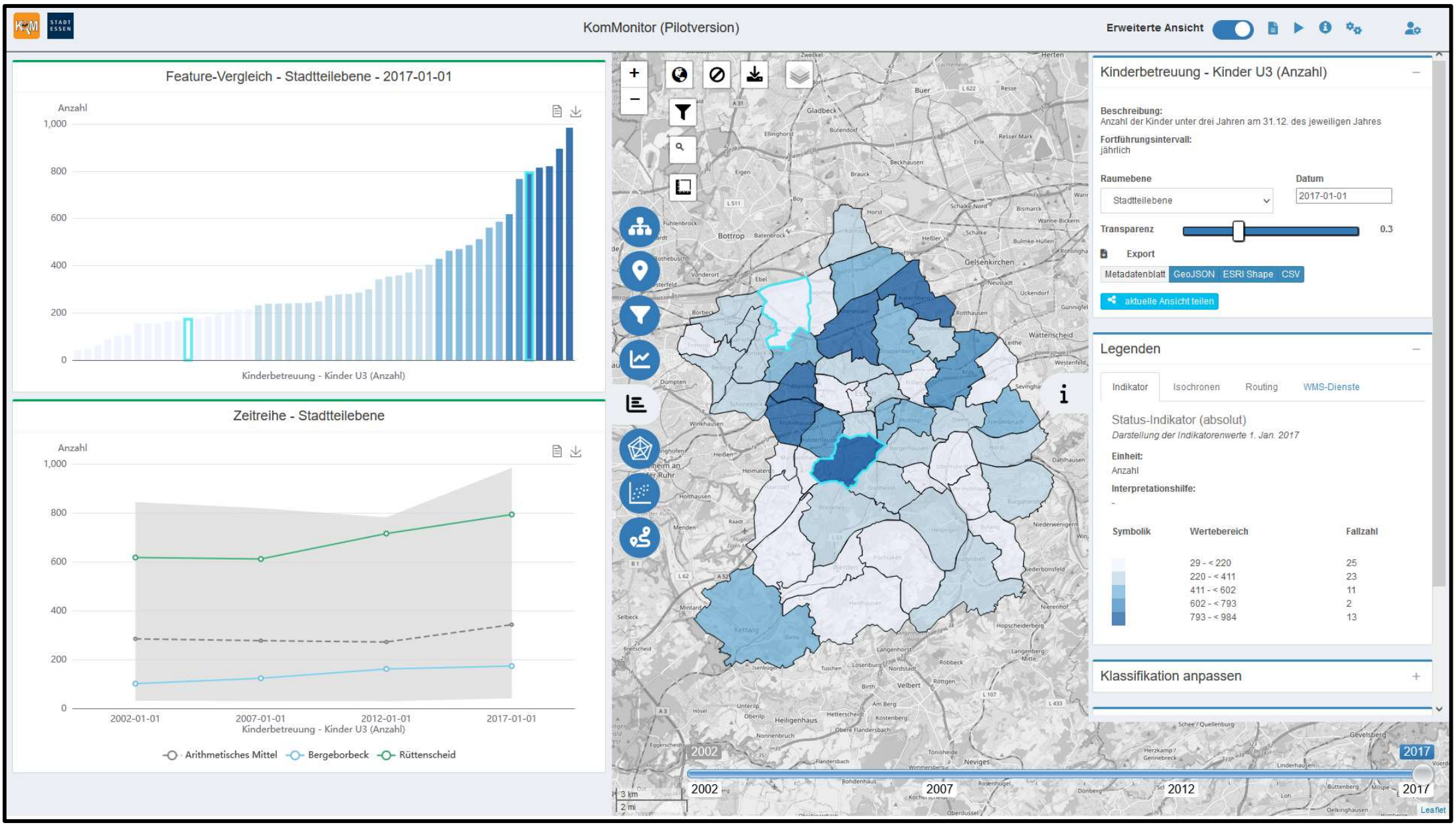
KomMonitor - spatial decision support platform for urban monitoring



Multispatial indicators

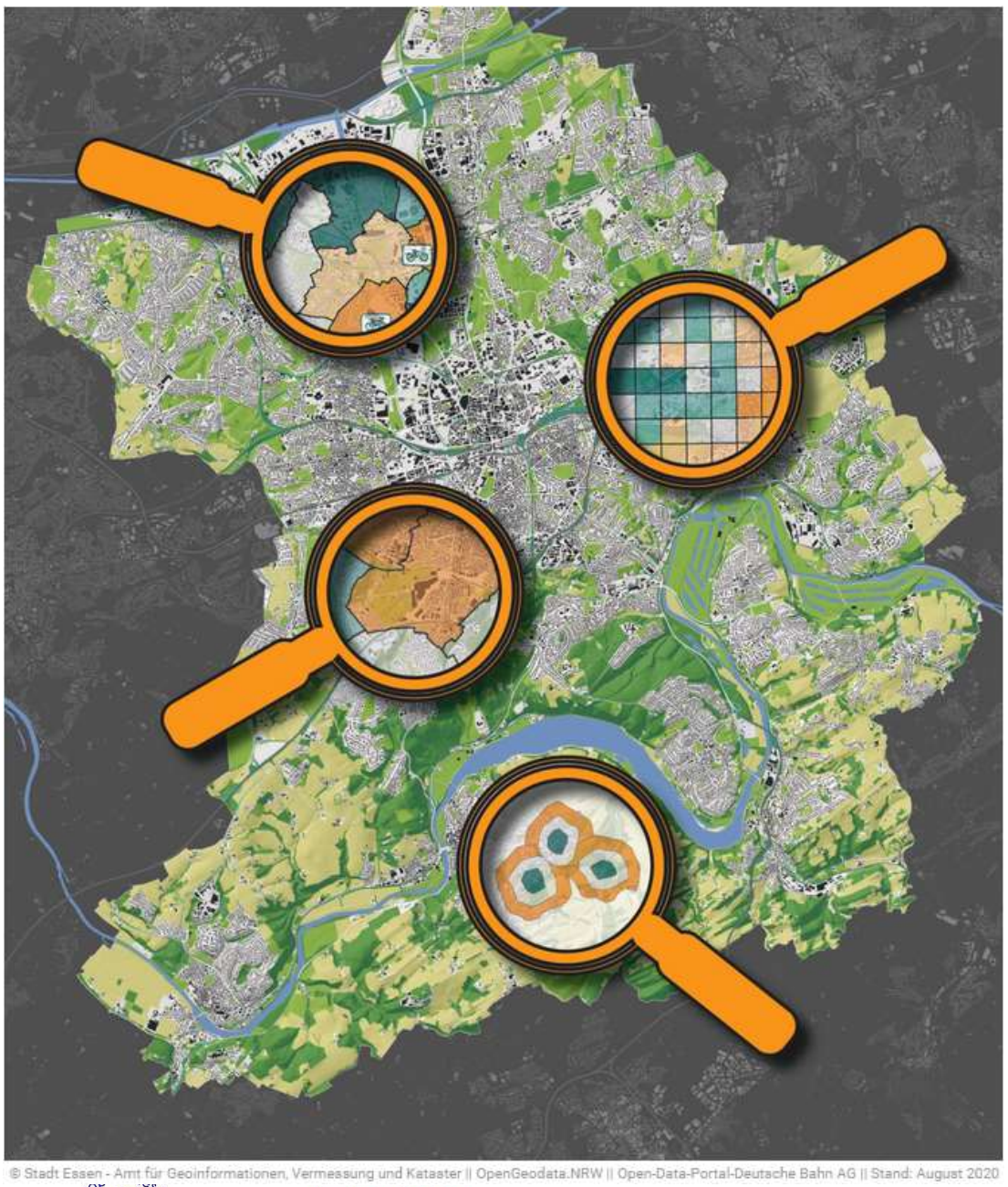
Multitemporal indicators and geodata

Topological statistical indicator computation

Statictical diagrams report generation

GIS based functions for spatial analysis

OpenStreetMap based reachability analysis



GEFÖRDERT VOM
Bundesministerium für Bildung und Forschung
FONA Ressource Land BMBF
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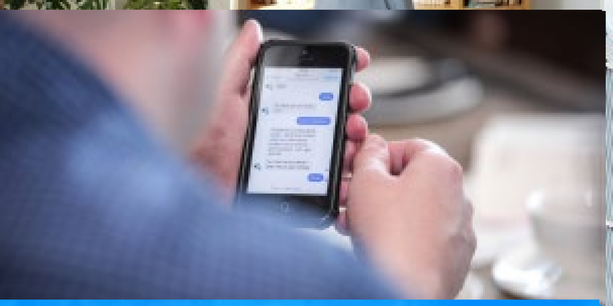
ESSEN
Mülheim an der Ruhr Stadt am Fluss



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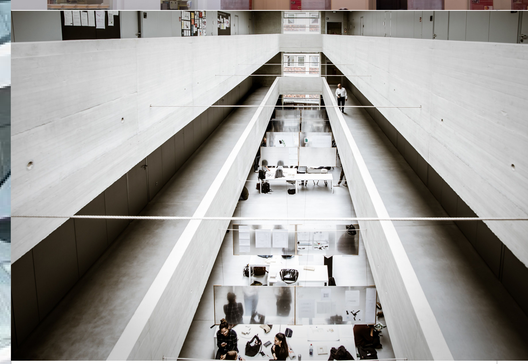
Researching the **acceptance** of new technology

www.acceptancelab.com

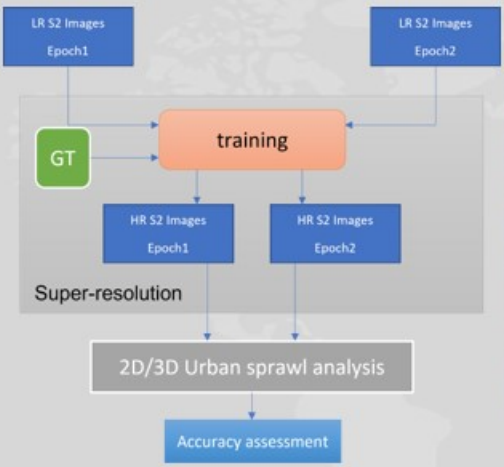


PRESENTER:
Patrick Planing, Jan Silberer

Hochschule für Technik Stuttgart
University of Applied Sciences

URBAN SPRAWL AND POPULATION MONITORING USING SUPER-RESOLUTION SATELLITE IMAGERY BASED ON MACHINE LEARNING APPROACHES

Prof. Dr. Hossein Arefi, hossein.arefi@hs-mainz.de
Hochschule Mainz - University of Applied Sciences
i3mainz – Institute for Spatial Information and Surveying Technology
Lucy-Hillebrand-Straße 2, 55128 Mainz



In today's world, the study of urban sprawl needs to be addressed seriously. Satellite imagery can provide very valuable spatial and spectral data for this task, but free satellite imagery such as Sentinel-2 does not provide the appropriate spatial resolution. By applying machine learning methods, the quality of the images can be increased, which is called "super-resolution procedure". Therefore, we can use the created high-resolution satellite images by machine learning and apply statistical methods to model various urban changes such as urban sprawl and monitor the population using cross-time data.

The goal of this proposal is to predict population trends using 2D and 3D changes in urban elements such as residential buildings. Freely available spatial data such as Sentinel-2 optical satellite data, Google Earth imagery, Openstreetmap vector data, and SRTM DEM elevation data are used.

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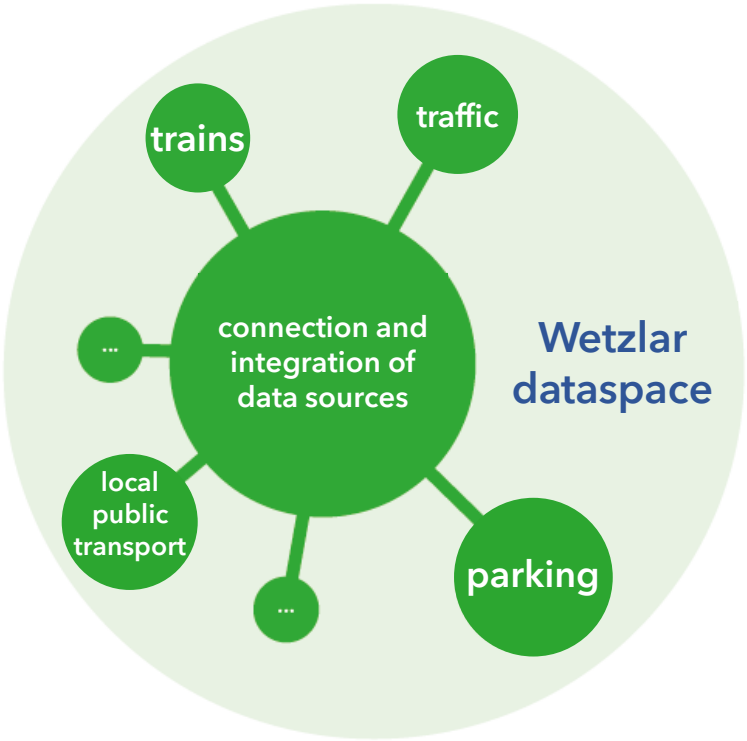
VLUID

Verkehrs**l**ösungen für komplexe **U**mbauszenarien auf der Grundlage **i**ntelligenter **D**atenauswertung

Traffic Management solutions for complex reconstruction scenarios based on intelligent data analysis



real time data & artificial intelligence

goals

- Reduction of congestions
- Efficient routing and planning
- Recommendations with real-time data
- Predictions with real-time data
- Interconnected mobility

intelligent solutions

- Dynamic traffic light circuit
- alternative routing
- Individual recommendation

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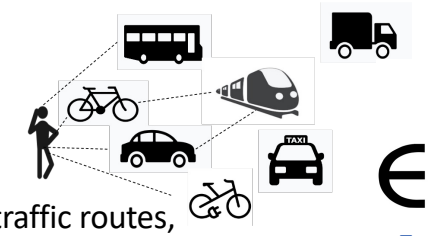
Large-scale Multi-Agent Modeling & Simulation

HAW HAMBURG

MULTI AGENT RESEARCH & SIMULATION

Digital Twins of Cities and Sustainable Mobility



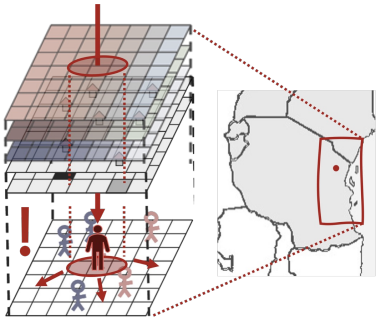
Traffic is the result of means of transport, traffic routes, weather, personal preferences, and many individual choices.

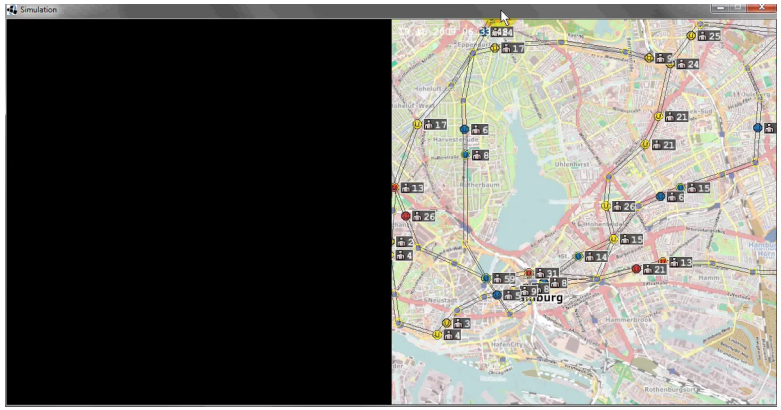
The Spread of Infectious Diseases

ESiDA

Epidemiological Surveillance for Infectious Diseases in sub-Saharan Africa

https://www.haw-hamburg.de/en/research/research-projects/project/project/show/esida/





Lenfers et al. 2021. Incorporating Multi-Modal Travel Planning into an Agent-Based Model: A Case Study at the Train Station Kellinghusenstraße in Hamburg. *Land*. 2021 Nov 3;10(11):1179. https://www.mdpi.com/2073-445X/10/11/1179

Clemen et al. 2021. Multi-Agent Systems and Digital Twins for Smarter Cities. In: Proceedings of the 2021 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation. New York, NY, USA: ACM; 2021. p. 45–55. https://dl.acm.org/doi/10.1145/3437959.3459254

Tolk, A., Clemen, T., Gilbert, N., Macal, C.M., 2022. How Can We Provide Better Simulation-Based Policy Support?, In: 2022 Annual Modeling and Simulation Conference (ANNSIM). IEEE, pp. 188–198. doi:10.23919/ANNSIM55834.2022.9859512

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https://www.mars-group.org

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Prof. Dr. Olaf Schroth

Research at the interface of landscape planning, climate change and digital tools

WEIHENSTEPHAN · TRIESDORF
University of Applied Sciences

« back to profile

Research CV

- Professor for Geodesign and Landscape Informatics
- Specialising in developing and testing digital technologies in landscape architecture (such as GIS, CAD, Visualisation, Digital Terrain Modeling, BIM) in order to facilitate landscape planning processes and to address current challenges, e.g. climate change, urbanisation and new energy systems
- Research topics: landscape and visual impact assessment, participatory and online GIS, landscape visualisation and the impact of climate change adaption and mitigation on the landscape scale

I have worked at the interface of landscape planning, urban design, participation, Geographic Information Systems (GIS) and visualization tools for more than ten years. My main research interests are participatory planning methods within community planning; the development, application and evaluation of spatial analysis and visualization tools; and planning processes that address sustainability, especially climate change, issues at local to regional scales.

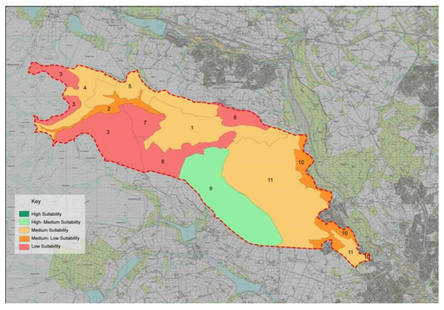
In my research, I want to further develop, apply, and evaluate innovative and inter-/transdisciplinary landscape planning processes using up-to-date GIS analysis and visualization tools.

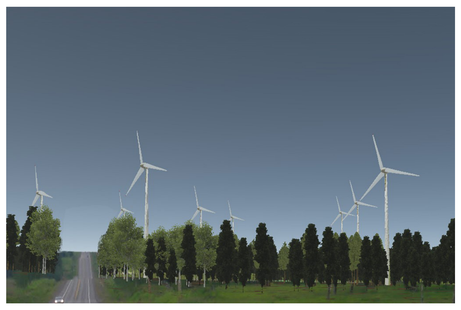
Transformation of the Energy Sector in the Wake of Climate Change

Research focus on the use of geodata-based landscape visualization to illustrate renewable energy scenarios in the landscape and research people´s preferences on how renewable energies are integrated in the landscape. The research is also contributing to the explanation of social acceptability of different renewable energy scenarios.
Example: Comparison of wind energy scenarios with many small turbines versus few but taller turbines.

In this context, I am also using Geographic Information Systems (GIS) to calculate the viewshed or the zone of theoretical visibility of various renewable energy systems as part of visual impact assessment.

Example: Development of a visual impact assessment method for solar pv using digital surface models.



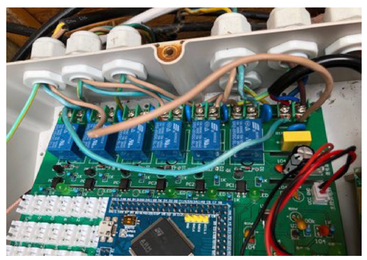


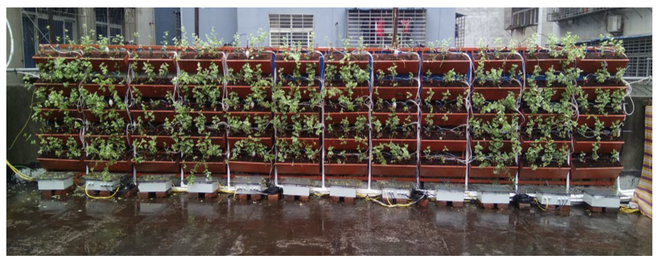
Images from left to right: GIS-based suitability analysis for wind energy, Visualization of scenarios with many small vs. few tall turbines

Smart Cities

Research focus on the use of geodata and sensors 1) to contribute to the maintenance of green infrastructure in cities and 2) on the application of „smart“ technologies in the region („smart region“) and settlements in rural areas. Green infrastructure is still neglected in most smart cities and their digital representation („digital twin“) although the potential is large because green infrastructure can fulfill multiple functions in terms of recreation, biodiversity, stormwater management, etc. Sensors can be used to monitor the condition of vegetation in open spaces, to adopt to diverse uses of spaces, to increase the effeciency of irrigation systems, to control lighting in open spaces, etc.

Example: In his PhD thesis, supervised by Schroth, Junyi Zhao developed a smart irrigation system for living walls.





Images from left to right: Software and hardware to control a smart living wall, prototype constructed as part of our research

Selected Referenzen

- Updating and backdating analyses for mitigating uncertainties in land change modeling: a case study of the Ci Kapundung upper water catchment area, Java Island, Indonesia. In: Rani, M.; Cameron, R.; Schroth, O.; Lange, E. (2022). International Journal of Geographical Information Science 36 (8).
- Schroth, O., Pond, E., & Sheppard, S. R. J. (2015). Evaluating presentation formats of local climate change in community planning with regard to process and outcomes. Landscape and Urban Planning. doi:10.1016/j.landurbplan.2015.03.011
- Jiang, L., Kang, J., & Schroth, O. (2015). Prediction of the visual impact of motorways using GIS. Environmental Impact Assessment Review, 55, 59–73. doi:10.1016/j.eiar.2015.07.001
- Schroth, O., Wissen, U., Lange, E., Schmid, W.A. (2011). Visulands – A multiple case study of landscape visualization as a tool for participation. Landscape Journal, 30(1), 53–71.
- Burch, S., Sheppard, S., Pond, E. Schroth, O. (2013). Climate change visioning: Effective processes for advancing the policy and practice of local adaptation. In: Moser, S. and Boykoff, M. (eds.). Successful Adaptation to Climate Change: Linking science and policy in a rapidly changing world. London: Routledge, 270-286.
- Schroth, O., Pond, E., Tooke, R., Flanders, D., Sheppard, S.R.J. (2012). Spatial Modeling for Community Renewable Energy Planning: Case Studies in British Columbia, Canada. In: Stremke, S. and van den Dobbelsteen, A. (eds.) Sustainable Energy Landscapes: Designing, Planning, and Development. Netherlands: Taylor & Francis, 311–334.

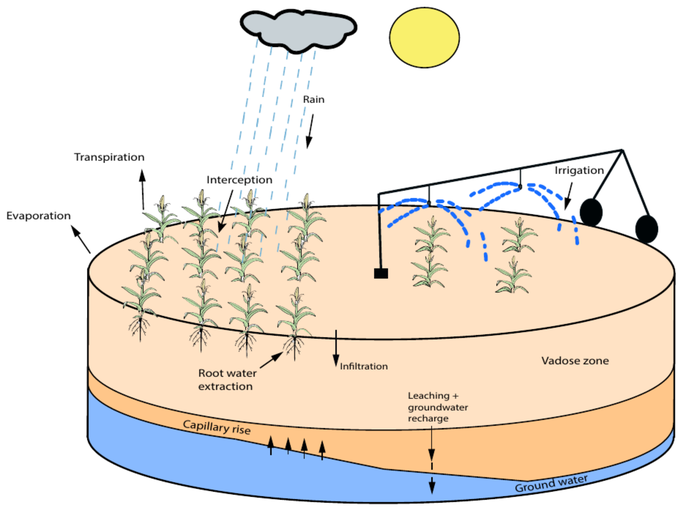
Towards agricultural water sustainability through closed-loop irrigation scheduling

Bernard Agyeman, Jinfeng Liu
Department of Chemical and Materials Engineering
University of Alberta

Introduction

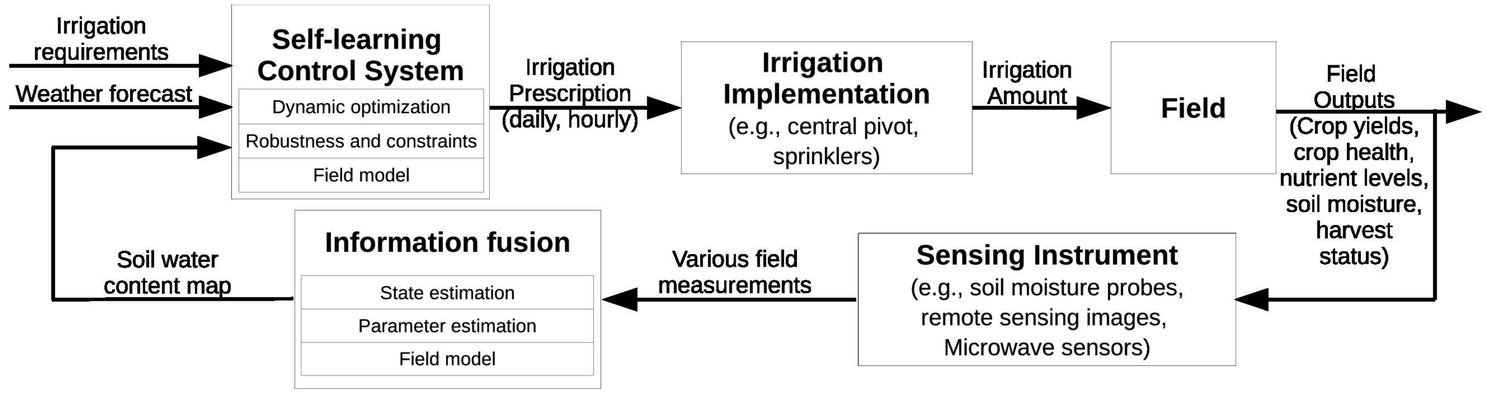
- Agricultural activities consume about 70% of the total freshwater globally
- The average water-use efficiency is about 50% - 60%
- Improving the water-use efficiency is critical in addressing water crisis
- Closed-loop irrigation is a promising approach to improve irrigation water-use efficiency

Background

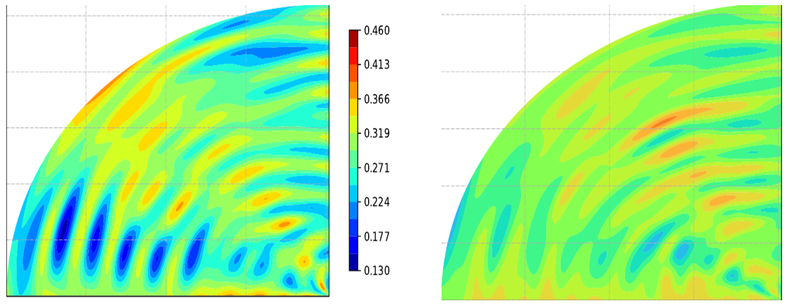


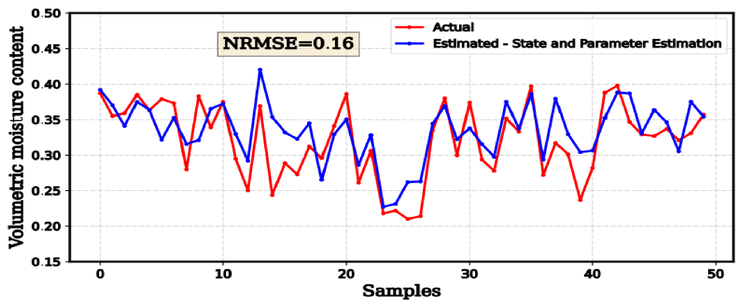
- Center pivot irrigation is the most commonly used irrigation system for large-scale agricultural fields
- Current irrigation practice is mainly in open-loop

Closed-loop irrigation scheduling



What we can do now





- Soil moisture map construction based on state and parameter estimation using limited soil moisture measurements (Agyeman et al., 2022)

Next Steps

- How to use the constructed soil moisture map to make variable rate irrigation decisions?
- Challenges include the very large-scale of the agro-hydrological model, uncontrolled environments, various types of uncertainties (sensing, modeling, predictions)
- Limited availability of irrigation (a center pivot takes 1-3 days to move across a field)
- Limited control capacity (when dry, we can irrigate; when wet, nothing can be done)
- Model reduction may provide a way to reduce the complexity of the problem
- Reinforcement learning may provide a way to alleviate the online calculation of the control system

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Contact

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Prof. Jinfeng Liu
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phone: +1 780 492 1317

References

1. B.T. Agyeman, E. Orouskhani, and J. Liu. Simulataneous estimation of soil moisture and hydraulic parameters for precision agriculture. Part B: Application to a real field. *In Proceedings of the 7th International Symposium on Adavced Control for Industrial Processes*, pages 18-23, Vancouver, Canada, 2022.

Hochschule für Technik Stuttgart

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iCity

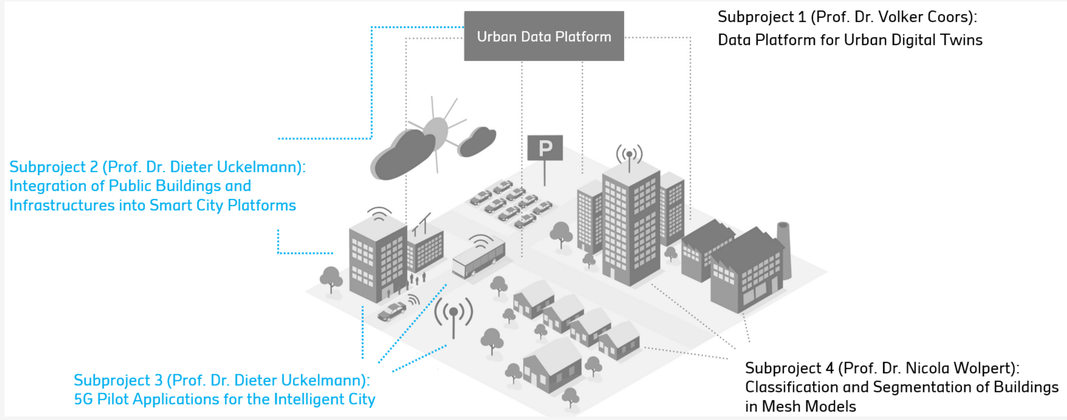
UDigiT4iCity – Urban Digital Twins for the Intelligent City

Integration of Public Buildings and Infrastructures into Smart City Platforms

Overview

Project:	UDigiT4iCity – Urban Digital Twins for the intelligent city
Subproject:	Integration of public buildings and infrastructures into smart city platforms
Project Lead:	Prof. Dr.-Ing. Dieter Uckelmann
Researchers:	Myriam Guedey, Robert Otto
Runtime:	1. Sep. 2022 – 30. Nov. 2024
Sponsoring:	Federal Ministry of Education and Research

Subprojects



Motivation

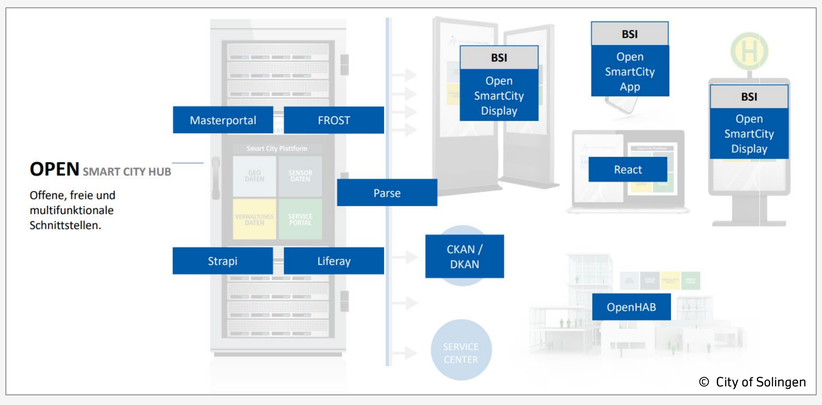
The past two years have drastically proven the need for an increased use of sensors, data platforms and communication systems for a resilient, intelligent city. Whether it is a flood disaster, the Corona pandemic or the current energy crisis – municipalities are now more than ever faced with challenges that can be met more reliable and faster through the use of urban digital twins.

For urban digital twins, information from a city's public buildings, e.g. on their energy consumption, can be crucial. Within this subproject, the interfaces between public buildings and smart city hubs are going to be investigated through different use cases that have been co-developed in a previous project.

Objectives

The project focuses on the technical and organizational interfaces between the smart building and the smart city. Therefore, several smart building applications with their respective interfaces will be developed, tested and evaluated in the actual environment of the two project partners.

Hereby, the use of open software and open standards is aspired to enable interoperability and independence of the results. All developments will build on an OSS stack including a management software for the Smart Home (openHAB) as well as on existing infrastructures of the partners.



Approach and Methodology

The project builds on the results of the previous ICT4iCity project. The methodological approach follows the idea of a living lab that aim for co-design, co-production, and co-evaluation of science and practice.

ICT4iCity (2021–2022)

AP 2.1 Requirements Analysis Smart Buildings and Infrastructures (co-development)
Identification of existing and planned infrastructures, Selection of public buildings for the basic installation (public swimming hall, school building); Joint development of use cases.

AP 2.2 Wireless networks and basic installation in the public buildings
Establishing wireless networking at the selected public buildings (LoRaWAN); Selection, installation, and connection of different sensors (energy monitoring) at the partners' premises; Setting up the basic installation (software stack).

UDigiT4iCity (2022–2024)

AP 2.1 Analysis of technology-driven innovations in municipalities and cities
Development of an iterative model based on the Semiotic Ladder (Stamper, 1973) for the development and structuring of technology- and user-oriented applications in a municipal or urban environment.

AP 2.2 Pilot applications in Solingen and Ludwigsburg (co-production)
Prototypical implementation and testing of smart public building pilot applications based on the requirements and use cases identified in ICT4iCity (1. energy monitoring and energy savings, 2. utilization of public infrastructures, 3. cross-building sensor management).

AP 2.3 Interface development (data flow in and out of the building)
Investigation and implementation of interfaces for the exchange of data between building(s) and smart city platforms. Data-in: use data from the smart city in the public building (e.g. weather), data-out: prepare and provide data from the public building for smart city hubs (e.g. energy consumption).

AP 2.4 Evaluation, documentation and pre-transfer (co-evaluation)
Evaluation of the pilot applications together with the partners; investigation of possible operating and business models as well as digital sustainability with a view to long-term use and permanence of the applications.

Partners

- Stadt Solingen (Solingen Digital),
- Stadtwerke Ludwigsburg-Kornwestheim

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ENERGIE WENDE BAUEN

Forschung für energieoptimierte Gebäude und Quartiere

KoWa-Webpage

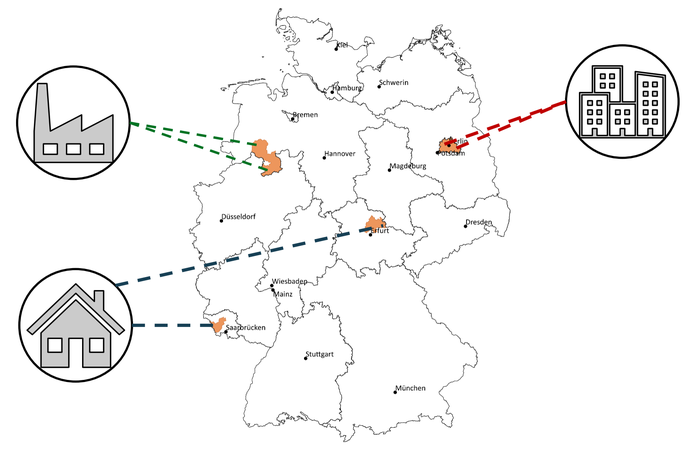
KoWa-results (German Webpage)

Supported by:

Federal Ministry for Economic Affairs and Climate Action

on the basis of a decision by the German Bundestag

Grafik: WERNERWERKE GbR, Berlin.



Industry cluster
- Use of industrial waste heat

Urban Cluster
- urban building und infrastructur

Cluster with Existing infrastructur
- small-town building structure and existing heating network

KoWa - Heat transition in municipal energy supply

The research project KoWa - 'Heat transition in municipal energy supply' aims to support municipal utilities in the development of sustainable heat supply systems. The focus points of the project include a stakeholder analysis as well as a multi-criteria sustainability assessment.

Situation in Germany

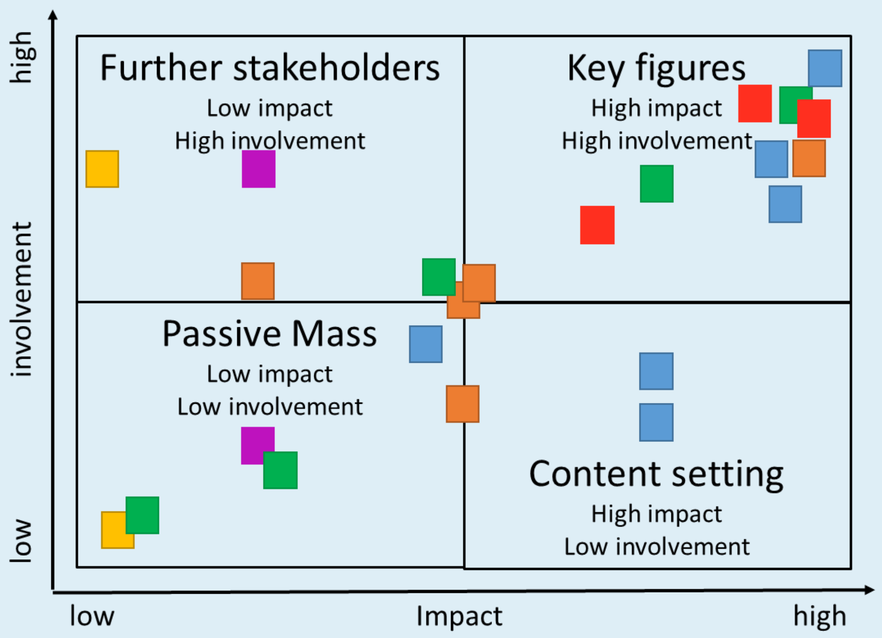
- Greenhouse gas emissions from the building sector are not falling fast enough (115 Mio. CO_{2eq} in 2021)
- Space heating and hot water correspond to over 80% of the energy consumption for living (511 TWh + 106 TWh in 2019)
- Share of renewable energies is low (15 % in 2019)

Stakeholder Analysis

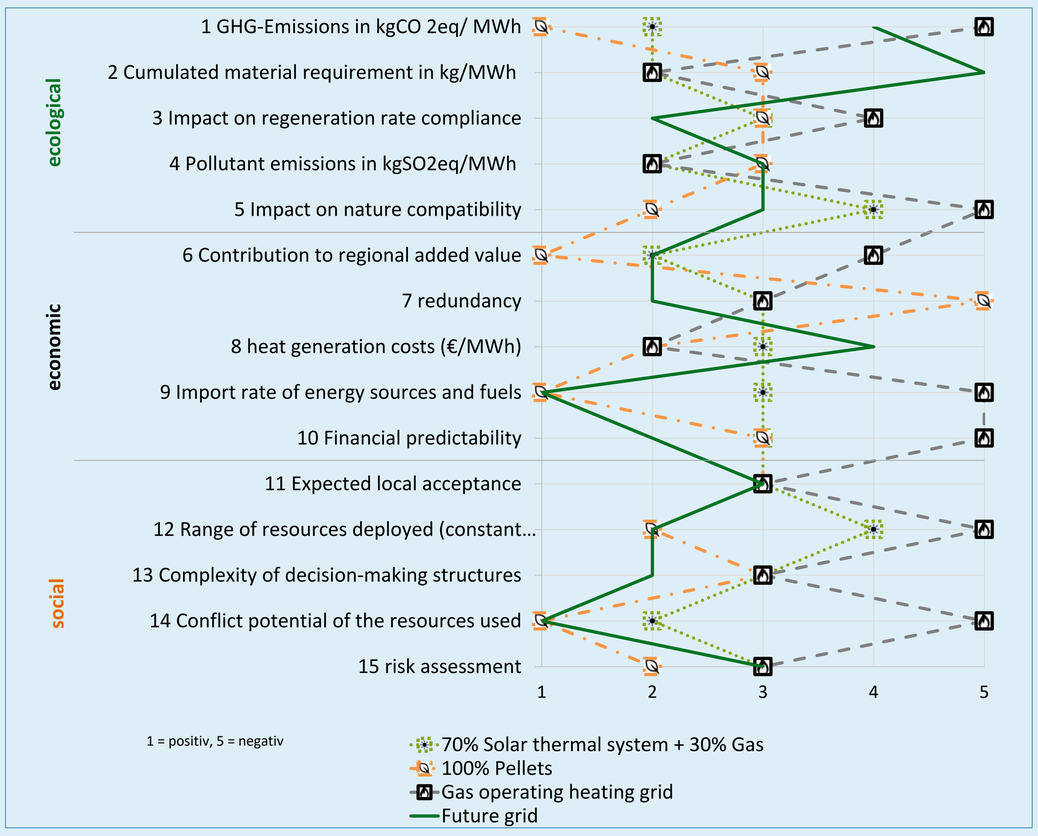
For the stakeholder analysis, a total of 45 interviews were conducted in six study areas (two in each cluster). We chose the interview partners on the basis of existing studies, e.g. Dunkelberg et al. Content logs were prepared by the research team. These were analysed using a qualitative content analysis based on Mayring (Mayring & Fenzl 2019; Prainsack 2021). Method describes in Welz et al. (2021).

Sustainability assessment

As part of the project, various heat supply options were designed in the six study areas and compared using a multi-criteria sustainability assessment. In order to ensure a comparable and transparent procedure, the methodology was developed on the basis of sustainable economics and published in a method description (Gapp-Schmeling et al., 2021).



Citizens	
Energy companies	
Subject matter experts	
Industry	
City and politics	
Housing industry	



Literature:
Dunkelberg, E., Gährs, Swantje, Weiß, Julia, Salecki, S. (2018): Wirtschaftlichkeit von Mehrlei-ter-Wärmenetzen. Ökonomische Bewertung von Mehrleiter-Wärmenetzen zur Nutzung von Niedertemperaturwärme. Schriftenreihe des IÖW 215/18.
Gapp-Schmeling, K., Hewelt, F., Meyer, M., Rogall, H., Schmidt, C., Waldhoff, C., . . . Wern, B. (2021). Nachhaltigkeitsbewertung kommunaler Wärmeversorgungsoptionen: Methodenbeschreibung (KoWa-Berichte). Retrieved from https://www.kowa-projekt.de/wp-content/uploads_kowa/2021/10/KoWa_AP4-Methode-Konzeptbewertung_fin.pdf
Mayring, Philipp & Fenzl, Thomas (2019). Qualitative Inhaltsanalyse. in Nina Baur & Jörg Blasius (Hrsg.), Handbuch Methoden der empirischen Sozialforschung (S.633-648). Wiesbaden: Springer.
Prainsack, Barbara & Pot, Mirjam (2021). Qualitative und interpretative Methoden in der Politikwis-senschaft. Wien utb/Facultas.
Welz, Anna Masako; Gapp-Schmeling, Katharina & Becker, Daniela (2021). Erhebung der Akteursstrukturen. Methodenbeschreibung. IZES - Institut für ZukunftsEnergie- und Stoffstromsysteme & HWR Berlin. Berlin, Saarbrücken 2021. https://www.kowa-projekt.de/wp-content/uploads_kowa/2022/04/KoWa_AP-4-Methode-Akteursanalyse.pdf

www.energiewendebauen.de

Project Profile

Projekt title	KoWa – Wärmewende in der kommunalen Energieversorgung (Heat transition in municipal energy supply)
Funding indicator	03EN3007
Project duration	01/2020 bis 12/2022
Keywords	Wärmewende, Nachhaltigkeitsbewertung Akteure, Technologie, Potentialanalyse, Umsetzungsleitfäden
Project type	practice and science

kowa
...die Wärmewende im Quartier gestalten

Autors
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Investigation of environment-friendly dielectric insulation gases up to 1.5 MPa to **replace SF_6**

I. Introduction

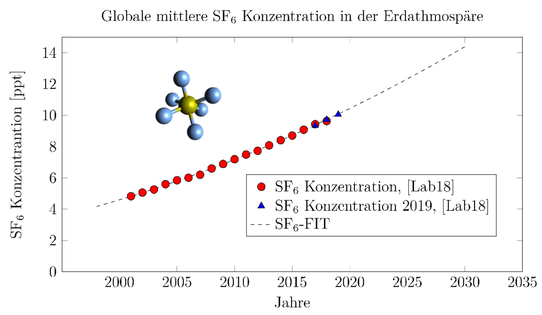
- **SF6 – high voltage insulation gas**

  + great dielectric insulation properties

  + good arc quenching characteristics

  + electron attachment

  - high known global warming potential (1kg SF6 → 22.800t CO2)



- **alternative insulation gases e.g. Air, N2,**

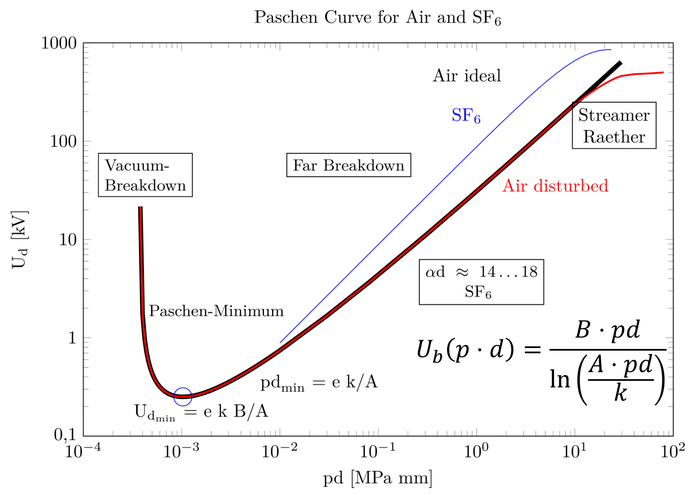
  + **eco friendly**

  + **no global warming potential**

  - less dielectric performs, which can be compensated by pressure

  - less electron attachment

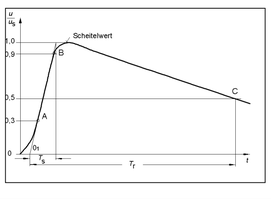
- **Paschen‘s law of breakdown voltage**

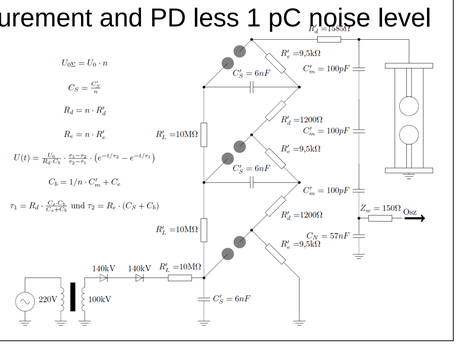


II. Setup High Voltage Lab

HS Mannheim High Voltage Laboratory

1. 500 kV, 100 kVA, 200 mA high voltage AC cascade transformer (AC HiPot)
2. 400 kV, 10 mA, HVDC Greinacher cascade
3. 1200 kV, 30 kJ, lightning impulse generator (BIL, SIL)
4. Surge current generator up to 10 kA and 10 kV
5. Pressure vessel for 420 kV AC and 1050 kV BIL and 1.5 MPa pressure
6. Dissipation loss measurement and PD less 1 pC noise level
7. High Bay WxDxH: 12x10x7.5 meter

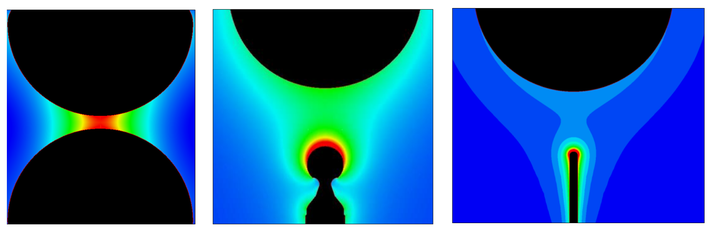




II. Setup High Voltage Lab

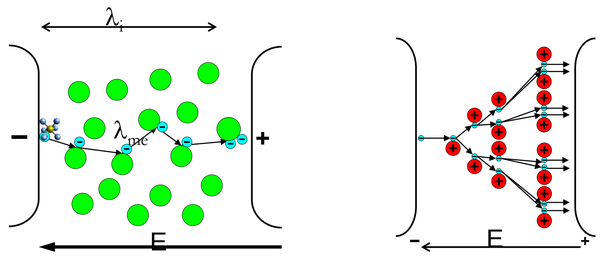
- pressure vessels
- variable sparking gap
  - d = 0…50 mm
  - radius of spheres = {25, 50, 75} mm
- max. pressure 1.5 MPa (220 psi)
- max. voltage 1050 kV

PG MWB – Bamberg PGT



III. Investigation

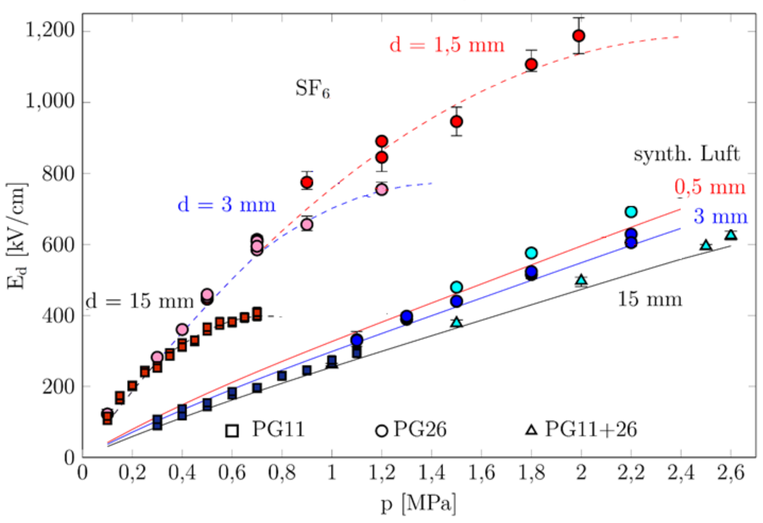
- breakdown mechanism of several gases
  - Influences
    - Pressure,
    - field geometry
    - Surface roughness
    - Partial discharges
    - Electron attachment
    - Pre ionization
    - Statistical time lag
    - Impulse voltages
    - Preconditioning of surface
    - influences on cleaners
- Theoretical approach
  - Calculation of attached and generated charge carrier



- New Streamer model
- Electron affinity of clean air
- Superimposed electrical influences
- Saturation of SF_6 insulation performance

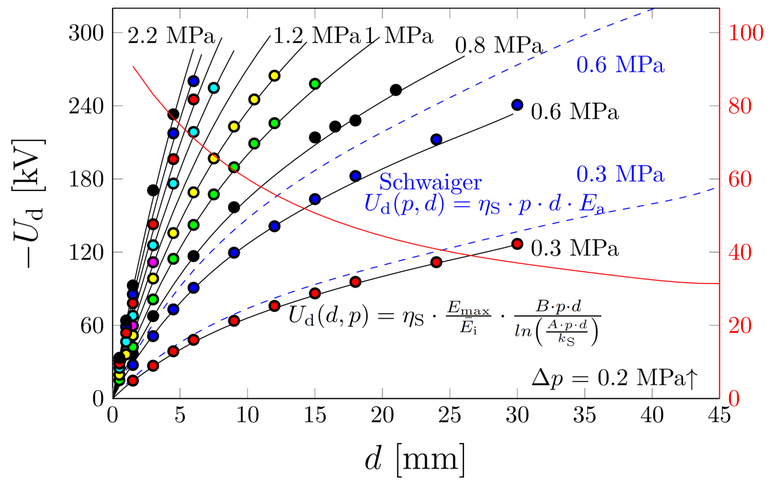
IV. results

Dielectric strength of Air, SF_6 and its comparison



In the figure above it can be seen, that SF_6 insulated approximately 3 times better compared to air at low pressure. However the performance of SF_6 is non-linear, but air is almost linear. Concluded out of this high pressure measurements technical SF_6 application at 0.6 MPa can be replaced by using clean air of 1.4 MPa

Breakdown Voltage U_d of synth. air inhomogeneous field, $T = 293$ K, $r_k = [9.5_{(-)}\ 50_{(GND)}]$ mm, $\eta_S = 90 \ldots 30$ %



In the figure above it can be seen, each measuring point is matching the calculated curve of breakdown voltage in dependency of pressure and distance at a variation of several field efficiency factors. These curves are calculated with a new formed integral algorithm to design and calculate the dielectric performance of natural gases.

V. technical achievements

- Eco-friendly high voltage devices up to 420 kV line-line voltage
- ZERO GWP
- Reliable and proven design
- Green high voltage for future
- F-Gas-free technology

[Siemens/Trench]

HS Mannheim, University of applied sciences
High Voltage Engineering

8/31/2022

Prof. Dr.-Ing. Andreas Hopf

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TECHNISCHE HOCHSCHULE NÜRNBERG
GEORG SIMON OHM

Green Energy
αCP
applied computational physics

Currents fields of work

and future projects

-

Jan Lohbreier

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

TH Nürnberg

Located in northern Bavaria, Germany

~ 13000 students *

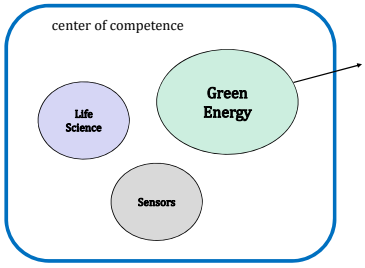
12 faculties (from Architecture to Social Sciences)

- Focus on **applied** research and development
- **Strong link** to (local) companies (SME)
- **Interdisciplinarity** (e.g. with applied chemistry, electrical and process engineering)

*Fall semester 2020/21

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Applied Computational Physics (www.th-nuernberg.de/cp4x)



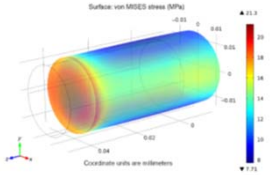
multiphysical simulations

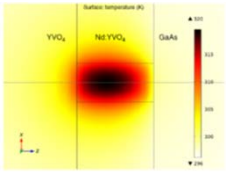
- FEM tools
- equations of various fields of physics
- coupling of these equations and solving them for real-world problems

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Multiphysical simulation

New laser for eye surgery:
Temperature field and deformation of the focal zone of a laser spot in a micro crystal laser





Optics
+
Heat transfer
+
Structural mechanics

Erdal Türkyilmaz et. al., "Simple ps microchip Nd:YVO4 laser with 3.3-ps pulses at 0.2 to 1.4 MHz and single-stage amplification to the microjoule level," Opt. Eng. 55(6), 066126 (2016), doi: 10.1117/1.OE.55.6.066126.

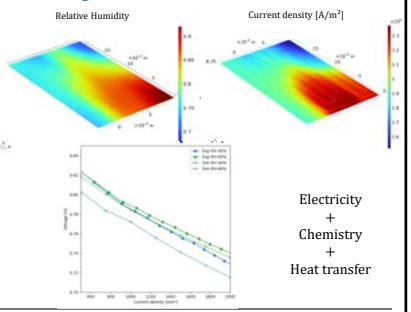
Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Field of work: Proton-exchange Membrane Fuel Cell

PEM FCs rely heavily on the humidity of the membrane (middle)

Only if the membrane is kept moist, its conductivity is high enough for the protons (far right)

The U-I curve shows a good agreement with experimental and simulational data (below)



Electricity
+
Chemistry
+
Heat transfer

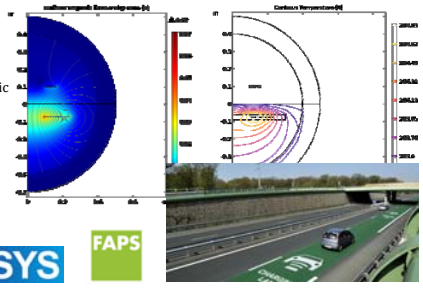
Fabian Gumpert et. al., "Multiphysical Simulation of a PEM FC". DPG spring conference 2022. (https://www.dpg-verhandlungen.de/year/2022/conference/erlangen/part/ako/session/3/contribution/47?lang=en)

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Field of work: Inductive charging of moving vehicles

Increased temperature due to inductive charging. (application: dynamic charging of EV)

Electromagnetism
+
Heat transfer



ELSYS FAPS

https://motorbikewriter.com/italy-launches-inductive-highway-ring-with-contactless-charging-for-evs/
downloaded 17.10.2022

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Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Future projects and fields of interest...

- **Fuel Cell and Battery technology**
- **Energy Harvesting (for low power applications)**
- **Electrical drives and energy conversion**
- **New ideas ?!?**

>> your name goes here <<

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www.th-nuernberg.de
page 7

Thank you!

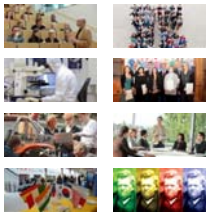
Any questions?

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

TH Nürnberg

The Nuremberg Institute of Technology (TH-N) ranks among the largest universities of applied sciences in Germany with about 13.000 students (summer 2022) and is known for

- wide study guide
- **interdisciplinary research**
- application-oriented teaching
- international orientation
- attractive working conditions
- excellent performance
- importance for the metropolitan area
- famous heritage Georg Simon Ohm



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www.th-nuernberg.de
Seite 9

Prof. Dr. Jan Lohbreier
Department of Applied Mathematics, Physics and Humanities

Nuremberg Institute of Technology

- **Applied Mathematics, Physics and Humanities**
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- Architecture
- Civil Engineering
- Business Administration
- Electrical Engineering, Precision Engineering, Information Technology
- Design
- Computer Science
- Mechanical Engineering and Building Services Engineering
- Social Sciences
- Process Engineering
- Materials Engineering

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Fraunhofer
CAN

FRAUNHOFER CENTER FOR APPLIED NANOTECHNOLOGY - CAN

Development and Manufacturing of catalyst nanoparticles for electrocatalysis

Motivation

Nanoparticles and their high surface-to-volume ratio are well suited for catalysis. In order to meet the goals for production of green hydrogen, reduction of PGM metal content, improving catalyst efficiency and durability, and upscaled manufacturing methods are of utmost importance.

Continuous flow synthesis: Advantages and Opportunities

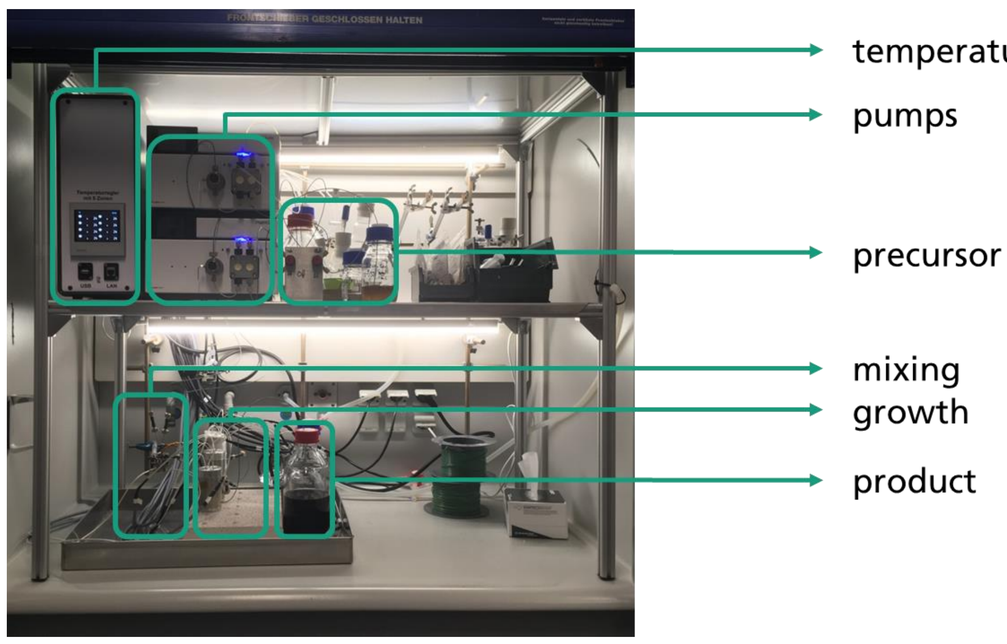

Abb. 1: Continuous flow reactor at lab scale

Fraunhofer CAN's flow reactor allows for control of size, shape and composition of catalyst nanoparticles.

Advantages of this process include:

- **Variation of synthesis parameters** allowing for development of different catalyst material
- **Platform technology**
- Reviewing/checking of **simulation/modelling data**

Catalyst manufacturing: product and characterisation

Fraunhofer CAN competencies encompass material development, processing and characterisation.

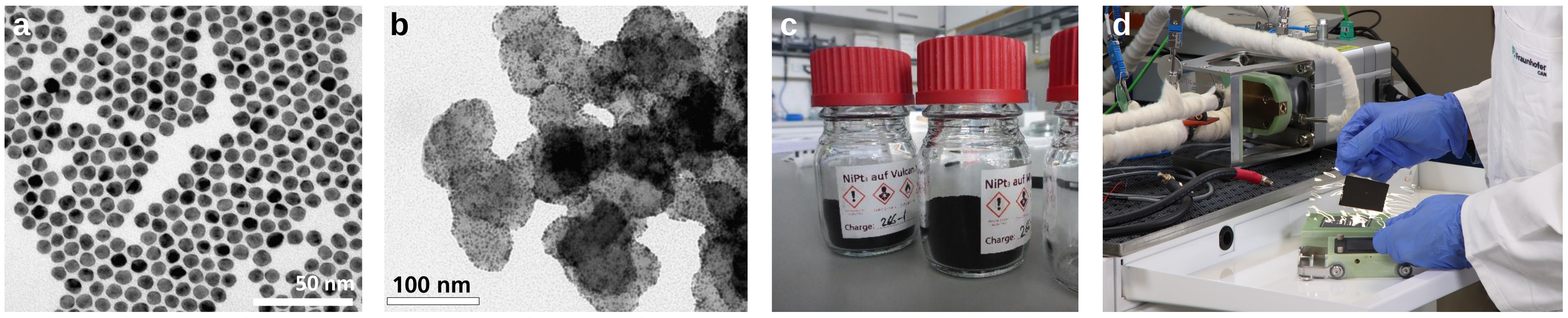

Fig. 2: Manufacturing and characterisation of PGM catalyst material.

Fraunhofer Center for Applied Nanotechnology - CAN
Energy Materials
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michael.hoeltig@iap.fraunhofer.de
www.iap.fraunhofer.de

Possible collaboration

Fraunhofer CAN develops, manufactures and evaluates catalyst material and CCMs for application within the hydrogen technologies. Upscaled catalyst material manufacturing at multiple 10g scale for pilot-scale testing is possible.

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UCB-SENMOD: A MODEL FOR ANALYZING FUTURE ENERGY SYSTEMS WITH 100 % RENEWABLE ENERGY TECHNOLOGIES

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Mail: h.teheesen@umwelt-campus.de

Umwelt-Campus Birkenfeld | Hochschule Trier

Institut für Betriebs- und Technologiemanagement
Institute for Operations and Technology Management

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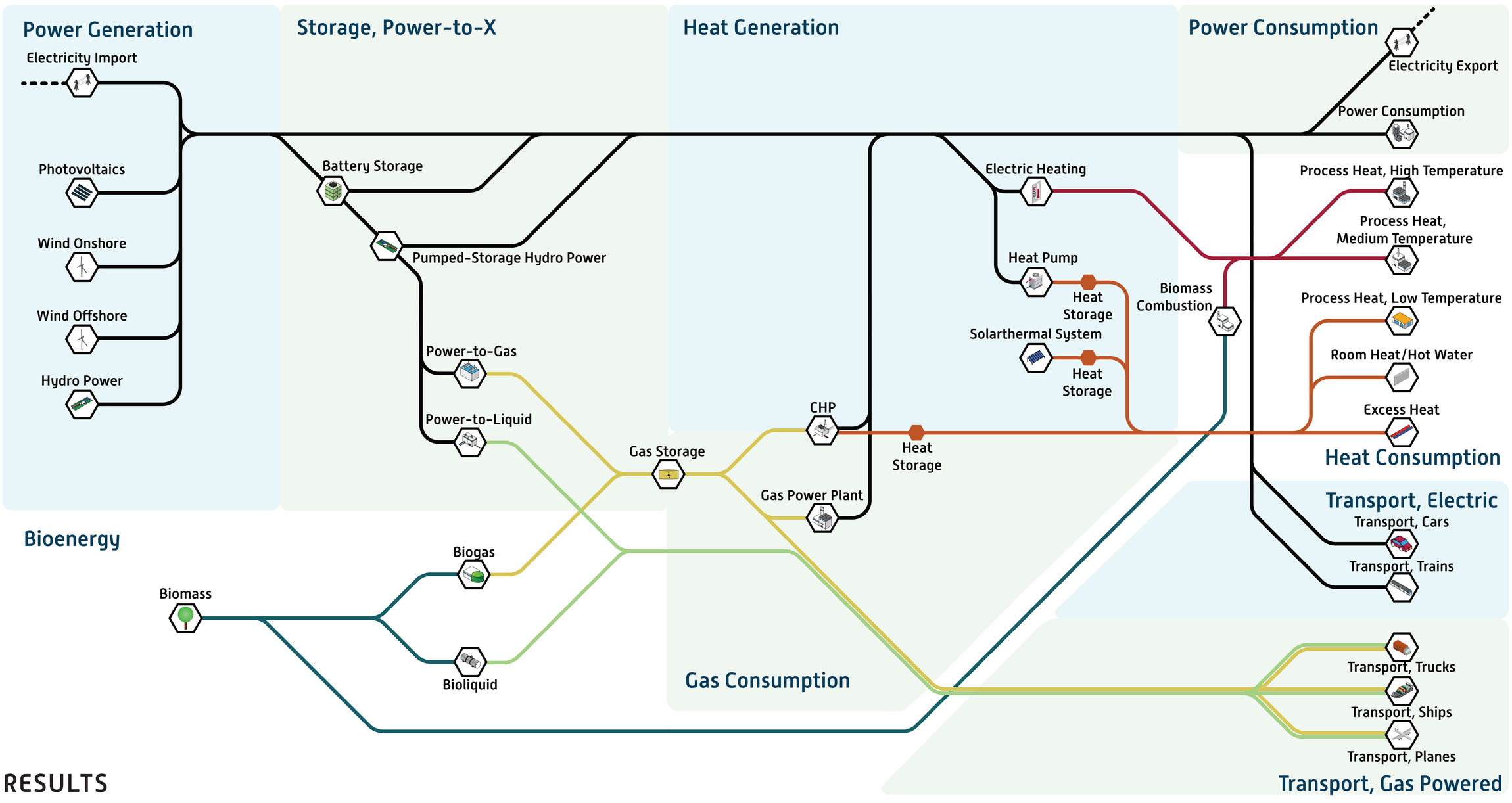
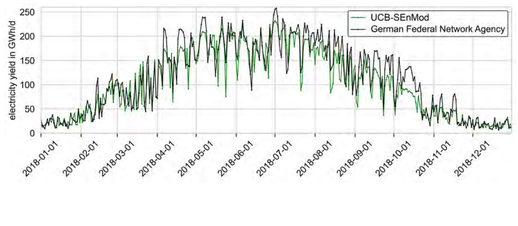
ABSTRACT

While the contribution of renewable energy technologies to the energy system is increasing, so is its level of complexity.
In addition to new types of consumer systems, the future system will be characterized by volatile generation plants that will require storage technologies. Furthermore, a solid interconnected system that enables the transit of electrical energy can reduce the need for generation and storage systems. Therefore, appropriate methods are needed to analyze energy production and consumption interactions within different system constellations.
Energy system models can help to understand and build these future energy systems. However, although various energy models already exist, none of them can cover all issues related to integrating renewable energy systems. The existing research gap is also reflected in the fact that current models cannot model the entire energy system for very high shares of renewable energies with high temporal resolution (15 min or 1-h steps) and high spatial resolution. Additionally, the low availability of open-source energy models leads to a lack of transparency about exactly how they work.
To close this gap, the sector-coupled energy model UCB-SEnMod was developed. Its unique features are the modular structure, high flexibility, and applicability, enabling it to model any system constellation and can be easily extended with new functions due to its software design. Due to the software architecture, it is possible to map individual buildings or companies and regions, or even countries. In addition, we plan to make the energy model UCB-SEnMod available as an open-source framework to enable users to understand the functionality and configuration options more easily.

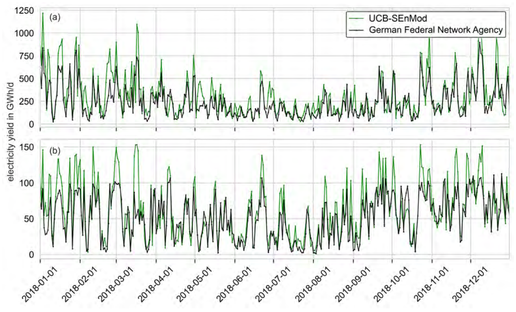
ENERGY MODEL



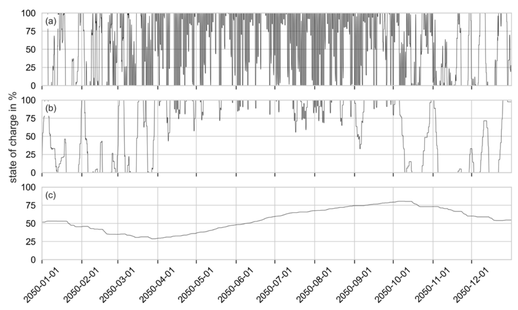
RESULTS



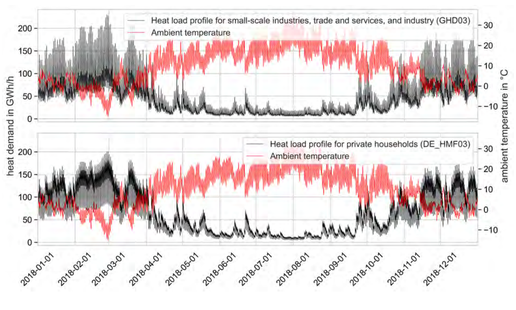
Validation of the photovoltaic yield simulations using Germany's example in 2018 with the German Federal Network Agency data. The~datasets are aggregated to daily totals. Data is trend adjusted to compensate plant capacity's growth during the year without changing the average. The example's validation shows that our model simulation produces good results even under simplified assumptions. However, by simulating several plants located in regions that differ climatically, the RMSE can be improved.



The upper part shows the validation of onshore wind power simulations and the lower partfor offshore wind power - both using Germany as an example in 2018 with data from the German Federal Network Agency. The data are trend-adjusted and aggregated to daily sums. Even under quite simple assumptions, the validation shows promising results. However, the data of the German Federal Network Agency (shown in black) partly differ significantly from the simulated data (shown in green). It is again mentioned that by simulating several plants in regions with different climatic conditions, the RMSE will improve.



Example of the state of charge pattern of battery, pumped-storage hydropower, and gas storage. The upper part shows the pattern of the battery storage, the middle part that of pumped-storage hydropower, and the lower part shows the state of charge pattern of the gas storage.



Example of a simulated heat load curve of space heating and water heating for households (upper part of the figure), small-scale industries, trade and services, and industry (lower part of the figure), and the ambient temperature using Germany's example for 2018. The demanded heat load (shown in black) is inversely proportional to the ambient temperature (shown in red). Although the example shown represents the load profile of a country, the approach presented can also be applied to individual buildings or companies

BIBLIOGRAPHY

A. Blinn, H. te Heesen (2022). UCB-SEnMod: A Model for Analyzing Future Energy Systems with 100% Renewable Energy Technologies-Methodology. Energies, 15(12), 4383–4405. https://doi.org/10.3390/en15124383
A. Blinn, H. te Heesen (2021). Sector Coupled Energy Model for the European Electricity, Heat and Transport Sectors - Methodology. 38th European Photovoltaic Solar Energy Conference and Exhibition, 1356–1363. DOI: 10.4229/EU-PVSEC20212021-6CO.11.5
M.-C. Leonhard, H. te Heesen (2020). Energy Model for a Rural Region in Germany - Methodology. 37th European Photovoltaic Solar Energy Conference and Exhibition. S. 1850 - 1854. Sept. 2020. DOI: 10.4229/EUPV-SEC20202020-6BV.5.22
M.-C. Leonhard, M. Kamberaj, H. te Heesen (2018) Sector Coupling in Europe to Reach the Climate Change Mitigation Goals by 2050. 35th European Photovoltaic Solar Energy Conference and Exhibition. Brussels, Belgium. P. 2104-2018. Sep. 2018. DOI: 10.4229/35thEUPVSEC20182018-7EP.1.2

Multi-Physics Modelling of Next-Generation Structural Supercapacitors (SCCs)

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I-HTWK Hochschule für Technik, Wirtschaft und Kultur Leipzig

THALES NAWA TECHNOLOGIES TECHNISCHE UNIVERSITÄT DRESDEN PRINTCAP

Project Website

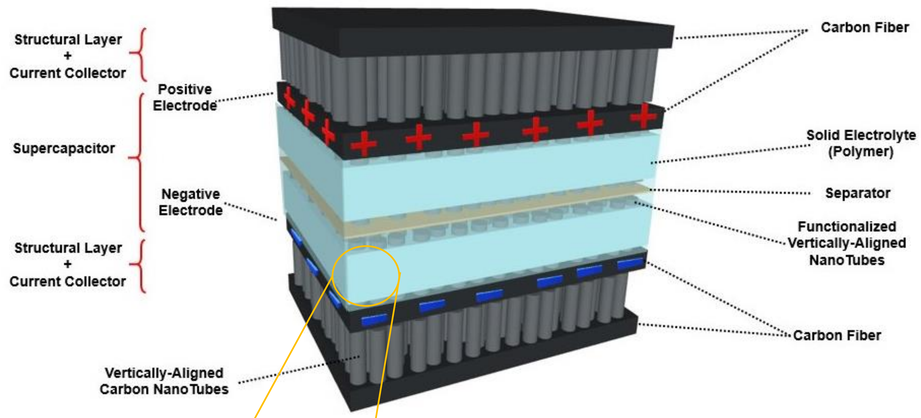
Motivation

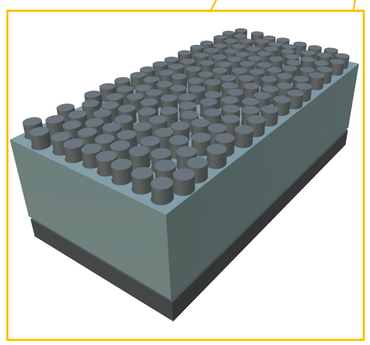
- SCCs offer a combination of supercapacitors' performance with structural capabilities.
- SCCs provide dramatic reduction of weight as function of the stored energy, which can be a potential breakthrough in various fields such as aviation and transportation [1].
- Multiple physical processes are involved in a SCC and their coupling effects need to be analyzed[2].
- Example of a working device made of SCCs [3]

Methodology

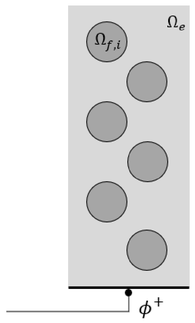
- Numerical characterization through multi-scale FE-modeling
- Optimization of the SSC design

Product Concept





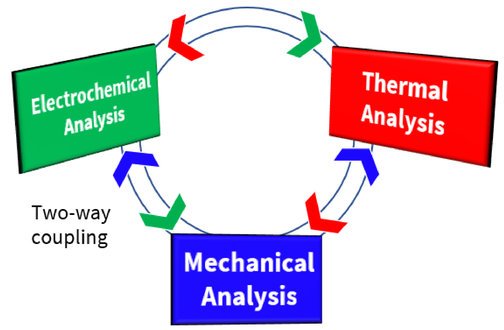
Idealized Domain Schematics



$\Omega_{f,i}$ — Carbon Fibre
Ω_e — Solid Polymer Electrode

Coupled Processes in SCCs [2]

Thermo-electro-mechanical framework



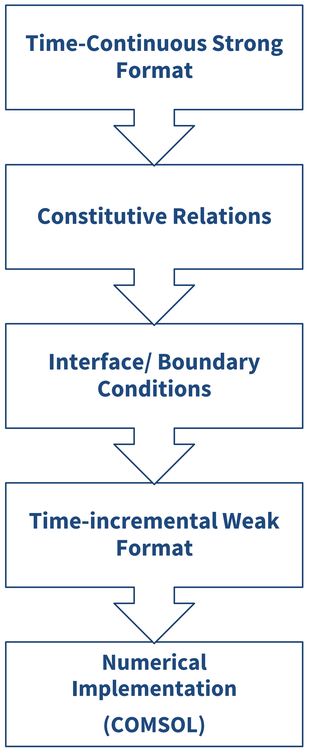
Governing Equations (Strong Format)

$$-\sigma.\nabla = 0$$

$$-SF[\Delta c] + d.\nabla = 0$$
$$\partial_t(Sc_\alpha) + j_\alpha.\nabla = 0$$
$$\partial_t S + \hat{\omega}.\nabla = 0$$

$$C_v\partial_t\theta + \mathrm{q}.\nabla + j_\alpha.\nabla\mu_\alpha + F[\Delta j].\nabla\varphi = Q_{elec}$$

Numerical Implementation



Conclusion

A computational modelling framework to predict the coupled thermo-electro-chemo-mechanical performance of SCCs will be developed and is used to analyze the performance of SCCs in various use-cases.

References

[1] ACS Appl. Mater. Interfaces 2020, 12, 23, 25683–25692. DOI: 10.1021/acsami.9b23427
[2] Carlstedt, David; et. al: Asp, Leif E. (2022): Solids 94, p. 104586.
[3] Greenhalgh, E. S. et al. (2015), J. of Comp. Mat. 49 (15), pp. 1823–1834. DOI: 10.1177/0021998314554125.

Project PRINTCAP

The research project "Next Generation of 3D Printed Structural Supercapacitors" (PRINTCAP) addresses the development of a new generation of supercapacitors (SC) for fast-charging, structural energy storages for the automotive and aerospace industries.

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Contact Information

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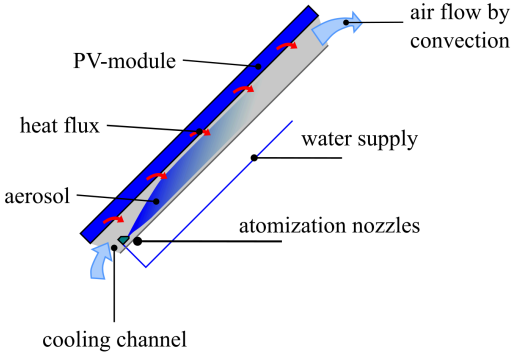
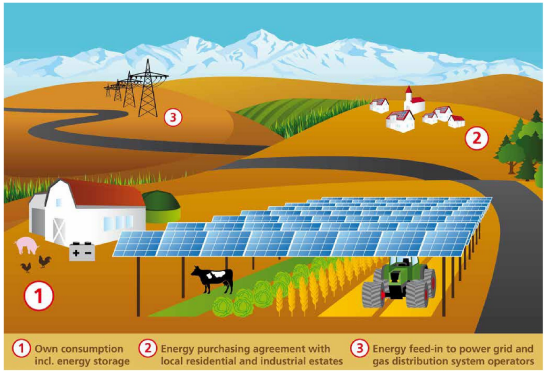
Institutional Website:	https://www.hochschule-bochum.de/itf/
Research Field, Expertise:	Fluid mechanics
Research Interests, Methods:	Experimental fluid mechanics methods, fluid mechanics simulation, renewable energy

Agri-photovoltaics with spray cooling for combined efficiency improvement of photovoltaics (PV) and water-efficient irrigation of agricultural lands



- PV loose electrical efficiency by increased cell temperature due to solar radiation
- Sustainable cooling system is of advantage
- Proposed system is based on atomization and evaporation of water in a back-mounted cooling channel
- Previous laboratory tests have shown an efficiency gain of 10%
- Unevaporated water is collected

- PV and agriculture are land intensive
- Agri-Photovoltaics combines them on one area
  - More efficient land use
  - Advantageous for e.g. crop cultivation
- PV shades soil and reduces evaporation
- Sustainable water spray-based cooling can add positive aspects
  - Water that is needed for irrigation can increase efficiency of PV in a first run
  - Atomization and evaporation enrich the air with moisture
  - Water that is technically needed for atomization but excess for evaporation can be used for direct irrigation
- Similar positive effects for floating photovoltaics



Source: Fraunhofer ISE

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Simulation-based identification of energy flexibility in a medium sized manufacturing company

M. Eley[1] & K. Mußenbrock[1]

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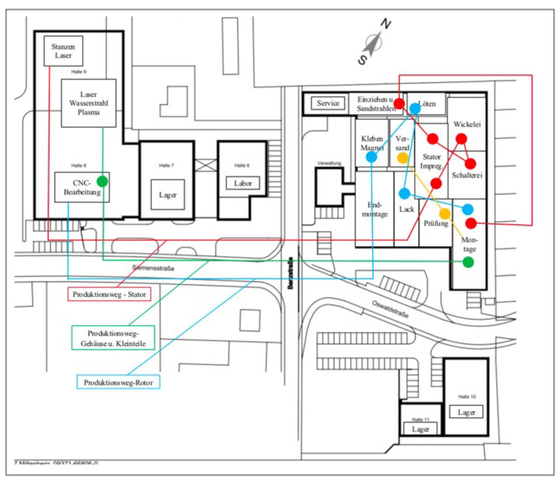
Motivation

- Expansion of renewable energies will have an impact on grid stability.
- Flexibilities in industrial production can meet this challenge.
- Therefore production flexibilities and the potential for targeted load shifting and reduction have to be evaluated both technically and economically.
- Knowledge of flexibility in production provides companies with additional competitive advantages through the marketing of flexibility in the energy trading market in addition to production-side advantages.

Target of the research work

The aim of the ongoing research project is the systematic identification and evaluation of the flexibility of the production system and the optimization of the load profile while adhering to production key figures, such as throughput time and delivery reliability.



Solution approach

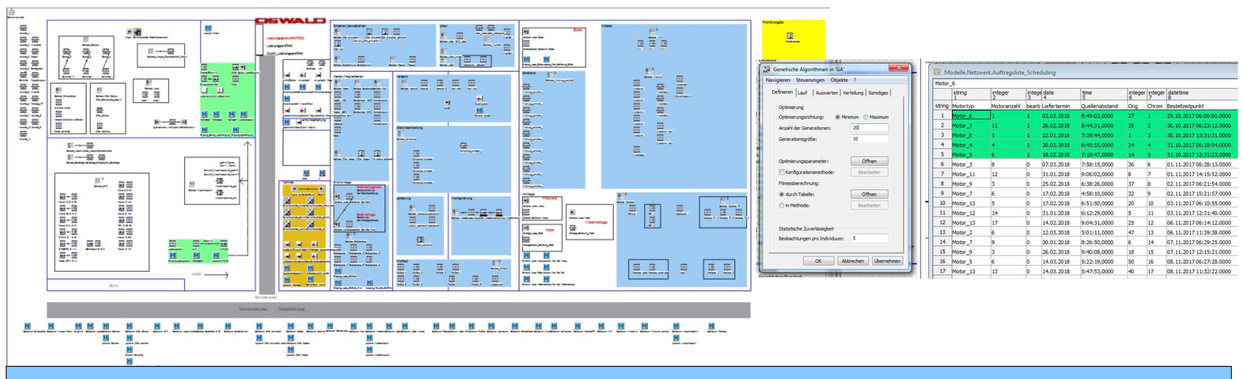
Discrete Event Simulation (DES)
- Modelling of production recourses and processes.
- Detailed analyzation of energy consumption.
- Generation of a synthetic load profile.

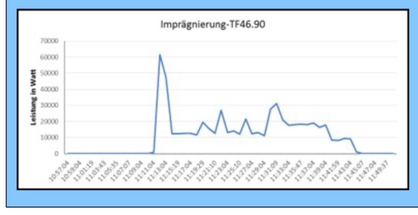
Optimization Approach (e.g. GA)
- Online / offline optimization with dress production scheduling with respect to load profile.

Evaluation (EV)
- Testing different scenarios (organizational and technical measures) with respect to load profile.
- Quantitative flexibility determination.

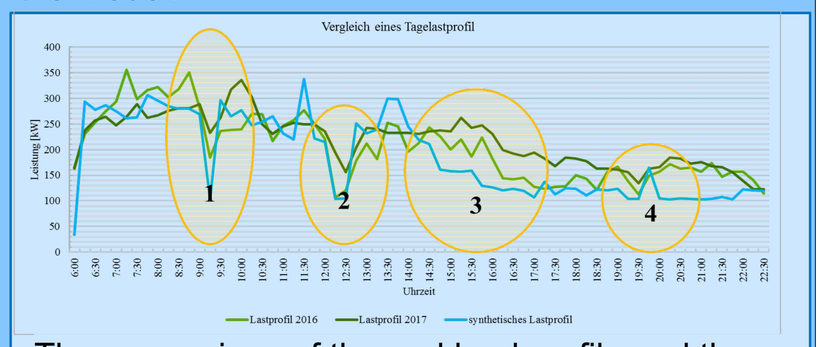
Discrete Event Simulation

Simulation model



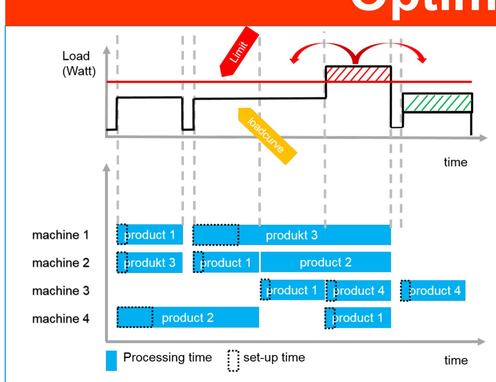


Individually determined load profiles of machines and process stages form the energetic basis for the model.



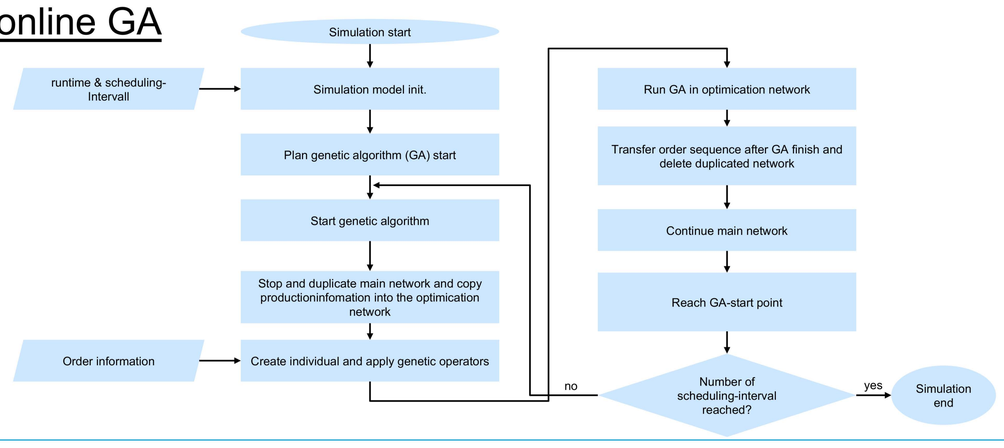
The comparison of the real load profile and the synthetically determined load profile is the first step towards checking the validity of the model.

Optimization Approach



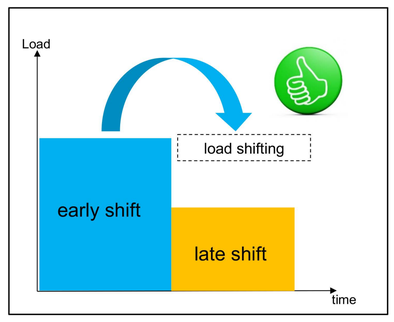
Using a genetic algorithm, the flexible job shop problem was solved by optimizing the order sequence, taking into account different scheduling periods. The primary objective function was to minimize peak load subject to capacity constraints and restrictions that guarantee that delivery dates are not violated.

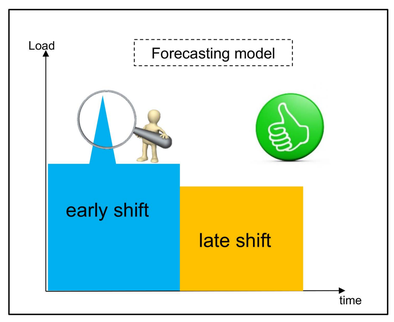
Flow chart online GA



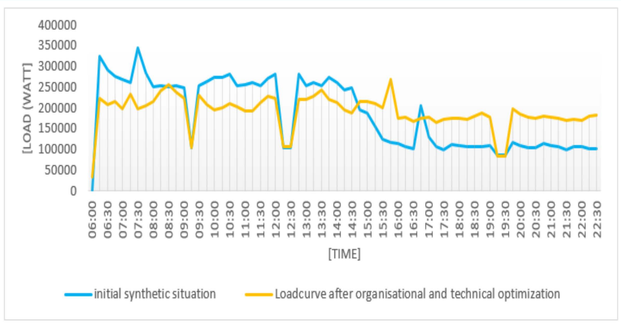
Evaluation

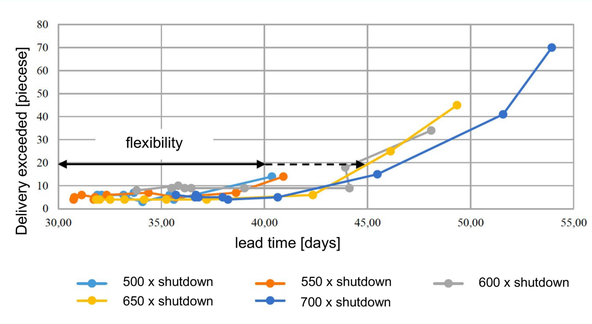
With a organizational and technical load optimization with different shift plan variations a reduction of peak load can be achieved.



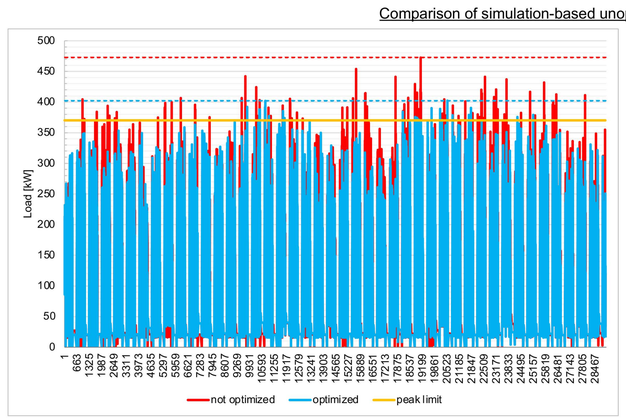


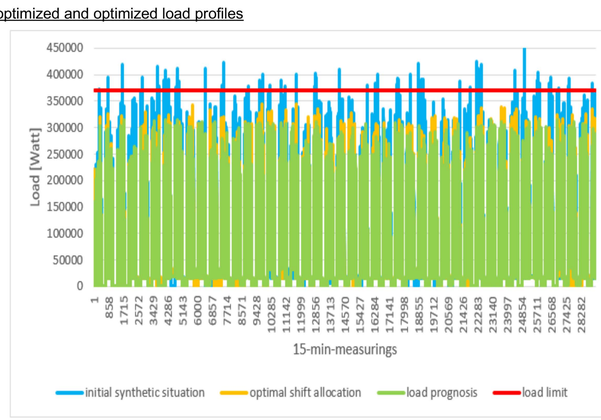
Result: quantitative flexibility determination





Comparison of simulation-based unoptimized and optimized load profiles





Simulationvariant	Peak power [kW]	Order lead time [days]	Savings per year [€]
Initial simulationmodel	453.692	30	-
Machine shutdown by energy supplier	465	???	8.118,30
Shift shifting	344.002	34	860,22
Shift shifting **combinded** with machine shutdown by peak forecast	325	34	1.168,20
Order Scheduling	402,24	30	874,03

Literature (selction)

Eley, M. (2012). *Simulation in der Logistik.* Berlin Heidelberg: Springer Verlag.

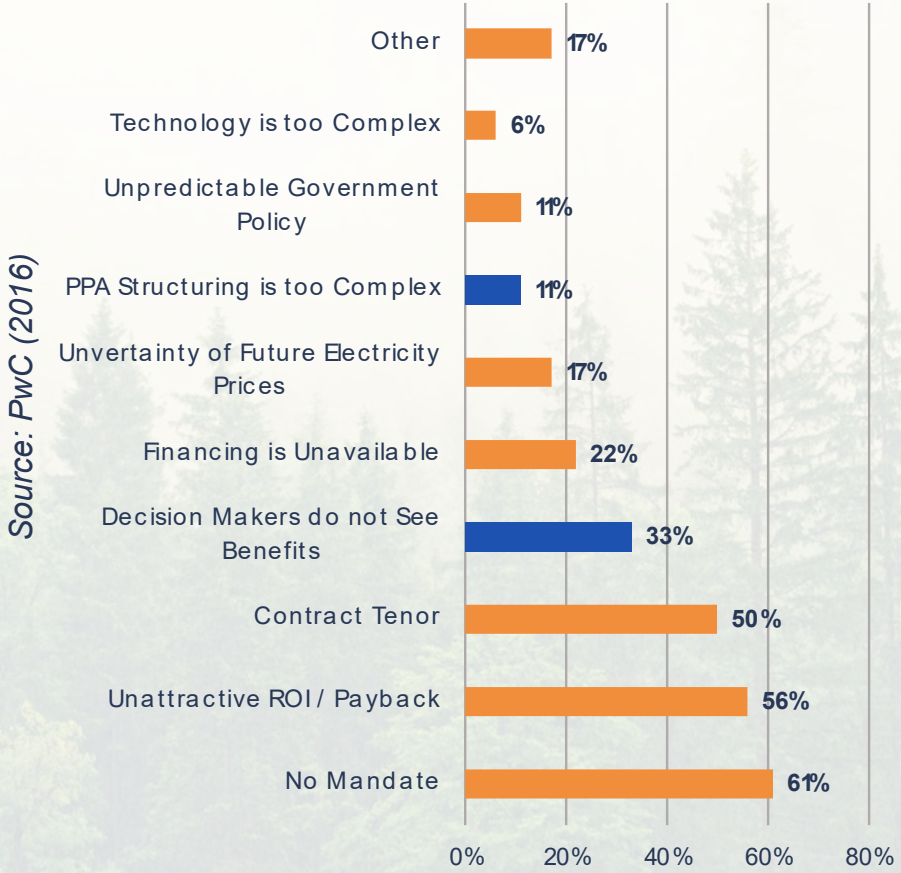
Gahm, C., Denz, F., Dirr, M., & Tuma, A. (2016). Energy-efficient scheduling in manufacturing companies: A review and research framework. *European Journal of Operational Research*, S. 744-757.

Liu, Ying; Dong, Haibo; Lohse, Niels; Petrovic, Sanja; Gindy, Nabil (2014). An investigation into minimising total energy consumption and total weighted tardiness in job shops. *Journal of Cleaner Production* 65, S. 87–96. DOI: 10.1016/j.jclepro.2013.07.060.

POWER PURCHASE AGREEMENTS

The role of Offtaker Quality and the Bankability of Renewable Energy Projects

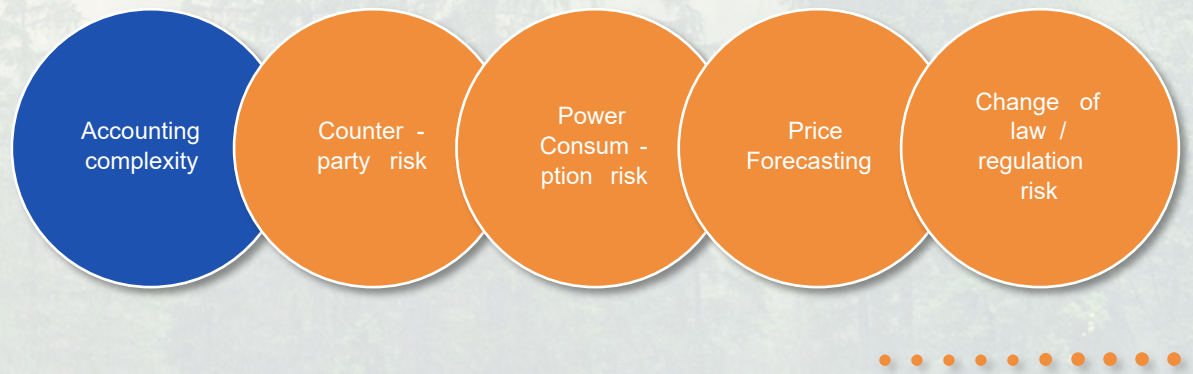
Major Barriers for negotiating PPAs



Source: PwC (2016)

- complex PPA structuring and the lack of internal support are hampering the occurence of PPAs. Moreover, tracking the actual financial savings remains an ongoing challenge for the majority of offtakers
- most corporates treat energy expense as overhead costs across departments. This distortion disincentivize business units to improve energy use and increase risk of wrong sustainaability investments

Main concerns of C&I offtakers entering into PPAs



Source: PwC (2017)

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Biorefinery paradigm in wastewater management: opportunities for resource recovery from aerobic granular sludge systems

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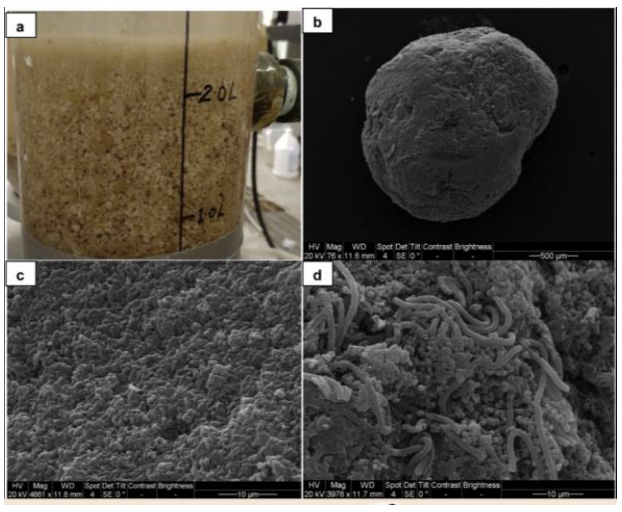
Aerobic Granular Sludge

Self-immobilized microbial consortium:

- True microbial biomass
- Minimum particle diameter ~ 0.2 mm
- AGS SVI_5 is comparable to SVI_{30} of typical activated sludge
  - Outstanding settleability
  - High biomass retention
  - Diverse microbial community
  - Small footprint requirement: ***reduced by a factor of 4***
  - Energy savings: ***up to 50%***
  - Tolerance to toxicity
  - High removal efficiency
  - High OLR
  - Sustainable – ***no chemicals***



Applications of the AGS Biotechnology

- ❖ Municipal wastewater treatment
  - Organic matter & nutrients (N&P) removal
  - Emerging contaminants
  - Microplastics?
- ❖ Industrial wastewater treatment
  - High-strength organic wastewater
  - High-strength ammonia wastewater
  - Toxic aromatic pollutants (e.g., phenol)
  - Sulfate and nuclear waste
  - Biosorption of heavy metals
- ❖ Municipal wastewater treatment
  - Integrated anaerobic-aerobic granular system
- Aerobic granular sludge membrane bioreactor

Resource Recovery from Aerobic Granular Sludge Systems

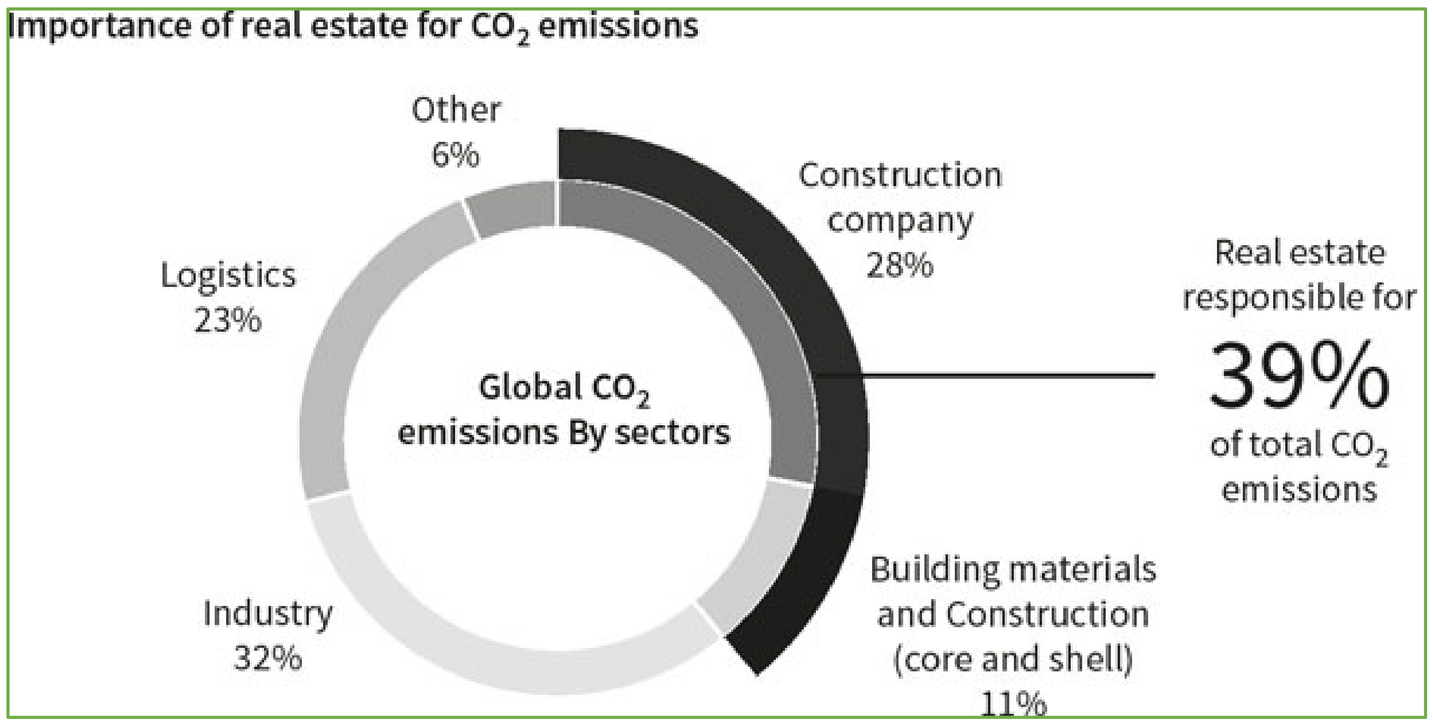
- ❖ Great opportunity for resource recovery
  - High EPS content in the granule matrix
  - High phosphorus removal capabilityM
- ❖ Resource recovery from AGS systems in line with circular economy
- ❖ Current design of WWTPs - wastewater-resource factories inserted into circular cities
- ❖ Waste granules are one of the top valuable raw materials from biological wastewater treatment processes

Current Research on resource Recovery

- Focus is on xanthan and curdlan
- Optimizing their biosynthesis and developing protocols for their recovery from AGS biosolids

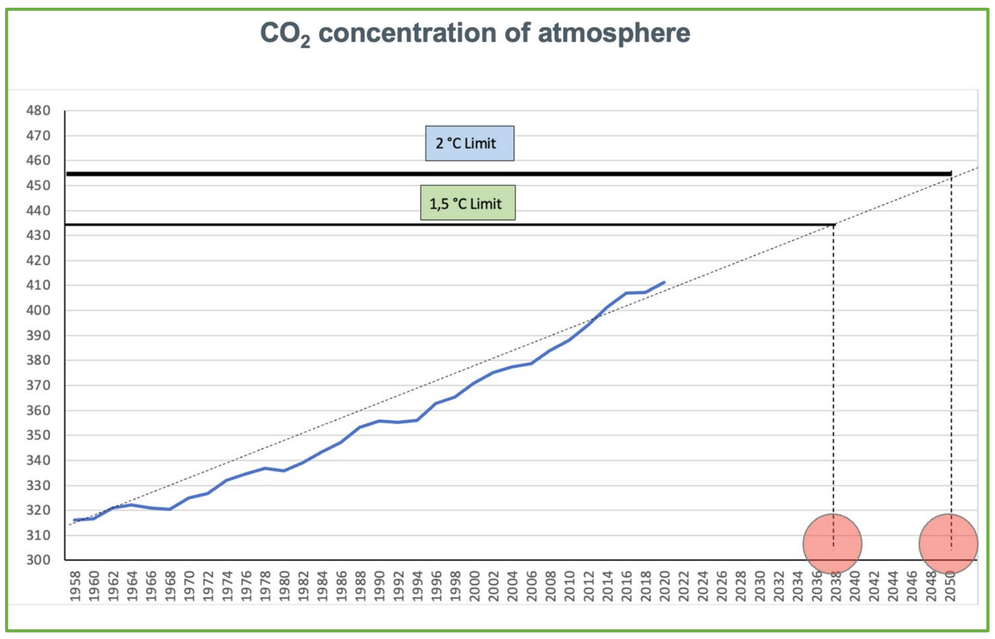
TECHNISCHE HOCHSCHULE MITTELHESSEN

Real Estate: Paris Climate Agreement as Benchmark

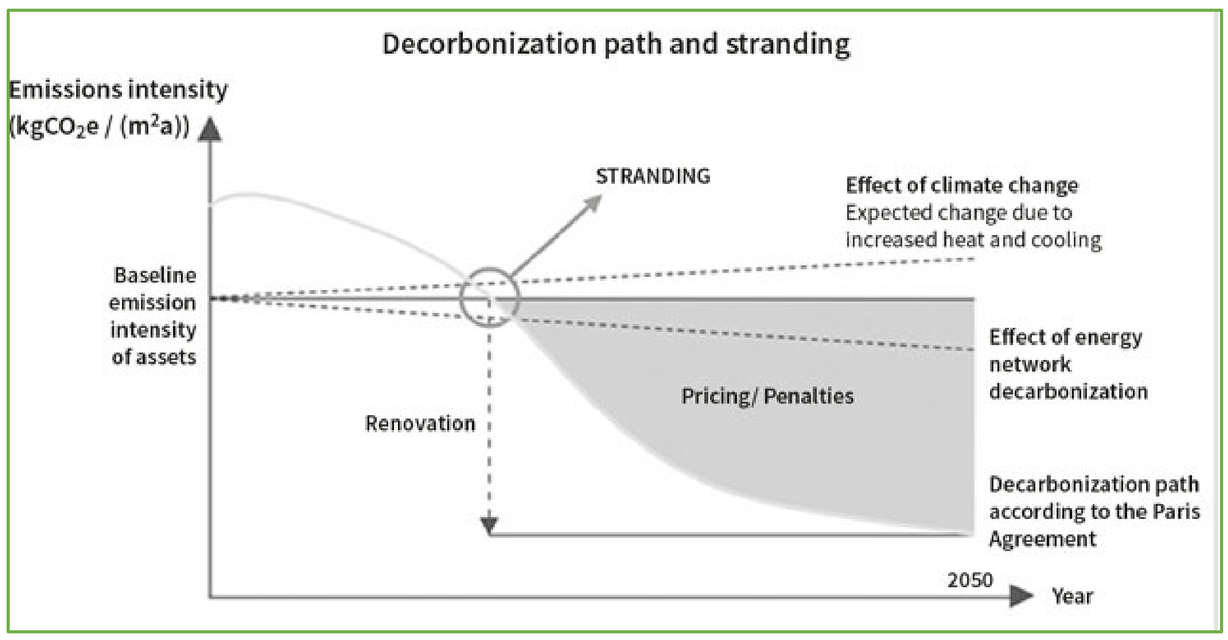


Source: Architecture, 2030 (2021), and Global Alliance for Building (2018)

- 39 percent of global CO_2 emissions from real estate
- Real estate sector has much potential for improvement
- Agreement of the UN Climate Conference in Paris with commitment:
  - Limitation to temperature +2.0°C
  - Ideally limitation to temperature +1.5°C
- With a linear extrapolation of the increase in CO_2 ppm:
  - Reaching 1.5°C temperature increase in 2038
  - Reaching 2.0°C temperature increase in 2050
- Benchmark opportunities through Paris Climate Agreement for real estate and companies
- What becomes a "stranded asset" since no longer usable due to CO_2 pricing, environmental regulations, and market expectations?
- Derivation > Strategies for decarbonization



Source: www.co2levels.org



Source: Building Minds (2020), www.crrem.eu

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