



HPI SAP Symposium 2019

Reports from the HPI Research Schools
SAP Next-Gen, 10 Hudson Yards, New York
December 10 - 11, 2019

Design IT. Create Knowledge.

Agenda

Tuesday, December 10, 2019

- 10:30 - 12:05 **Opening: Modern IT-Systems & Visual Analytics**
Keynote
Prof. Andreas Polze, Speaker of the HPI Research School
RailChain + Rail2X - Distributed Ledger Technology and WLANp Communication in German Rail's Living Lab
Keynote
Prof. Jürgen Döllner, Head of the HPI Computer Graphics Systems group
Spatial Artificial Intelligence
Vladeta Stojanovic, PhD Candidate
Digital Twins for Indoor Environments
- 12:05 - 13:05 **Lunch**
- 13:05 - 13:55 **Agile Computing & Human-Computer Interaction**
Christoph Matthies, PhD Candidate
Agile Software Development Process Improvement (in Retrospectives)
Sebastian Marwecki, PhD Candidate
An Operating System for Virtual Reality
- 13:55 - 15:15 **Poster Session & SAP Tech Demo Showcase**
- 15:15 - 16:30 **Deep Learning and Digital Health**
Julian Risch, PhD Candidate
User Comment Analysis – Deep Learning in the News Room and Beyond
Mazhar Hameed, PhD Candidate
Data Preparation: A Survey of Commercial Tools
Sidratul Moontaha, PhD Candidate
Applications of Kalman filter Technology in Healthcare Systems
- 16:30 - 16:45 **Coffee Break**
- 16:45 - 17:35 **SAP Next-Gen & Emerging Technologies**
Ann Rosenberg, Head of SAP Next-Gen & SAP University Alliances
Keynote
Harry Benjamin, SAP Solution Specialist SAP Experience Center
SAP Emerging Technologies
- 17:35 - 17:45 **Closing Remarks**
Dr. Joann Halpern, Director, Hasso Plattner Institute, New York
- 18:00 - 21:00 **Social Event**

Wednesday, December 11, 2019

- 11:00 - 12:00 **Poster Session**
HPI Ph.D. students present their research
[Industry/Academia Networking Mixer](#)
- 12:00 - 12:20 **Coffee Break**
- 12:20 - 13:30 **SAP and HPI Meetup Mixer**
HPI SAP Symposium Attendees
[Mixer](#)
- 13:30 - 15:30 **Lunch & Social Event**
Walking Tour
[New York Highline Walking Tour](#)

HPI Research Symposium

The world around us is increasingly digitally connected. As we begin to integrate the various technologies that have recently benefited our economy, society, health and everyday life, we are faced with new, complex challenges. These include the efficient processing of increasing amounts of data and extracting useful insights from these collections, both for industry as well as academic contexts.

The Research Schools on “Service-Oriented Systems Engineering” and “Data Science and Engineering” of the Hasso Plattner Institute in Potsdam, Germany, focus on research that tackles the challenges of digitalization. The HPI Research Schools unite PhD students from all over the world in all areas of data-driven research, science and technology.

At the 2019 HPI Research Symposium in New York PhD students and professors from both HPI Service-Oriented Systems Engineering (SSE) and Data Science and Engineering (DSE) Research Schools will be presenting their novel research in the fields of computer graphics, human computer interaction, deep-learning, connected healthcare, Agile software development, and data engineering.

The research talks and case studies will demonstrate industrial applications of modern service-oriented systems integration, analysis of complex data using deep-learning approaches, connected healthcare applications, as well as solutions for the Big Data and IoT challenges we face in our modern world.

We look forward to sharing research and expanding our network in the SAP Hudson Yards area!



The HPI Research Schools

The HPI Research Schools for “Service-Oriented Systems Engineering” (SSE) and “Data Science and Engineering” (DSE) are the two graduate schools of the Hasso Plattner Institute. The branches of the graduate schools are in Cape Town, Haifa and Nanjing. Students enjoy a great research environment and close mentorship by professors and postdocs.

The HPI Research School on Service-Oriented Systems Engineering (SSE)

The HPI SSE Research School has dedicated itself to the field of software engineering in the context of service-oriented systems. The design, analysis and implementation of service-oriented architectures poses numerous research questions from the fields of software engineering, system analysis and modeling, adaptability, and application integration. Service-Oriented Systems Engineering represents a synthesis of best practices in object orientation, component-based development, distributed computing, and business process management, providing integration of business and IT concerns. The topics of the research school thus have a unique potential not only in terms of academic research but also in industrial applications. The HPI Research School on Service-Oriented Systems Engineering, founded in 2005, is based on the model of the DFG (German Research Foundation) “Graduiertenkolleg”. PhD students at the research school participate in joint activities such as lectures, seminars, winter schools and workshops.

The HPI Research School on Data Science and Engineering (DSE)

The 2019 newly established HPI research school on “Data Science and Engineering” unites PhD students in all areas of data-driven research and technology, including scalable storage, stream processing, data cleaning, machine learning and deep learning, text processing, data visualization and more. The participating researchers join forces whenever possible and apply their research to many different use cases across the interdisciplinary research groups. The increasing abundance of data in science and in industry creates many challenges and opportunities. Data science has grown to be a foundational discipline in information technology, allowing new insights from data and creating ever more intelligent applications. Simultaneously, it is becoming increasingly difficult to collect, clean and deliver the vast amounts of data and apply and maintain complex data science processes. Targeting these challenges, the discipline of data engineering has become equally foundational.

The Members of the Research Schools

The professors of the HPI with their research groups are supporting pillars for the two HPI research schools. With their interdisciplinary structure, the research schools interconnect the individual research groups and foster close and fruitful collaborations. Students enjoy an exceptional research environment, close mentorship by professors and postdocs of the research groups, interactions with their peers, enormous computing power in HPI's data lab, and significant travel funding. Please find the latest information about the PhD students of the HPI research schools, their research interests, joint projects, and events at

<https://hpi.de/en/research/research-school>

Research Symposium in New York

At the HPI Symposium at SAP Next-Gen in Hudson Yards, we will present the research of the HPI research school PhD students and professors to the research community in the NYC area, providing a forum for exchange and discussion of ideas among industry and academia.

Speakers

Prof. Dr. Andreas Polze is the Operating Systems and Middleware Professor at the Hasso Plattner Institute at University Potsdam, Germany. He is also the speaker of the HPI Research School and member of the steering committee of HPI's Future SOC Lab. Andreas received a doctoral degree from Freie University Berlin, Germany, in 1994 and a habilitation degree from Humboldt University Berlin in 2001, both in Computer Science. At HPI, his research focuses on architectures of operating systems, on component-based middleware, as well as on predictable distributed and cloud computing. Andreas Polze was visiting scientist with the Dynamic Systems Unit at Software Engineering Institute, at Carnegie Mellon University, Pittsburgh, USA, where he worked on real-time computing on standard middleware (CORBA) and with the Real-Time Systems Laboratory at University of Illinois, Urbana-Champaign. Current research interests include Predictable Service Computing, Adaptive System Configuration, and End-to-End Service Availability for standard middleware platforms. Together with Charité, GETEMED, and Deutsche Telekom, he has run the Fontane telemedicine project. Joint research with SAP has investigated porting HANA to new processor architectures.



Prof. Dr.
Andreas Polze

Speaker of the
HPI Research School

Speakers



Prof. Dr.
Jürgen Döllner

Computer Graphics Systems
Group

Jürgen Döllner studied mathematics and computer science at the University of Siegen, Germany (1987-1992). He got his Ph.D. in computer science from the University of Münster, Germany (1996); he also received there his habilitation degree (2001). As a guest researcher he jointed a number of international research institutions. In 2001 he became full professor for computer science at the Hasso-Plattner-Institute at the University of Potsdam, where he is leading the chair "analysis, design, and construction of complex computer graphics systems". He currently also serves as chair of the faculty council.

His major research areas are in, generally speaking, "visual computing". His research topics include spatial analytics (e.g., web mapping, 3D spatial analysis, virtual 3D city models, and 3D virtual environments), information cartography (e.g., information visualization, visual analytics), computer graphics (e.g., 3D real-time rendering, 3D non-photorealistic rendering, image & video abstraction) as well as software analytics as key component for advanced software engineering (e.g., information landscapes for source code, activities and dynamics, system evolution, software maps, and system metrics). He is author of more than 270 papers in these fields (for an overview of publications, see www.hpi3d.de). He serves as reviewer to a number of international and national journals, conferences, and workshops. Apart from his work as scientist and professor, he is also engaged in technology start-up companies.

Ph.D. Student Talks

Agile Software Development Process Improvement (in Retrospectives)

Agile software development methods, especially Scrum, have become the de facto standard in modern software development. One of the core aspects of Agile methods is a focus on adaptation and continuous improvement, concerning both the product as well as the employed development process itself. Retrospective meetings are Scrum's instrument for process improvement. These meetings represent one of the most important aspects of the Scrum method and its implementation in organizations. However, while Retrospectives aim at solving existing process issues, they themselves also face their own set of challenges. Agile practitioners have highlighted common problems, which repeatedly appear in meetings and negatively impact the quality of process improvement efforts. To remedy these problems, Retrospective activities, which can help teams think together and break the usual routine, have been proposed. We investigate the effects of a select set of Retrospective activities on identified issues in educational and industry teams. While we find evidence for the claimed benefits of activities in the majority of studied cases, the application of remedies also led to new problems arising. This research paves the way for empirically-validated software development processes based on self-organizing teams.



Christoph Matthies

PhD Candidate

Christoph is a PhD Candidate and Research Assistant at the Enterprise Platform and Integration Concepts Research Group of Prof. Dr. h.c. Hasso Plattner. His research focuses on the topics of Empirical Software Engineering and Software Process Improvement, especially in the context of Agile Software Development. He is a member of the HPI Research School on Service-Oriented Systems Engineering and teaches undergraduate courses on Agile software engineering.



Sebastian Marwecki

PhD Candidate

An Operating System for Virtual Reality

The goal of my research is to allow virtual reality experiences to be run in arbitrary tracking volumes and with arbitrary physical objects. VR experiences today are designed with a specific tracking volume and objects in mind, such as “square 5x5m space with a rubber sword”. This prevents experiences from running with different objects or in tracking volumes of smaller size or different shape, making it impossible to share experiences, especially with home users. I address this by creating an abstraction between VR applications and the space and physical objects they are using. Instead of accessing space and physical objects directly, in my system applications express their needs in an abstract way, which my systems then maps to the actual available physical space and physical objects. This allows VR applications to run on a wide range of installations. Solving this problem would have substantial commercial impact, as the proliferation of real-walking VR is currently hindered by developers’ reluctance to require users to have space and objects. My work is inspired by operating systems research. Before opening systems, application programs were written for a specific machine. Operating systems allow applications to run on arbitrary computers and architectures by creating an abstraction of the physical hardware, an API, that allows applications from accessing the hardware directly.

I am currently a Ph.D. student with Prof. Patrick Baudisch at Hasso Plattner Institute at Potsdam University. I have interned at Microsoft Research with Andy Wilson. I received my master’s degree at Universitat Pompeu Fabra in Barcelona and my bachelor’s degree in computer science from University of Konstanz (with honors)

User Comment Analysis – Deep Learning in the News Room and Beyond

Comment sections on online news platforms are an essential space to express opinions and discuss various topics. These platforms face enormous challenges because of the overwhelming and ever-increasing number of received comments. The overload of information not only renders content moderation infeasible, but also hinders users from engaging in discussions. In this talk, we present our deep learning approaches for the prediction of moderation effort, semi-automated detection of toxic comments, and comment ranking. To this end, we investigate the research question: "How can we foster engaging, respectful, and informative online discussions?"



Julian Risch

PhD Candidate

Julian Risch is a fourth-year Ph.D. student at the Web Science Group at Hasso Plattner Institute in Potsdam and a member of its graduate school, the HPI Research School. Before that, he studied IT Systems Engineering at the same institute at the University of Potsdam. In his research, he analyzes user comments on online news platforms and develops machine learning approaches to support the moderation of online discussions. An example application of his work is the automatic detection of hate speech.



Mazhar Hameed

PhD Candidate

Data Preparation: A Survey of Commercial Tools

Raw data is often messy: it follows different encodings, records are not well structured, values do not adhere to patterns, etc., and it is in general often not fit to be ingested by data management and data analytics tools. The act of obtaining information from raw data relies on techniques deployed during the data preparation process. Data preparation is integral to advanced data analysis and data management, not only for data science but for any data-driven application and field. Even though existing data preparation tools are operational and useful, there is still room for improvement and optimization. With increasing data volume and its messy nature, the demand for prepared data increases day by day. To cater to this market demand, many companies and researchers are developing techniques and tools for data preparation. To better understand the available data preparation systems, we have conducted a survey to investigate (1) prominent data preparation tools, (2) the most contributing and distinctive tool features, (3) the degree of sophistication for these features, (4) the need for preliminary data processing even for these tools and, (5) which features and abilities are still lacking. We conclude with an argument in support of automatic and intelligent data preparation beyond traditional and simplistic techniques.

Mazhar Hameed is a 1st year Ph.D. student in the Information Systems Group working with Prof. Dr. Felix Naumann. His talk will provide a state-of-the-art overview for developing techniques and tools for data preparation.

Applications of Kalman filter Technology in Healthcare Systems

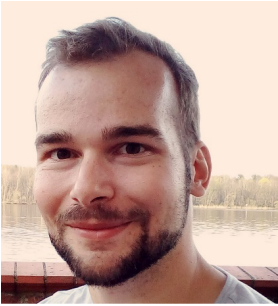
In many applications of data science it is necessary to estimate a signal embedded in noise. Generally, estimation can be performed from measurements by employing a known mathematical model which describes the behavior of the signal. A wide class of signal estimation problems can be approached by state space modelling and Kalman filtering. For linear Gaussian time series, prediction, filtering and smoothing can be performed within this framework in an optimal way. Surely, Kalman filtering is also playing an important role in applications from the “connected health” paradigm which establishes connection methods between client and health care professionals. Such as this approach can be applied to EEG time series obtained from digital health systems, i.e., smart watch treatment monitors, it can be applied to sensor data collected from wearable devices or by methods from the “internet of things”. The existing methodology of state space modelling and Kalman filtering has already been applied successfully to the m-Health system given by electronic seizure diaries of patients suffering from treatment-resistant epilepsies. The aim of the analysis was to find optimal dosages of antiepileptic drugs for the individual patients, so that an online drug management system operated by the health care providers is achievable.



Sidratul Moontaha

PhD Candidate

Sidratul Moontaha is a Research Assistant and PhD candidate at the Hasso Plattner Institute, University of Potsdam at the Digital Health - Connected Healthcare chair of Prof. Dr.-Ing. Bert Arnrich.



Vladeta Stojanovic

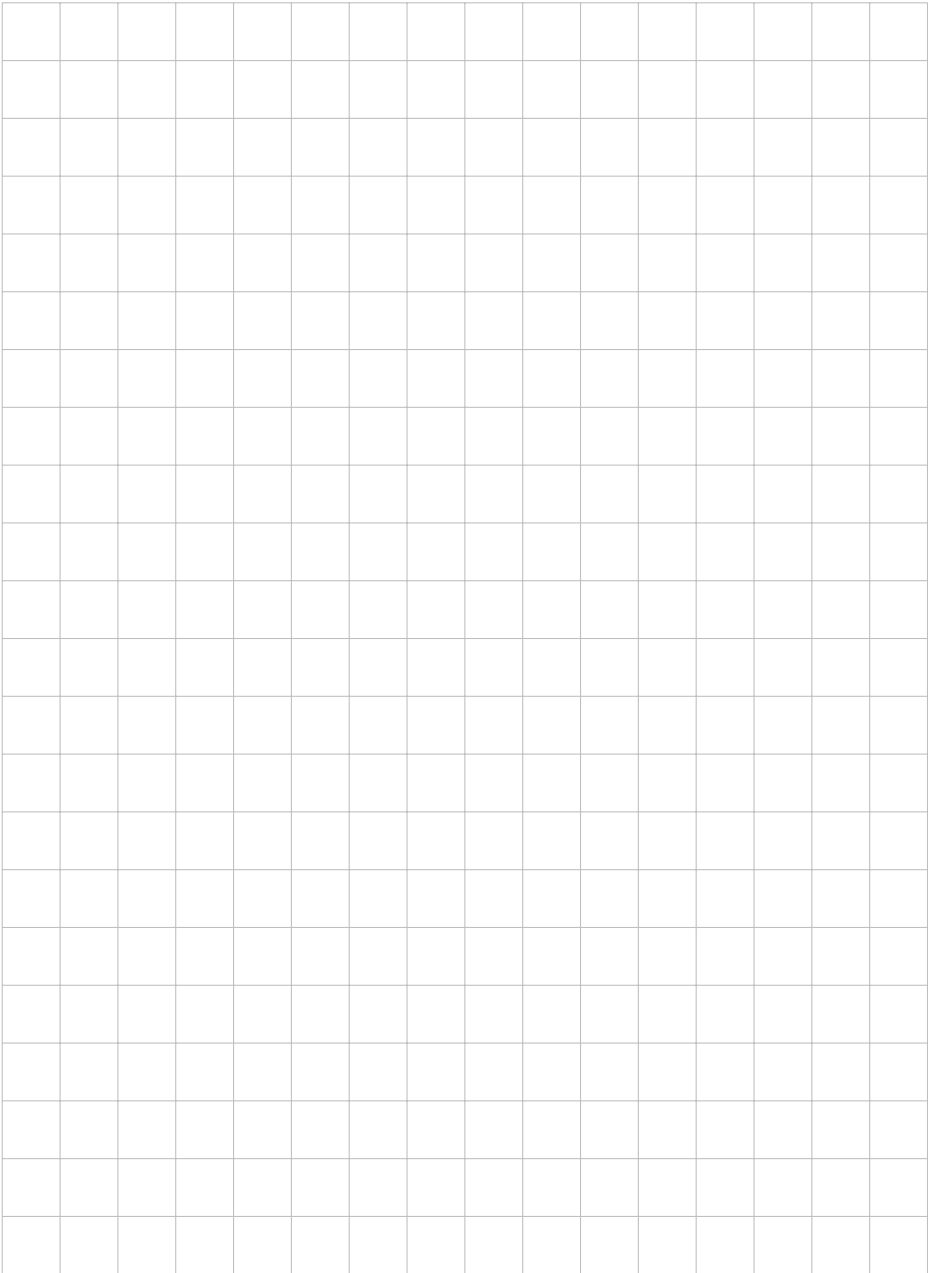
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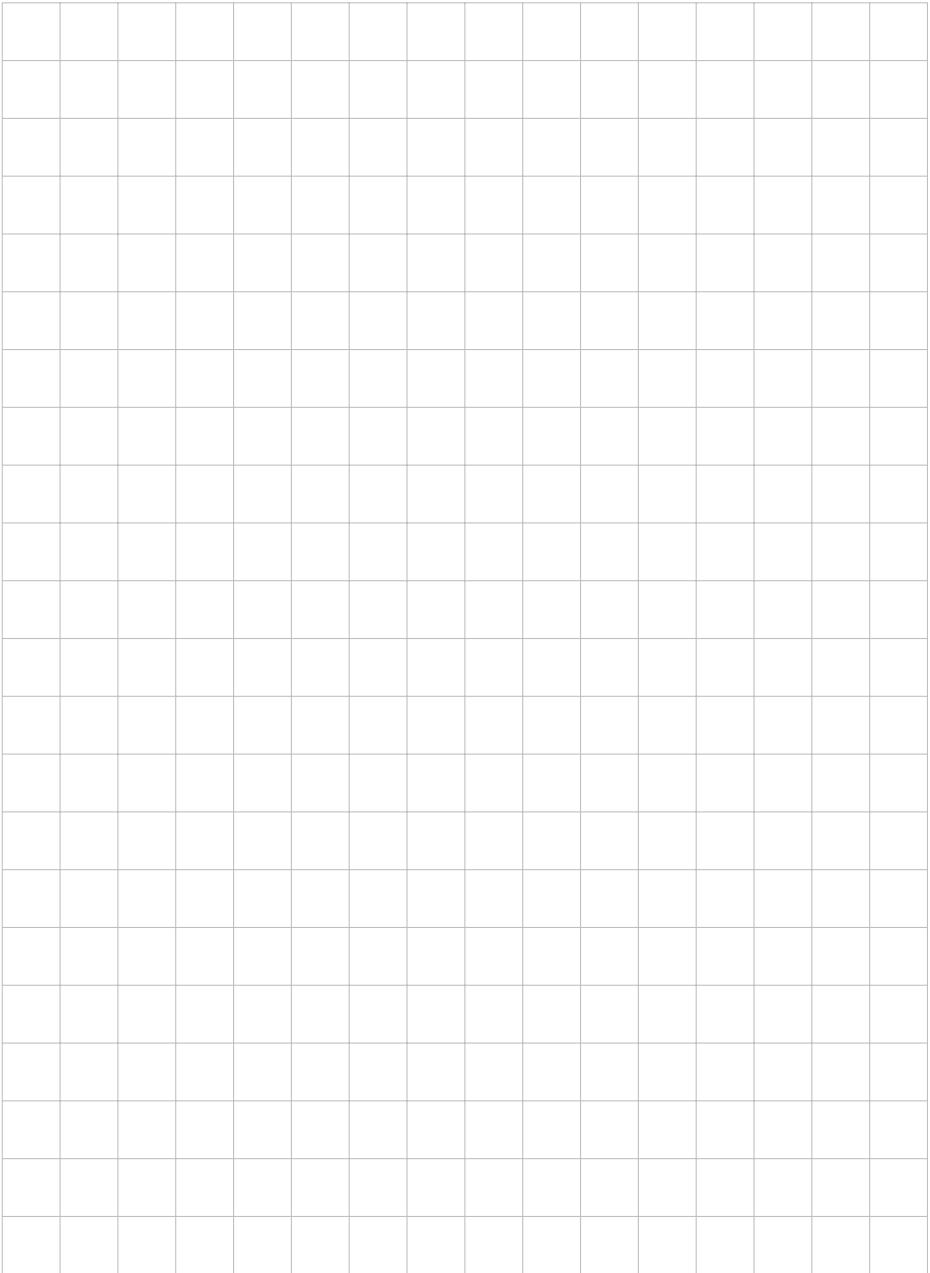
Digital Twins for Indoor Environments

One of the key challenges in modern Facility Management (FM) is digitally reflecting the current state of the built environment, referred to as-is or as-built versus as-designed representation. While the use of Building Information Modeling (BIM) can address the issue of digital representation, generation and maintenance of BIM data requires considerable amount of manual work and domain expertise. Another key challenge is being able to monitor and forecast the current state of the built environment, which is used to provide feedback and enhance decision making. The need for integrated solutions is becoming more pronounced as practices from Industry 4.0 are currently being evaluated and adopted for FM use. This research presents methods and approaches for complete digital representation of indoor environments. Specific topics addressed by the research include: (1) Point cloud processing and semantic enrichment; (2) Sensor data processing and visualization; (3) Tracking of user annotations and data management using secure ledgers; and (4) Interactive visualization of combined representations within a service-oriented paradigm. The outcome of this research will show that digital data related to FM and Real-Estate 4.0 activity can be analyzed and visualized in real-time using a service-oriented approach, and aid in decision making related to Operation and Maintenance (O&M) procedures within the scope of the post-construction life-cycle stages of typical office buildings.

Vladeta Stojanovic is a PhD candidate at the Hasso Plattner Institute, University of Potsdam. His research focus is on the field of interactive visualization and related software technologies. He originally came from a computer games and real-time 3D graphics programming background. He is currently investigating built environment visualization, digital twins of indoor environments and semantic enrichment of indoor 3D point cloud data. He has a Bachelor's Degree in Computer Games Technology and a Masters degree in Computer Science from the Abertay University, United Kingdom.

Notes





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