



14th Annual Symposium on Future Trends in Service-Oriented Computing

Hasso Plattner Institute
Potsdam | April 10 - 12, 2019

Design IT. Create Knowledge.

Agenda

Wednesday, April 10, 2019

Room: H.E-51

9:30 - 10:15 **Keynote**

Mariana Mărașoiu, Ph.D. Student, University of Cambridge, UK
[Supporting the Work of Data Analytics and Visualisation](#)

10:15 - 10:30 **Coffee Break**

10:30 - 11:50 **Session DS-1**

Stefan Ramson, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Implicit Layer Activation in Context-Oriented Programming](#)

Sankalita Mandal, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Flexible Event Subscription for Business Process Enactment](#)

Yuying Li, Ph.D. Student, Nanjing University, China
[Collaborative Crowdsourced Testing: An Approach towards Personalized Microtask Recommendation](#)

Francesco Quinzan, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Greedy Maximization of Submodular Functions: Theoretical Insights and Practical Implications](#)

11:50 - 13:00 **Lunch Break**

13:00 - 14:00 **Session DS-2**

Jecton Tocho Anyango, Ph.D. Student, University of Cape Town, South Africa
[An Investigation of a Game Generator Tool to Teach Recursion](#)

Andreas Grapentin, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Understanding Sources of Heterogeneity in SMP Systems](#)

Christoph Matthies, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Data-Informed Software Process Improvement](#)

14:00 - 14:30 **Ice Cream & Poster Session**

14:30 - 15:10 **Session DS-3**

Toni Mattis, Ph.D. Student, Hasso Plattner Institute, Potsdam
[Concept-aware Programming Environments for Program Comprehension and Modularity](#)

Joseph P. Telemala, Ph.D. Student, University of Cape Town, South Africa
[Investigating Language Preferences for Improving Multilingual Swahili Information Retrieval](#)

15:30 **Social Event: Tree Climbing in AbenteuerPark Potsdam and Dinner**

Thursday, April 11, 2019

Room: HS1 (Lecture Building)

- 12:00 - 12:10 **Opening of the Symposium on Future Trends in Service-Oriented Computing**
Prof. Dr. Felix Naumann, Prof. Dr. Andreas Polze, HPI, Potsdam
- 12:10 - 12:30 **Elevator Pitches**
HPI Research School "Service-Oriented Systems Engineering", Potsdam
PhD Students Introduce Their Work
- 12:30 - 13:00 **Keynote**
Ulrich Walther, Business Development Manager AI, IBM Deutschland
Artificial Intelligence - New Opportunities for the Economy, Challenges for the Society, Driven by Technology
- 13:00 - 13:20 **Coffee Break**
- 13:20 - 14:20 **Session 1: Impact of Software**
Prof. Dr. Friedrich Köhler, Charité Berlin
Efficacy of Telemedical Interventional Management in Patients with Heart Failure (TIM-HF2)
Mina Rezaei, Ph.D. Student, Hasso Plattner Institute, Potsdam
Learning Imbalanced Semantic Segmentation through Cross-Domain Relations of Multi-Agent Generative Adversarial Networks
Luke Church, Computer Science Lab, University of Cambridge, UK
Using Socio-Technical Design to Improve the Service of Humanitarian Interventions
- 14:20 - 14:30 **Group Photo**
- 14:30 - 14:50 **Coffee Break**
- 14:50 - 16:10 **Session 2: Analytics**
Prof. Dr. Roy Friedman, Technion, Haifa, Israel
Adaptive Software Cache Management
Melissa Densmore, University of Cape Town, South Africa
Design for Strengthening of Bandwidth-Constrained Communities: Moms, Music and iNethi
Christian Adriano M.Sc., PMP, Ph.D. Student, Hasso Plattner Institute, Potsdam
Tackling the Perfect Fault Understanding Assumption with One Thousand Programmers in the Loop
- 16:10 - 16:30 **Coffee Break**
- 16:30 - 17:30 **Session 3: Trends in Systems**
Prof. Dr.-Ing. Jörg Nolte, BTU Cottbus
NVRAM - How Memory Will Change Our View on Computing
Zola Mahlaza, Ph.D. Student, University of Cape Town, South Africa
On Data-to-Text Generation of South African Nguni Languages
Huang Zuxian, Ph.D. Student, Nanjing University, China
Webly-Supervised Semantic Segmentation via Curriculum Learning
- 18:00 **Social Event: Boat Trip to Museum Barberini and Dinner**

Friday, April 12, 2019

Room: HS1 (Lecture Building)

09:30 - 10:00 **Keynote**

Prof. Dr. Thomas Fritz, Associate Professor of Human-Oriented Software Engineering at the Department of Informatics s.e.a.I, University of Zurich, Switzerland
Leveraging Personal Data to Boost Developer Productivity

10:00 - 10:20 **Coffee Break**

10:20 - 11:20 **Session 4: Future in Computing**

Robert Kovacs, Ph.D. Student, Hasso Plattner Institute, Potsdam
TrussFab & TrussFormer: Software Tools for Large-Scale Personal Fabrication

Jan Klimke, Ph.D. Student, Hasso Plattner Institute, Potsdam
Image-Based Provisioning and Application of Large-Scale Virtual 3D City Models on the Web

Meng Cao, Ph.D. Student, Nanjing University, China
Heterogeneous Information Network Embedding with Graph Attention Networks

11:20 - 11:40 **Coffee Break**

11:40 - 12:40 **Session 5: Advances in CS**

Ilya Kolchinsky, Ph.D. Student, Technion, Haifa, Israel
Towards Scalable Multi-Pattern Complex Event Processing

Christine Wanjiru Mburu, Ph.D. Student, University of Cape Town, South Africa
Melding Disparate Experiences of NICU through Cooperative Prototyping

Prof. Dr.-Ing. Bert Arnrich, Hasso Plattner Institute, Potsdam
Connected Healthcare: Paving the Way for a User-Centered and Preventive Healthcare Model

12:40 **Closing Remarks**

Hasso Plattner Institute for Digital Engineering

The Hasso Plattner Institute for Digital Engineering in Potsdam is Germany's university excellence center for IT-Systems Engineering. HPI is the only university institution in Germany to offer the Bachelor's and Master's degree in "IT-Systems Engineering" – a practical and engineering-oriented alternative to a conventional computer science study program. Current enrollment is at approximately 500 students. It carries out research noted for its high standard of excellence in its twelve topic areas. Research work is also conducted at the HPI Research School for Ph.D. candidates as well as at its branches in Cape Town, Haifa and Nanjing.

The HPI School of Design Thinking is Europe's first innovation school for university students. It is based on the Stanford *d.school* model and offers 240 places annually for a supplementary study program. Since 2012 the Hasso Plattner Institute has offered Massive Open Online Courses (MOOCs) at its own interactive platform, *openHPI*. The courses on IT topics have so far reached more than 170,000 users from over 180 countries. Free via the Internet, learners can access didactically prepared multi-media course materials and learn in close exchange with other course participants through social media.



The Symposium on Future Trends in Service-Oriented Computing

The Symposium on Future Trends in Service-Oriented Computing 2019 is the annual symposium of the HPI Research School and is taking place for the twelfth time. It outlines new trends in the area of Service-Oriented Computing and highlights recent work of select Research School members.

As the HPI Research School is an interdisciplinary undertaking of the HPI research groups, the Symposium on Future Trends in Service-Oriented Computing covers a wide range of topics concerning SOC, which include but are not limited to: cloud computing, software, platform, infrastructure as a service, service description, discovery and composition, service deployment, platform configuration and capacity planning, monitoring, service middleware, service-oriented architectures (SOAs), service management, information as a service, service development and maintenance, novel business models for SOAs, economical implications of web services and SOAs, service science, mobile and peer-to-peer services, data services, quality of service, exception handling, or service reliability and security.

Excellent speakers – both from industry and academia – leaders in their respective field of research, are invited to talk about their latest projects and resulting outcomes.



The HPI Research School

In October 2005, the HPI started its Research School on "Service-Oriented Systems Engineering", a graduate school based on the model of the DFG (German Research Foundation) "Graduiertenkolleg".

The Vision of the Research School

Design and implementation of service-oriented architectures impose numerous research questions from the fields of software engineering, system analysis and modeling, adaptability, and application integration. Service-Oriented Systems Engineering represents a symbiosis of best practices in object orientation, component-based development, distributed computing, and business process management. It provides integration of business and IT concerns. Service-Oriented Systems Engineering denotes a current research topic in the field of IT-Systems Engineering with high potential in academic research as well as in industrial application. Supported by an internationally renowned grant, Ph.D. students at our college participate in joint activities such as lectures, seminars, winter schools and workshops.

The Members of the Research School

The professors of the HPI with their research groups are supporting pillars for our Ph.D. school. With its interdisciplinary structure, the research college on Service-Oriented Systems Engineering interconnects the HPI research groups and fosters close and fruitful collaborations.

In context of the Research School, the different groups at HPI work on the following topics:

Evolutionary Transition of Enterprise Applications to Service-Orientation (Prof. Dr. h.c. Hasso Plattner), Security Engineering of Service-Based IT-Systems (Prof. Dr. Christoph Meinel), Algorithm Engineering for Service-Oriented Systems (Prof. Dr. Tobias Friedrich), Services Specification, Composition, and Enactment (Prof. Dr. Mathias Weske), Service-Oriented Geovisualization Systems (Prof. Dr. Jürgen Döllner), Digital Health - Connected Healthcare (Prof. Dr. Bert Arnrich); Digital Health - Machine Learning (Prof. Dr. Christoph Lippert); Human Computer Interaction and Computer Vision as Service (Prof. Dr. Patrick Baudisch), Service-Oriented Information Systems (Prof. Dr. Felix Naumann), Operating System Abstractions for Service-Oriented Computing (Prof. Dr. Andreas Polze), Tools and Methods for Software Engineering in Service-Oriented Systems (Prof. Dr. Robert Hirschfeld); and Modeling and Verification of Self-Adaptive Service-Oriented Systems (Prof. Dr. Holger Giese).

On the website of the Research School, please find latest information about the Ph.D. students, their research interests, joint projects, and events:

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

The Doctoral Symposium

Over the years the HPI Research School has been expanded to a state in which we are excited to – in addition to our members from **Hasso Plattner Institute Potsdam**, Germany – welcome colleagues from **University of Cape Town (UCT)**, South Africa; the **Technion**, Israel; and **Nanjing University**, China. In order to foster collaboration and information exchange, we organized a Doctoral Symposium, so that Ph.D. students from HPI, UCT, Technion, and NJU will get to know each other both on the social and the academic levels.

The event includes a mix of a social event, poster session, and demo presentations. The poster session that dives into the research topics of the attending Ph.D. students, will follow a more informal pattern: eating ice cream while exploring other people posters and explaining yours!



Social Event on Wednesday: Tree Climbing in AbenteuerPark Potsdam + Dinner

We will spend a few hours among the tree tops in Potsdam's tree climbing adventure park "AbenteuerPark Potsdam". The location is one of the most impressive tree climbing parks in Germany, and offers routes of varying difficulty, while providing a high level of safety at all times. Afterwards, we will have dinner together.

Logistics: We depart all together from the main Symposium location at Potsdam Griebnitzsee by train to Potsdam main station and continue from there on foot. Please bring shoes that you are comfortable in, as well as sturdy trousers and a jacket.

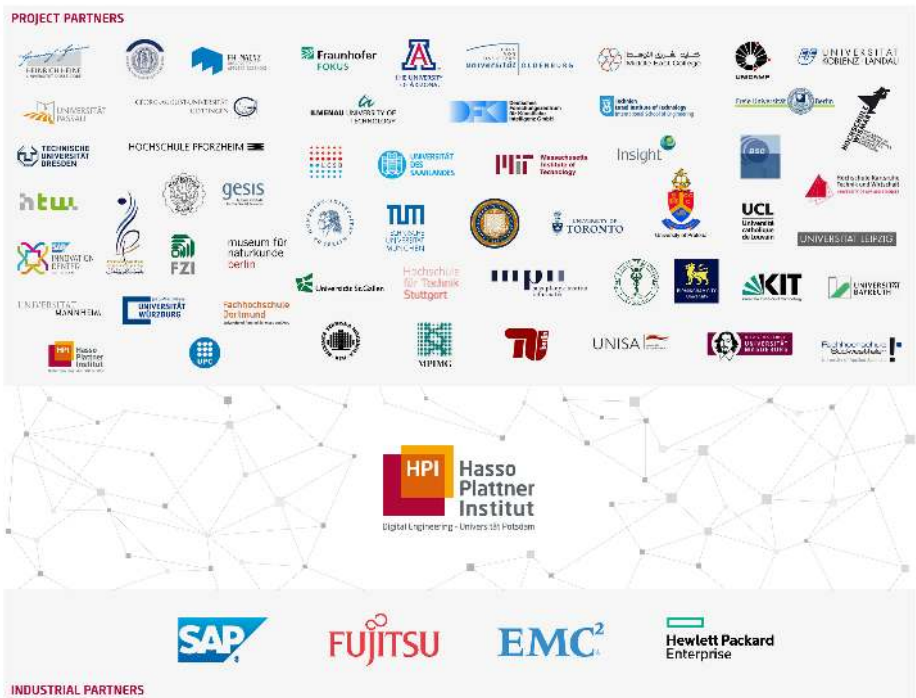
The HPI Future SoC Lab

The HPI Future SOC (Service-Oriented Computing) Lab is a cooperation of the Hasso Plattner Institute and the industrial partners EMC, Fujitsu, SAP and Hewlett Packard Enterprise. Its mission is to enable and promote exchange and interaction between the research community and the industrial partners.

The Lab provides researchers with free of charge access to a complete infrastructure of state of the art hard- and software. This infrastructure includes components, which might be too expensive for an ordinary research environment. The offerings address researchers particularly from but not limited to the areas of computer science and business information systems. Main areas of research include cloud computing, parallelization, and In-Memory technologies.

Future SOC Lab Day – Spring 2019

On Tuesday, April 9, 2019, the projects of the previous Future SOC Lab period got a chance to present the results of their research activities. Additionally, selected requesters of new projects can expand their ideas. You are welcome to hand in a project proposal and to apply for the usage of the lab's resources. More information: <https://hpi.de/future-soc-lab>



Speakers

Opening of the Symposium on Future Trends in Service-Oriented Computing

Felix Naumann studied mathematics, economy, and computer sciences at the University of Technology in Berlin. He completed his PhD thesis on “Quality-driven Query Answering” in 2000. In 2001 and 2002 he worked at the IBM Almaden Research Center on topics of data integration. From 2003 – 2006 he was assistant professor for information integration at the Humboldt-University of Berlin. Since then he holds the chair for information systems at the Hasso Plattner Institute at the University of Potsdam in Germany. He is editor-in-chief of the Information Systems journal; his research interests are in data profiling, data cleansing, and text mining.



Prof. Dr.
Felix Naumann

Head of the HPI Information
Systems Group

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

Vice Dean and Speaker of the
HPI Research School

Speakers



Mariana Mărășoiu

Ph.D. Student, University of
Cambridge, UK

Supporting the Work of Data Analytics and Visualisation

Whilst the process of analysing and presenting data can be found across professional sectors, the details of the work practice vary. They depend on the analyst's existing expertise with different parts of the process, the audience of the output, the time to do the analysis, the expected lifetime of the work and a wide range of other variables.

In this talk I will survey some work practices of different data analyst groups, including business analysts, information designers and data journalists. I'll discuss several systems built to address the diversity of these practices and will then conclude with some of the remaining open challenges for the design of the next generation of data tools.

Mariana is currently a final year PhD student at the University of Cambridge in the Computer Laboratory, where she works on designing and building novel systems for data visualisation informed by fieldwork. More broadly, she is interested in building tools that better support the way people work. Before her PhD, she finished the MPhil degree in Advanced Computer Science from the University of Cambridge and graduated from the University "Politehnica" of Bucharest.

Implicit Layer Activation in Context-Oriented Programming

Context-oriented programming directly addresses context variability by providing dedicated language concepts: layers, units of modularity, store context-dependent behavior. During runtime, layers can be applied dynamically depending on the current context of the program.

Various activation means for layers have been proposed. Most of them require developers to model context switches explicitly. In contrast, implicit layer activation allows developers to bind the activation status of a layer to a boolean predicate. The associated layer stays automatically active as long as the given predicate evaluates to true.

Despite its declarative semantics, implicit layer activation is usually implemented in an imperative fashion. In this work, we present and compare two implementation variants for implicit layer activation in ContextJS: an imperative and a reactive implementation. Furthermore, we discuss their trade-offs regarding code complexity, runtime overhead, and conceptual limitations.



Stefan Ramson

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Stefan Ramson is a doctoral researcher in the Software Architecture Group led by Prof. Dr. Robert Hirschfeld at HPI Potsdam. His research interests span live and exploratory programming environments, tool support dedicated to the comprehension of runtime state, and declarative programming paradigms, such as object constraint programming and reactive programming.



Sankalita Mandal

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Flexible Event Subscription for Business Process Enactment

Business process management (BPM) enables modeling, executing and monitoring organizational processes to achieve certain business goals. Organizations continue to strive for agility and take advantage of the digital era to bring flexibility in their processes, for example by integrating complex event processing (CEP) techniques. Event handling specifies how a process interacts with its environment and how the environmental occurrences influence the execution of the process. Though highly expressive and feature-rich languages like BPMN exist for process specification, they still lack the flexibility required for event handling in different real-life scenarios. In this work, an event handling model is proposed that take into account the possibilities of event subscription at different points in time with respect to process execution. The model is grounded formally and provides mapping to Petri Nets as implementation semantics. Further, trace analysis ensures correct execution of process behavior while maintaining the temporal dependencies intact among event subscription, event occurrence, event consumption and event unsubscription.

Sankalita is a PhD student in the Business Process Technology Group at Hasso Plattner Institute, Potsdam since March 2015. After completing her Bachelor studies from Kolkata, India, she did Masters in Computer Science from TU Kaiserslautern. Her area of interest is integrating external event information for enacting and improving business processes. Especially, she is focused on flexible subscription management of events.

Collaborative Crowdsourced Testing: An Approach towards Personalized Microtask Recommendation



Yuying Li

Ph.D. Student, Nanjing University, China

Software engineering community has recognized the value of crowds' knowledge for decades, and many works have employed this knowledge to assist in testing, debugging, design, and development. Even though software engineering researcher can mine this knowledge from crowdsourcing platforms, such as StackOverflow, there lack mechanisms and platforms for developers to communicate with crowds and help them contribute to software development. To bridge this gap, I plan to design mechanism and build platforms to ease and support crowds in contributing their domain knowledge. The ultimate goal of this research is to release the barrier between crowdsourced contributors and software development. Specifically, the mechanism is designed for crowds to collaborate with each other and the software development and the platforms are built to ease the knowledge share and expertise matching procedure.

On the other hand, the existing automated software engineering techniques often lack domain knowledge and may fail to explore aspects of functionality that matter to developers and end users. To alleviate this problem, I will present methods to fuse human knowledge to guide automation efficiently. This work explores the complementarity between human knowledge and automated tools, targeting translating human knowledge into the heuristic information that is understandable for automated tools.

I am Yuying Li, a first year Ph.D. student at Software Engineering, Nanjing University under the supervision of Professor Chen. My research has focused on synergizing the artificial intelligent technique with software engineering to automate various engineering tasks - supporting requesters of crowdsourced testing processing feedbacks from crowd workers and assisting developers understanding bug reports, and facilitating collaboration between distributed crowd workers.



Francesco Quinzan

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Greedy Maximization of Submodular Functions: Theoretical Insights and Practical Implications

In this talk, we discuss the performance of a deterministic Greedy algorithm for the problem of maximizing non-monotone submodular functions and monotone subadditive functions under a partition matroid constraint. Even though constrained maximization problems of monotone submodular functions have been extensively studied, little is known about greedy maximization of non-monotone submodular functions or monotone subadditive functions.

We present state-of-the-art theoretical results, and demonstrate how these results can be useful to approach problems that are commonly found in AI and combinatorial optimization.

Specifically, we give new approximation guarantees for the Greedy algorithm, in terms of the curvature. We then discuss applicability to the following settings: Maximizing the determinantal function of a positive semidefinite matrix and the maximum entropy sampling problem, the constrained maximum cut problem on directed graphs, and combinatorial auction games.

Francesco Quinzan is a 4th-year Ph.D. student at the Hasso Plattner Institute. His research interests include constrained submodular optimization, bio-inspired evolutionary computation, and scale-free networks embedding. Francesco holds a B.Sc. and an M.Sc. in Mathematics.

An Investigation of a Game Generator Tool to Teach Recursion

For many beginners, learning to program has proved to be a challenging and difficult task. Preliminary findings of this study like other studies before show that novices find recursion topic most difficult. Previous works have reported high failure rates in introductory programming, estimated at between 30 % and 50 % worldwide. Though some previous works have proposed Game Based Learning (GBL) as an alternative remedy, its mainstream adoption rate still remain low.

Some studies have reported that designing and developing educational games that meet their learning objectives is a difficult, time consuming and an expensive process. This may hinder teachers who want to adopt GBL approaches in teaching. The aim of the proposed study therefore is to investigate the use of a semi-automatic game generator tool to help instructors generate instances of educational games based on specific learning goals and preferences to teach recursion. We expect to find out whether or not using a game generator tool can enable educators to effectively create game instances that teach recursion.



Jecton Tocho Anyango

Ph.D. Student, University of
Cape Town, South Africa

Jecton holds a master degree in Information Systems from the University of Nairobi. With funding support from the International Development Research Centre, Canada (IDRC) and the Department for International Development- UK (DFID), Jecton was among the 20 young scholars from Global South selected to attend and present a paper in the CPRafrica2012 / CPRsouth7 conference on ICT policy research in the region. He works as a lecturer in the Department of Computer Science - Kenya Methodist University (Kenya). He has also taught as an adjunct lecturer in many Universities in Kenya including United States International University - Africa among others. Currently, he is pursuing a Ph.D. in Computer Science at the University of Cape Town with funding support from Hasso Plattner Institut (HPI). His research interest is in the area of Education Technology (Ed. Tech.)



Andreas Grapentin

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Understanding Sources of Heterogeneity in SMP Systems

There is a disconnect between the structure and behavior of computer systems, and the way they are described and instructed in applications and system software. To each application, the structure of the system is presented as a homogeneous collection of memory and compute resources and peripherals to be utilized in full, while the operating system attempts to provide a layer of abstraction from the specifics of the devices, and the resource contention inherent to multiprocessing systems. This simplified and abstract view allows applications to function correctly with little regard to the specifics of the underlying hardware, and scale up with relative ease. However, disregarding the inherent heterogeneity of the hardware comes at the cost of degraded performance and reduced interoperability.

I have identified sources of heterogeneity inherent to multiprocessing systems, or emerging through new hardware or interaction paradigms. I discuss how these effects impact the performance and interoperability of applications negatively, and outline ways to mitigate these effects through the introduction of heterogeneity aware scheduling algorithms and interoperability features on the binary level. I outline the creation of multiple testbeds, both on real hardware and in virtualization using the InstantLab project.

Andreas is a fourth-year Ph.D. Student at the Hasso Plattner Institute, where he works on shaping the future of operating systems on heterogeneous systems. He is a member of the Free Software Foundation, co-maintains the Parabola GNU/Linux-libre distribution, and is the head of the porting efforts of this distribution to the Risc-V and OpenPower architectures. He is a dad of twins. In his spare time, he enjoys debating the benefits of free software, collecting and playing guitars, doing woodworking and horsemanship.

Data-Informed Software Process Improvement

Improving the way that teams work together by reflecting and improving the executed process is at the heart of agile processes. In this research, we investigate how agile software teams can use their development data, such as commits or tickets, created during regular development activities, to gain insights into the executed process. Our previous research focused on data-informed process improvement in the context of student teams, where controlled circumstances and deep domain knowledge allowed usage of specific process measures. By enabling the usage and analysis of development data for software teams themselves, a more data-driven development process, based on custom development data, is possible.



Christoph Matthies

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Christoph is a research assistant and PhD candidate at the Enterprise Platform and Integration Concepts research group of Prof. Dr. h.c. Hasso Plattner. His research interests are in the fields of empirical software engineering, agile software development and software process improvement.



Toni Mattis

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Concept-aware Programming Environments for Program Comprehension and Modularity

Modularity determines how easy independent parts of a program (modules) can vary, and how well they can be understood individually. Ideally, each module implements a single domain concept. Over time, concepts scatter across multiple modules and get entangled with each other. As a result of this architectural drift, programs become harder to understand and change.

In this talk, we are assessing the problem of program comprehension in software systems by linking conceptually related but spatially distant code locations using machine learning. We automatically discover underlying concepts, their locations in source code, and distinguishing keywords by adapting elements from natural language processing and text mining to the structure of software repositories, including source code, version history, and run-time data. Subsequently, we investigate ways to integrate “concept models” into programming environments to help programmers understand, navigate, and edit source code from a conceptual perspective and support refactoring towards a more modular architecture.

Toni Mattis is a doctoral researcher in the Software Architecture Group led by Prof. Dr. Robert Hirschfeld at HPI Potsdam. His research interests span interactive and live programming environments, program comprehension, software modularity, and the usage of machine learning in programming tools.

Investigating Language Preferences for Improving Multilingual Swahili Information Retrieval



Joseph P. Telemala

Ph.D. Student, University of
Cape Town, South Africa

Multilingual information retrieval (MLIR) systems present results that do not consider users' preferences for languages on the result ranking. Users have different preferences for languages based on the topic of search. Considering the preferences for language will help to get top ranked results in the languages that users prefer, which is relevant in their perspective.

Based on what users search for (topic), this study proposes to determine user preferences for languages (determine Topic-Language association) using machine learning algorithms. Then reorganize (re-rank) the results to better match what users want. It is anticipated that utilization of topic-language associations will improve relevance of ranked results in MLIR for Swahili Web users.

Joseph P. Telemala is a second year PhD student in Computer Science in the Department of Computer Science at the University of Cape Town, focusing on aiding information retrieval for low-resourced African languages, particularly Kiswahili. He holds a master's degree in Computer Science from the Mahatma Gandhi University, India and Bachelor degree in Computer Science from the University of Dar es Salaam, Tanzania.

Speakers

PhD Students Introduce Their Work: Elevator Pitches

HPI Research School “Service-Oriented Systems Engineering”, Potsdam

Andreas Fricke:	A Digital Twin of an Urban Environment
Bjarne Pfitzner:	Federated Learning and its Application in Digital Health
Christiane Hagedorn:	How to Improve E-Learning Experiences with Gameful Learning
Christopher Weyand:	Scale-Free Network Generators
Kiarash Diba:	A Methodology for Process Mining
Gerardo Vitagliano:	Clustering-based Table Recognition in Multitable Spreadsheets
Johannes Henning:	Improving the Development of Data-intensive Applications in High-level Programming Languages
Johannes Wolf:	Combined Analysis of Geospatial Data Sources
Julian Risch:	News Comment Analysis - Deep Learning for News Rooms
Lan Jiang:	Data Preparation Operator Suggestion
Lukas Pirl:	Assessing Dependability in the Internet of Things
Martin Krejca:	Understanding Swarm Algorithms
Ralf Rothenberger:	Power-Law Distributions in Random Satisfiability
Robert Schmid:	Operating System Support for Near-Data Computing
Sumit Shekhar:	Multi-Dimensional Image Abstraction
Sven Köhler:	Programming Models for FPGAs with Coherent Memory
Thijs Roumen:	Portable Fit
Vladeta Stojanovic:	Semantic Enrichment of Indoor Point Clouds

The HPI Research School “Service-Oriented Systems Engineering” focuses on the design and implementation of service-based architectures. These architectures target various research problems from software engineering, system modeling and analysis, as well as the adaptability and integration of applications. It represents a synthesis of best practices in object orientation, component-based development, distributed computing, and business process management. The topics of the HPI Research School thus have a unique potential not only in terms of academic research but also in industrial application.

Artificial Intelligence - New Opportunities for the Economy, Challenges for the Society, Driven by Technology

Artificial intelligence (AI) is rapidly and significantly revolutionizing many scientific and industrial areas around the world. In certain aspects, AI will become a game changer in our daily life and will have a significant and disruptive impact in many areas in research, services and industries. While still in its infancy, there are plenty of opportunities for continuing research and developments, which is evidenced by active efforts in both academia and industries. In particular, artificial intelligence is a field that has been undergoing tremendous changes influenced by the latest developments of technology. Particularly, this presentation will cover topics on state-of-the-art deep learning methodologies, use cases applied in industries, impact on jobs and role models and powerful software and hardware developments. We will conclude this session on an outlook of challenges ahead like biased AI, compliance and privacy.



Ulrich Walther

Business Development
Manager AI, IBM Deutschland

Ulrich Walter is a Senior IT Architect and Business Development Manager of IBM on the topics of Artificial Intelligence. His interests include the design and planning for IT Systems architectures and the impact of technology for AI development, deployment and operations. He is an IEEE member and a Senior Member of the IEEE Computer Society.



Efficacy of Telemedical Interventional Management in Patients with Heart Failure (TIM-HF2)

**Prof. Dr.
Friedrich Köhler**

Charité Berlin

The improvement of outpatient care is essential to avoid unplanned cardiovascular hospitalizations, reduce mortality and healthcare costs. Remote Patient Management (RPM) in patients with heart failure might help to detect early signs and symptoms of cardiac decompensation and enables a prompt initiation of appropriate treatment and care before a heart failure decompensation is manifested. The RPM concept consists of three aspects: 24/7 telemonitoring, patient education (self-empowerment) and guideline-based therapy provided by outpatient physicians and medical staff of the telemedical center (TMC). The „TIM-HF2“ trial, funded by the German Federal Ministry of Education and Research, which was carried out during 2013 and 2018 with 1,538 heart failure patients, showed the superiority of RPM in terms of mortality and morbidity following recent hospitalization for heart failure. The pre-stratified subgroup analysis showed no significant interactions in terms of the primary endpoint between patients living in urban and rural regions. To translate the concept from TIM-HF2 to a nationwide care program for all heart failure patients in Germany an evolution of software technology using artificial intelligence (AI) is required: AI for prioritization of patients in the TMC and AI in smart devices at patient site. These developments are the objective of the R&D project „TELEMED5000“, funded by the Federal Ministry for Economic Affairs and Energy for the period of 2019-2022.

Friedrich Koehler, MD, FESC is Senior Physician in Cardiology at the Medical Department, Division of Cardiology and Angiology, Charité - Universitätsmedizin Berlin and Professor for Cardiovascular Telemedicine. He is Director of the Centre for Cardiovascular Telemedicine which is the specialized in research and development projects of remote patient management of heart failure patients. From 2013-2018 he was Principal Investigator of the public funded randomized controlled trial „Telemedical Interventional Management in Heart Failure II“ (TIM-HF2, NCT01878630) with 1,538 heart failure patients. Also, he is working in task forces for Digital Medicine in the European Society of Cardiology and German Society for Internal Medicine (DGIM). Since 2019 he is consortium leader of the R&D project „TELEMED5000“, funded by the German Federal Ministry of Economic Affairs and Energy, focussing on artificial intelligence in remote patient management of cardiovascular patients.

Learning Imbalanced Semantic Segmentation through Cross-Domain Relations of Multi-Agent Generative Adversarial Networks



Mina Rezaei

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Abstract: Inspired by the recent success of generative adversarial networks (GANs), we propose a multi-agent GANs, named 3DJoinGANs, for handling imbalanced training data for the task of semantic segmentation. Our proposed method comprises two conditional GANs with four agents: a couple segmentors and a couple discriminators. The proposed framework learns a joint distribution of magnetic resonance images (MRI) and computed tomography images (CT) from different brain diseases by enforcing a weight-sharing constraint. While the first segmentor is trained on 3D multi-modal MRI to learn semantic segmentation of a brain tumor(s), the first discriminator classifies whether predicted output by segmentor is real or fake. On the other hand, the second segmentor takes 3D multi-modal CT images to learn segmentation of brain stroke lesions, and the second discriminator classifies between a segmented output by segmentor and a ground truth data annotated by an expert. We investigate, the 3DJoinGANs is able to mitigate imbalanced data problem and improve segmentation results due to oversampling and training through a joint distribution of cross-domain images.

Mina Rezaei is a last year Ph.D. student on at Chair of Internet Technologies and Systems, Hasso-Plattner Institute. Prior to HPI, she received a master degree in Artificial Intelligence from Shiraz University, in 2013 and bachelor of software engineering in 2008. She was working for 5 years as a software developer at SCI. In 2013, she was internship at Chair for Computer Aided Medical Procedures & Augmented Reality (CAMP), Technical University of Munich, Germany. In 2017, she had short-term research visits in the department of Computer Science, University of Cape Town, South Africa and Nanjing University, China. Her research interests including deep learning, generative model, medical image analysis, and learning from imbalanced data. She will talk about "Learning Imbalanced Semantic Segmentation through Cross-Domain Relations of Multi-Agent Generative Adversarial Networks" that has received the best paper award in 2019 SPIE-Medical Imaging conference.



Using Socio-Technical Design to Improve the Service of Humanitarian Interventions

As a service, humanitarian interventions are often done to citizens, rather than with them. Applying a service design perspective we can consider this to be a problem of missing feedback mechanisms. In this talk I describe the work at Africa's Voices Foundation towards using a new approach to technology to support more effective humanitarian interventions by building these missing mechanisms.

Luke Church

Computer Science Lab,
University of Cambridge, UK

Luke is an affiliated lecturer at the Computer Laboratory in Cambridge, and the Director of Innovation and Learning at Africa's Voices Foundation. He works to improve the experience that people have with socio-technical systems, including programming languages, AI platforms, buildings, public policy and humanitarian interventions. His work is practice-led and incorporates methods from philosophy, computer science, psychology and critical design. In 2018 he founded Lark Systems to explore ways of integrating different forms of intelligence.

Adaptive Software Cache Management

Developing a silver bullet software cache management policy is a daunting task due to the variety of potential workloads. In this talk, I describe an adaptivity mechanism for software cache management schemes which offer tuning parameters targeted at the frequency vs. recency bias in the workload. The goal is automatic tuning of the parameters for best performance based on the workload without any manual intervention. I will present a study of two approaches for this problem, a hill climbing solution and an indicator based solution. In hill climbing, we repeatedly reconfigure the system hoping to find its best setting. In the indicator approach, we estimate the workloads' frequency vs. recency bias and adjust the parameters accordingly in a single swoop.

I will discuss how these adaptive mechanisms were applied to two recent software management schemes. I will explain how through an extensive evaluation of the schemes and adaptation mechanisms over a large selection of workloads with varying characteristics, we derived a parameterless software cache management policy that is competitive for all tested workloads.

Joint work with Gil Einziger, Ohad Eytan, and Benjamin Manes.



Prof. Dr. Roy Friedman

Technion, Haifa, Israel

Roy Friedman is a professor in the department of Computer Science at the Technion - Israel Institute of Technology. His research interests include Caching, Network Streaming Protocols, Fault-Tolerance, Dependability, High Availability, Consistency, Mobile Computing, and Mobile Ad-Hoc Networks. He has published more than 140 papers in major international journals and conferences on these topics. Roy Friedman serves as an associate editor for the IEEE TDSC and as PC co-chair for OPODIS 2019. He has served as PC co-chair for ACM DEBS 2015, ACM SYSTOR 2014 and Autonomics 2009 as well as vice chair for IEEE ICDCS 2013+2006 and EuroPar 2008+2003, and fast abstract chair for IEEE DSN 2013. Formerly, Roy Friedman was an academic specialist at INRIA (France) and a researcher at Cornell University (USA). He is a founder of PolyServe Inc. (acquired by HP) and holds a Ph.D. and a B.Sc. from the Technion.



Melissa Densmore

University of Cape Town,
South Africa

Design for Strengthening of Bandwidth-Constrained Communities: Moms, Music and iNethi

Rhetoric around information and communications technology for development (ICT4D) often centers around giving 'have-nots' equal access to the internet. Access to information and social networking resources, it is posited, will lead to 'digital inclusion' and therefore positive social development. However, we argue that framing the problem around internet access limits the potential of communities for leveraging communications technology. We demonstrate iNethi, a platform for enabling local creation and sharing of content and services, designed to support small communities and community wireless networks. I will talk about two projected use cases for iNethi – a peer education and support platform for mothers of premature infants, and a music-sharing platform for hip hop artists in Ocean View, Cape Town. In both cases, high costs of internet have inhibited full participation in existing platforms for peer education (e.g. BabyCentre, Mom Vlogs) and music sharing (e.g. YouTube, SoundCloud). We make an argument for the need for iNethi and establish a research agenda for the iNethi around co-design of content and services, as well as innovative approaches to communications infrastructure.

Melissa Densmore is a Senior Lecturer in the Department of Computer Science at University of Cape Town and the UCT Centre in Information & Communications Technology for Development. Her "Digital Street Theatre for Maternal Health" project explores infrastructures for bandwidth-constrained social networking to support peer education amongst parents of infants, specifically looking at co-design with mothers. This project will leverage her work on iNethi, a platform that supports community-based digital content and service creation for community wireless networks, with a goal of using local ICTs to strengthen communities, and understanding internet usage in bandwidth-constrained populations. Prior work includes an ethnography of technology adoption in an NGO program in Uganda, and deployments in South Africa, Ghana, India, DR Congo, Rwanda, and Mexico. Melissa completed her PhD at University of California, Berkeley in Information Management and Systems, has an MSc in Data Communications, Networks and Distributed Systems from University College London, and holds a BA in Computer Science from Cornell University.

Tackling the Perfect Fault Understanding Assumption with One Thousand Programmers in the Loop

Software programmers can spend up to 40 percent of their time searching for the causes of software failures. To alleviate that, programmers use debugging techniques to reduce the search space for software faults (bugs). However, these techniques assume “perfect fault understanding”, which means that the programmer will always recognize the bug when she sees it. Since this is not true, programmers waste time with invalid bug fixes and lose confidence in the debugging techniques.

I study how to mitigate that by predicting when programmers are accurate in their understanding of the software fault. For that, I performed two large experiments with more than one thousand programmers recruited on the Amazon Mechanical Turk platform. My results are promising in a sense that I could uncover a set of prediction factors that combine task attributes and programmers’ profiles.



Christian Adriano
M.Sc., PMP

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Christian is a Ph.D. candidate with degrees in Computer Engineering from the State University of Campinas and a Master in Software engineering from the University of California Irvine. He has a long experience in projects for the financial and energy sectors and has an active project management certification.

In his research, Christian focuses on studying how to generate, distribute and aggregate code inspection tasks. His toolbox comprises static analysis methods, supervised learning algorithms, stochastic models, and causal inference analysis.



Prof. Dr.-Ing. Jörg Nolte

BTU Cottbus

NVRAM - How Memory Will Change Our View on Computing

For decades data was either stored in byte addressable fast volatile memory or block addressable slow secondary storage. This distinction has been burned into the design of the majority of existing software systems and strongly influenced our way of thinking about memory as such. Now byte-addressable, non-volatile memory technologies (NVRAM) with significantly higher storage density than DRAM and about one order of magnitude higher access times are likely to hit the market from 2019 onwards. Thus the distinction between main memory and storage becomes strongly blurred. Since all software layers are potentially affected NVRAM is a highly disruptive technology. This talk discusses several aspects of NVRAM wrt upcoming memory hierarchies and usage scenarios.

Joerg Nolte is professor for computer science at the Brandenburg University of Technology (BTU) in Cottbus (Germany) where he holds the chair for distributed systems and operating systems. Prior to that position he was a senior researcher at the Fraunhofer Gesellschaft, Institute for Computer Architecture and Software Technology (FIRST), Berlin. He received his M.S. (Dipl.Inform.) in computer science in 1988 and his Ph.D. (Dr.-Ing.) in 1994, both from the Technical University of Berlin. He was a principal member and finally the deputy head of the PEACE group that developed the operating system for Germany's first massively parallel supercomputer. In the 90s he was a post doc fellow and senior researcher in the Tsukuba Research Center (TRC) of the Real World Computing Partnership (RWCP) in Tsukuba Science City, Japan. Since that time his research concentrated on scalable, low-latency middleware and operating system platforms for clusters and other parallel architectures, including rather strange ones such as wireless sensor networks. He is the member of the board of the special interest group for operating systems of the german GI and is currently the dean of the Faculty 1 (Mathematics, Computer Science, Physics, Electrical Engineering and Information Technology) of the BTU. His major research interests are operating systems, middleware and programming languages for parallel, distributed and embedded systems.

On Data-to-Text Generation of South African Nguni Languages

The field of Natural Language Generation (NLG) is concerned with the automatic generation of text that is meant to communicate some information to humans. A number of NLG systems that generate English text have been built over the years following the popular three step architecture (document planning, microplanning, and surface realisation). The last step, surface realisation, refers to the stage at which messages to be communicated to the end-user have already been decided upon (among other things) and are being converted into well-formed sentences. At the time of writing, existing surface realisation methods are not suitable for any Southern African language hence a large coverage and non-trivial NLG system cannot be built for the languages. This work presents a novel solution, which we term morphological templates, to support surface realisation for languages with a complex morphology. In particular, we develop model and notation of morphological templates to support surface realisation in four South African languages. We hypothesize that morphological templates are sufficient for generating non-trivial weather forecasts for the four chosen languages.



Zola Mahlaza

Ph.D. Student, University of
Cape Town, South Africa

I am a South African who is currently in their second year of the Computer Science Ph.D programme at the University of Cape Town. I am an aspiring academic whose current research focus is natural language generation for Southern African languages.



Huang Zuxian

Ph.D. Student, Nanjing
University, China

Webly-Supervised Semantic Segmentation via Curriculum Learning

we propose a weakly supervised semantic segmentation by automatically learning from web images, which are crawled from the Internet by using text queries, without relying on any explicit user annotations or even data pre-selection. With the goal of handling massive amount of noisy labels compared to previous weakly supervised methods.

The key insight to this part is that common and simple object patterns in images should be salient with both saliency detector and weakly supervised DCNNs, while being sparse with highly regional inconsistency between the result of saliency detector and DCNNs.

we design a three-stage approach in which we first aim to create pixel-level masks for the training images via a DSRG framework, and then design a new learning curriculum by measuring the complexity of data using its distribution density in a classification feature space and the complexity of masks by exploring the connection between saliency map and these segmented images, then rank the complexity in an unsupervised manner.

I joined the Department of Computer Science and Technology as a PhD student in Nanjing University since 2016 and became a member of MCG Group, led by Professor Gang-Shan Wu. My PhD research topic is about visual multimedia processing & analysis and understanding as well as computer vision, particularly in semantic segmentation.

As for my hobbies, I love music, photography and travel. I like to enjoy the beautiful scenery on the journey. I love badminton, and play 1-2 times per week. Coding is important, but the health matters more.

Speakers

Leveraging Personal Data to Boost Developer Productivity

Producing great software as fast as the market demands requires great, productive developers. Yet, what does it mean for an individual developer to be productive, and how can we best help developers to be productive? To answer these questions, researchers in software engineering have been, and are still predominantly looking at the output that software developers create, such as the source code. This output-oriented focus misses one of the most essential parts in the process of software development: the individual developer who creates the software.

Recent advances in technology afford the opportunity to collect a wide variety of detailed information on a software developer and her work, ranging from the number of resolved work items all the way to the cognitive load the developer experiences while working. The availability and accessibility of data on each developer is enabling us to explore questions about developer productivity in powerful new ways. In this talk, I will present research on the use of personal data to boost the productivity of professional developers, ranging from the use of biometric sensors to identify code quality concerns, to the use of computer interaction data and a traffic light-like LED lamp to reduce interruptions of professionals.



Prof. Dr. Thomas Fritz

Associate Professor of
Human-Oriented Software
Engineering at the
Department of Informatics
s.e.i., University of Zurich,
Switzerland

Thomas Fritz is an associate professor in the Department of Informatics at the University of Zurich, Switzerland. He received his Ph.D. from UBC and his Diplom from the Ludwig-Maximilians-University Munich, Germany. In his research, Thomas Fritz focuses on empirically studying software developers and on using personal and biometric data to improve software developers' productivity. For his research, he works with over 20 international companies, including ABB, Microsoft, and IBM. Furthermore, his research was featured in several media, including the New Yorker, the Wall Street Journal, and the New Scientist.



Robert Kovacs

Ph.D. Student, Hasso Plattner
Institute, Potsdam

TrussFab & TrussFormer: Software Tools for Large-Scale Personal Fabrication

3D printing objects at architectural scale is still out of reach for everyday users - not merely because of the size of these objects, but more importantly, because large objects tend to be subject to substantially larger forces that needs to be taken into account. TrussFab & TrussFormer are end-to-end software systems that allow non-engineers to create large-scale static and moving objects. The key idea behind these systems is to help users by (1) affording good structure, in particular truss structures, (2) visualizing static and dynamic load, and (3) predicting failure. We demonstrate the use of these software systems using a number of example objects, such as a 5m high pavilion and a 3m tall animatronic dinosaur.

Robert is Ph.D. candidate at the Human Computer Interaction Lab, supervised by Prof. Dr. Patrick Baudisch at the Hasso Plattner Institute, Potsdam, Germany. His research focuses on enabling non-experts to create large-scale objects via software systems that encapsulate domain knowledge from the fields of civil-engineering, mechanical engineering and robotics. He holds a master's degree in Mechatronics, Robotics, and Automation from the University of Novi Sad, Serbia.

Image-Based Provisioning and Application of Large-Scale Virtual 3D City Models on the Web

Virtual 3D city models represent and integrate a variety of spatial data and georeferenced data related to urban areas. With the help of improved remote-sensing technology, official 3D cadastral data, open data or geodata crowdsourcing, the quantity and availability of such data are constantly expanding and its quality is ever improving for many major cities and metropolitan regions. There are numerous fields of applications for such data, including city planning and development, environmental analysis and simulation, disaster and risk management, navigation systems, and interactive city maps.

The dissemination and the interactive use of virtual 3D city models represent key technical functionality required by nearly all corresponding systems, services, and applications. The size and complexity of virtual 3D city models, their management, their handling, and especially their visualization represent challenging tasks. For example, mobile applications can hardly handle these models due to their massive data volume and data heterogeneity. Common approaches are based on complex clients that require the 3D model data (e.g., 3D meshes and 2D textures) to be transferred to them and that then render those received 3D models. However, these applications have to implement most stages of the visualization pipeline on client side. Thus, as high-quality 3D rendering processes strongly depend on locally available computer graphics resources, software engineering faces the challenge of building robust cross-platform client implementations.

Web-based provisioning aims at providing a service-oriented software architecture that consists of tailored functional components for building web-based and mobile applications that manage, visualize, or generate image-based artifacts of virtual 3D city models. The approach shows how to decompose the complex, monolithic functionality of current 3D geovisualization systems into independently designed, implemented, and operated service-oriented units based on server-side rendering.



Jan Klimke

Ph.D. Student, Hasso Plattner
Institute, Potsdam

Jan Klimke just finished his Ph.D. at the Hasso Plattner Institute at the Computer Graphics Systems group. His research interest include image-based provisioning and visualization of massive virtual 3D city models as well as sensor data visualization in the context of industrial IoT.



Meng Cao

Ph.D. Student, Nanjing
University, China

Heterogeneous Information Network Embedding with Graph Attention Networks

Network embedding, which aims at projecting network elements into lower dimensional spaces for subsequent machine learning tasks, has drawn increasing attention over the recent years. However, the majority of contemporary network embedding algorithms focus on homogeneous networks, while most real-world systems are Heterogeneous Information Networks (HINs) which contain rich semantics and multi-typed relations. Embedding on HINs has brought new challenges for traditional network embedding tasks. Although several works have been proposed for HIN embedding, how to effectively preserve both the explicit and the implicit heterogeneity of large-scale networks still remains an open problem. In this work, we will present our model for heterogeneous network embedding. A meta-paths based random walk sampling scheme with Skip-Gram model is adopted for information sampling and pre-training, with Graph Attention Networks employed to collect and aggregate the heterogeneous information of each node and performs end-to-end embedding learning for machine learning tasks. Experimental results of node classification on a real-world bibliography network show the effectiveness of the proposed model.

Meng Cao is a Ph.D. student at the Department of Computer Science and Engineering, Nanjing University. She obtained her B.S. and M.E. degrees at the School of Electronic Science and Engineering, Nanjing University. Her research interests include social network analysis, network embedding and deep learning.

Towards Scalable Multi-Pattern Complex Event Processing

Rapid advances in data-driven applications over recent years have intensified the need for efficient real-time detection of arbitrarily complex patterns in massive data streams. This task is usually performed by complex event processing (CEP) systems. Large-scale CEP engines face multiple challenges that follow from the large number of patterns to be simultaneously tracked, their increasingly convoluted structure, restricted computation resources, and extremely tight constraints on response time. Unfortunately, detection mechanisms utilized by modern CEP frameworks often fail to adequately address these challenges, which results in limited scalability and applicability of such systems in real-life scenarios. In this talk, I will present a novel approach to real-time multi-pattern complex event processing. Based on a fusion of several optimization techniques and algorithmic solutions, our method successfully overcomes the adversity introduced by the aforementioned factors and is capable of achieving a performance boost of up to two orders of magnitude. I will also show how to easily deploy this approach in currently available CEP systems.



Ilya Kolchinsky

Ph.D. Student, Technion,
Haifa, Israel

Ilya Kolchinsky is a Ph.D. student at the faculty of Computer Science, Technion - Israel Institute of Technology. He is supervised by Prof. Assaf Schuster. Prior to that, Ilya received his B.Sc. and M.Sc. degrees also from the Technion. His research interests span a broad variety of areas in the Field of data mining and Big Data processing systems, in particular stream processing, complex event processing, distributed data mining, and Internet of Things technologies.



**Christine Wanjiru
Mburu**

Ph.D. Student, University of
Cape Town, South Africa

Melding Disparate Experiences of NICU through Cooperative Prototyping

There has been an increasing awareness about the importance of involving patients and their caregivers in the design process of health technologies. Based on this notion, this talk presents the co-design process carried out with Neonatal Intensive Care Unit (NICU) staff and mothers of preterm infants for the prototype of a possible communication tool aimed at providing psychological support to mothers of hospitalized preterm infants in low-income settings. We describe the strategies used to support cooperative prototyping amongst multiple stakeholders with conflicting design ideas by providing suggestions on co-design techniques that foster collaboration, disentangle participation and enhance participants creativity. We argue that when participants use their NICU experiences to refine technology requirements, the outcome is an intervention that met their needs in their unique environment. Furthermore, this approach encourages mutual learning amongst participants thus producing a sense of equity in a power imbalanced design space.

Wanjiru Mburu is a human-computer interaction for development (HCI4D) researcher who is passionate about designing technology intervention to bridge healthcare digital divide in developing countries. She believes that mobile technologies hold promise for improving population health, but unless they are developed and tested with the users, the ultimate impact will be limited. She previously worked for a technology company in Kenya where she managed m-health projects that focused on improving maternal health care across Africa. She is currently a Ph.D. candidate in the Department of Computer Science, University of Cape Town. Her research focuses on exploring how Information and Communication Technologies can be used to support low-income mothers of hospitalized preterm infants. She is using co-design approach to engaging NICU parents and staff in the design process of NICU communication tool.

Connected Healthcare: Paving the Way for a User-Centered and Preventive Healthcare Model

Connected Healthcare aims to pave the way for transforming healthcare systems from purely managing illness to maintaining wellness. Ubiquitous sensing and computing technologies are foreseen as the key enabler for pushing the paradigm shift from the established provider-centric healthcare model to a user-centered and preventive overall lifestyle health management that is available everywhere, anytime and to anyone.



**Prof. Dr.-Ing.
Bert Arnrich**

Hasso Plattner Institute,
Potsdam

Prof. Dr.-Ing. Bert Arnrich is Professor for Digital Health - Connected Healthcare at the Hasso Plattner Institute at University of Potsdam. His research on ubiquitous sensing and computing technologies is directed towards paving the way for transforming healthcare systems from purely managing illness to maintaining wellness everywhere, anytime and for anyone. He has been a PI in several European and national research projects. He has co-authored over 120 peer-reviewed publications. He studied "Informatics in the Natural Sciences" and received the PhD degree Dr.-Ing. for the thesis "Data Mart Based Research in Heart Surgery". He established and headed the research group Pervasive Healthcare in the Wearable Computing Laboratory at ETH Zurich. He received an EU FP7 Marie Curie Cofound Fellowship and was appointed to tenure track professorship at the Computer Engineering Department at Bosphorus University. He worked as a Science Manager for Emerging Technologies at Accenture Technology Solutions.

International Branches

International cooperation enables the HPI to extend its research scope and to provide its international partners with an opportunity for close exchange and with access to the HPI's international research contacts. Junior researchers work at their home universities, but receive their scholarships from the HPI in Germany. While being mentored jointly by their home university professors, they will be integrated into the Potsdam HPI Research School's research activities and participate in joint conferences and symposia.

Nanjing University, Nanjing, China

In November 2011 the "HPI Research School at Nanjing University" was opened.

Technion, Israel Institute of Technology, Haifa, Israel

Since April 2010 there is a HPI Research School at Haifa in cooperation with Technion – Israel Institute of Technology too. The Ph.D. students are working at the "HPI Research School at Technion, Haifa" within the HPI Research School team.

University of Cape Town, Cape Town, South Africa

In April 2009, the HPI Research School launched a "branch" in South Africa. The "HPI Research School at University of Cape Town" is mainly researching information and communication technologies that are relevant for developing and emerging countries.



Expansion of the Research School

Annually, the Institute's Research School seeks talented junior researchers and accordingly offers

8 Ph.D. Scholarships and 2 Postdoc Scholarships

The HPI Research School focuses on the foundation and application of large-scale, highly complex and interconnected IT systems. With its interdisciplinary and international structure, the Research School interconnects the HPI research groups as well as its international branches at Cape Town University, Technion – Israel Institute of Technology and Nanjing University. The HPI Future SOC Lab, a state-of-the-art computer center, enriches the academic work at the HPI Research School.

The HPI professors and their research groups ensure high quality research and will supervise Ph.D. students in the following topic areas: Enterprise Platform and Integration Concepts, Prof. Dr. h.c. Hasso Plattner; Internet Technologies and Systems, Prof. Dr. Christoph Meinel; Algorithm Engineering, Prof. Dr. Tobias Friedrich; Business Process Technology, Prof. Dr. Mathias Weske; Computer Graphics Systems, Prof. Dr. Jürgen Döllner; Digital Health - Connected Healthcare (Prof. Dr. Bert Arnrich); Digital Health - Machine Learning (Prof. Dr. Christoph Lippert); Human Computer Interaction, Prof. Dr. Patrick Baudisch; Information Systems, Prof. Dr. Felix Naumann; Operating Systems and Middleware, Prof. Dr. Andreas Polze; Software Architecture, Prof. Dr. Robert Hirschfeld; and System Engineering and Modeling, Prof. Dr. Holger Giese.

If you have prior experience in any of these areas, you are invited to submit a full application with the following documents: curriculum vitae and copies of certificates / transcripts, brief research proposal, work samples / copies of relevant scientific work (e.g. master's thesis), and a letter of recommendation.

Applications must be submitted by August 15th of the respective year. Positions are usually available at the beginning of October. Please send your applications to:

research-school-application@hpi.de

For more information on HPI and its HPI Research School see:

https://www.hpi.de/research_school

Social Event on Thursday: Dinner at Museum Barberini

With the Museum Barberini a new cultural attraction came to Potsdam. Exhibitions range from the Old Masters to contemporary art with a focus on impressionism. Based on works from the collection of Hasso Plattner, the museum's founder and patron, the Museum Barberini presents three temporary exhibitions each year with major loans from international private collections and museums.

The exhibitions are prepared at academic conferences with international curators and researchers. In addition, Art Stories as rotating presentations place prominent works in a new context and increase awareness of original artworks. Barberini Digital also ties into this. This virtual experience provides additional context and new aspects of the artworks and engages virtually with the original artwork.

The Museum Barberini in the reconstructed palace is located in the historic center of Potsdam on the square Alte Markt near the Stadtschloss (City Palace) where the Brandenburg Parliament meets. The building's courtyard opens onto Alte Fahrt with access to the Havelterrassen and a view of the Freundschaftsinsel on the opposite bank. Both the ambitious reconstruction project and the operation of the museum are funded by the Hasso Plattner Stiftung.



View of the historic center of Potsdam with the Museum Barberini, 2016, photo: Helge Mundt, © Museum Barberini

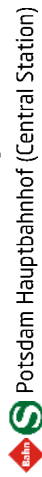
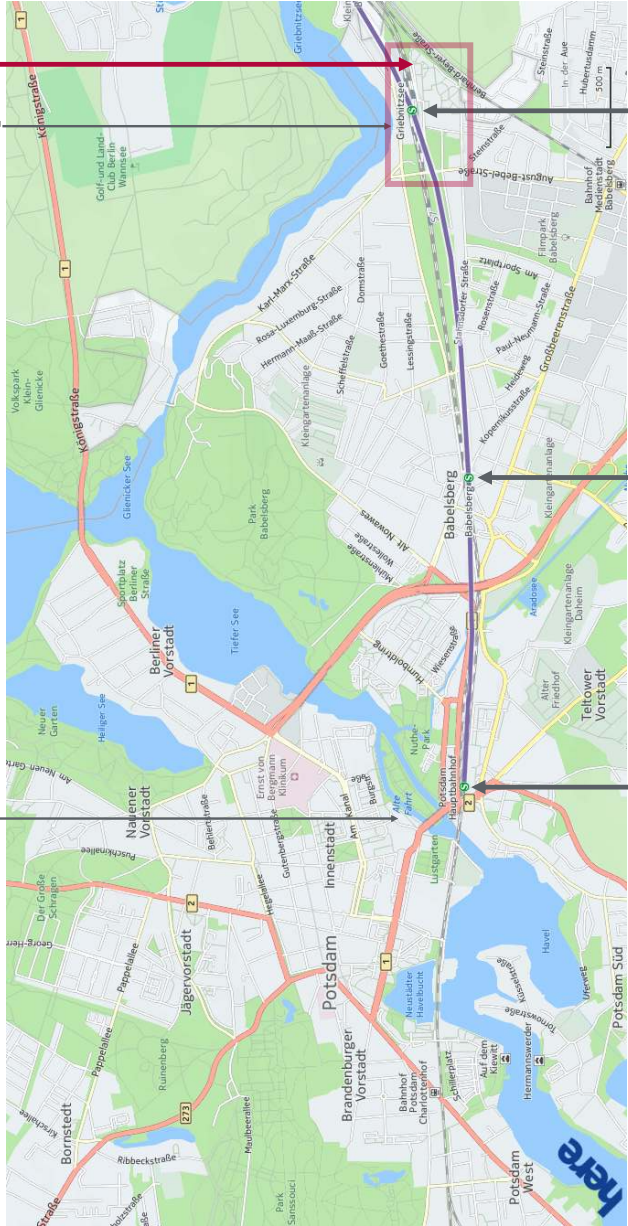
Museum Barberini
(Thursday's social event)

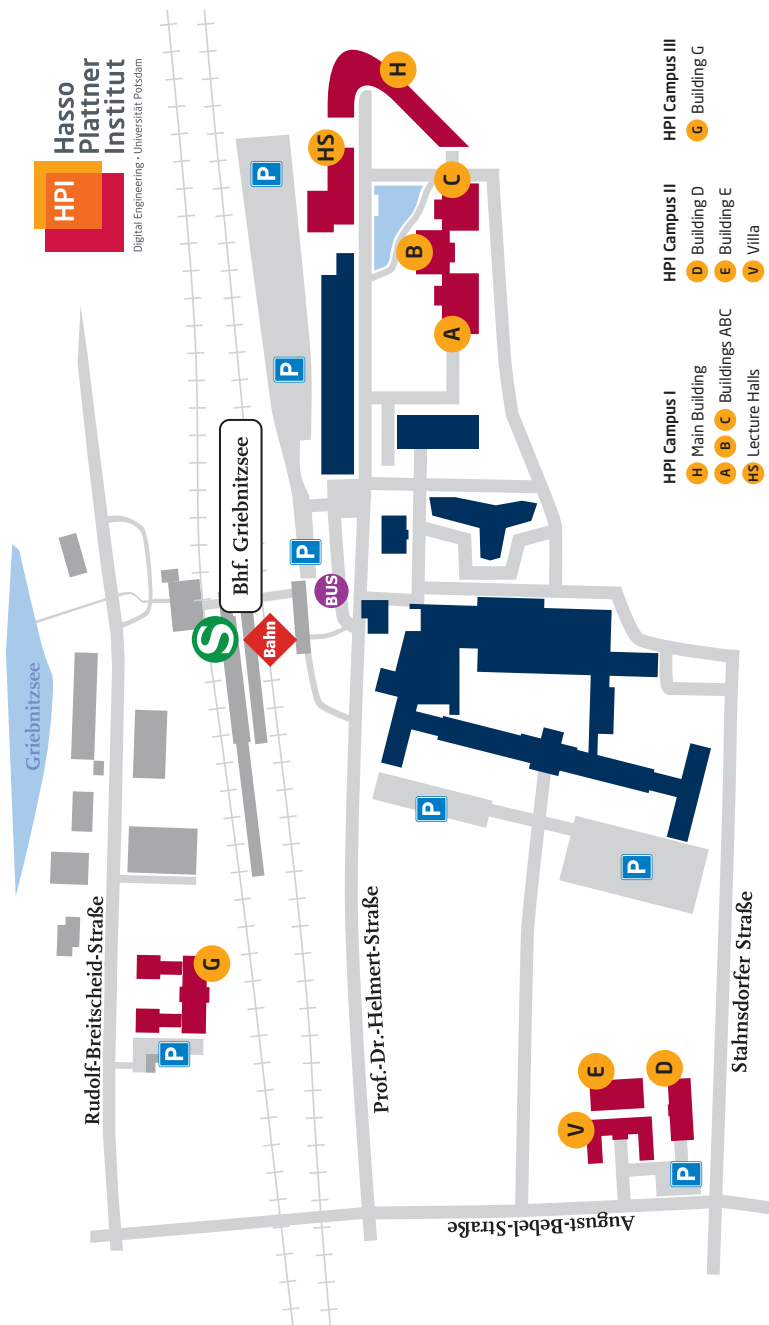
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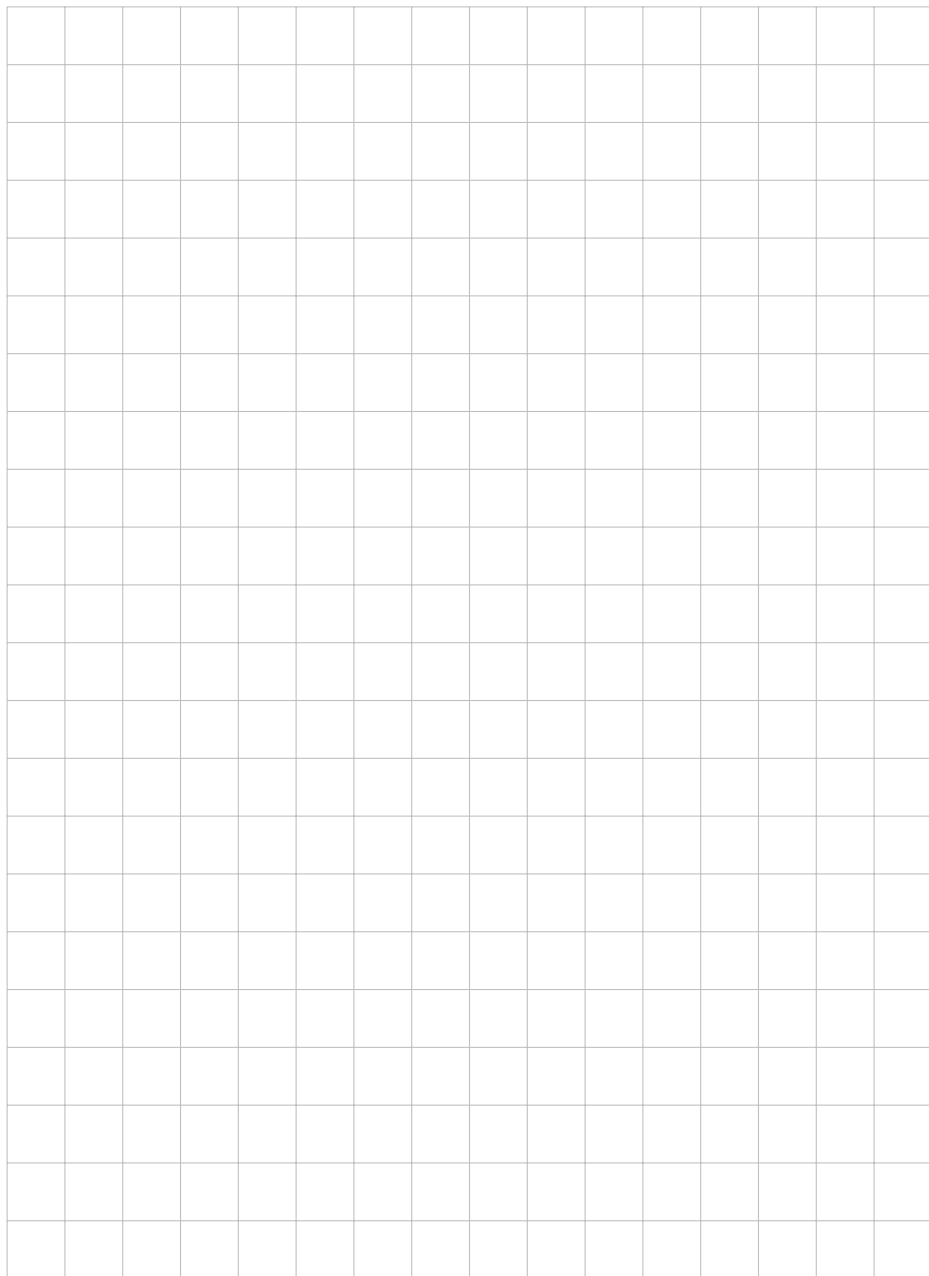
Hasso
Plattner
Institut

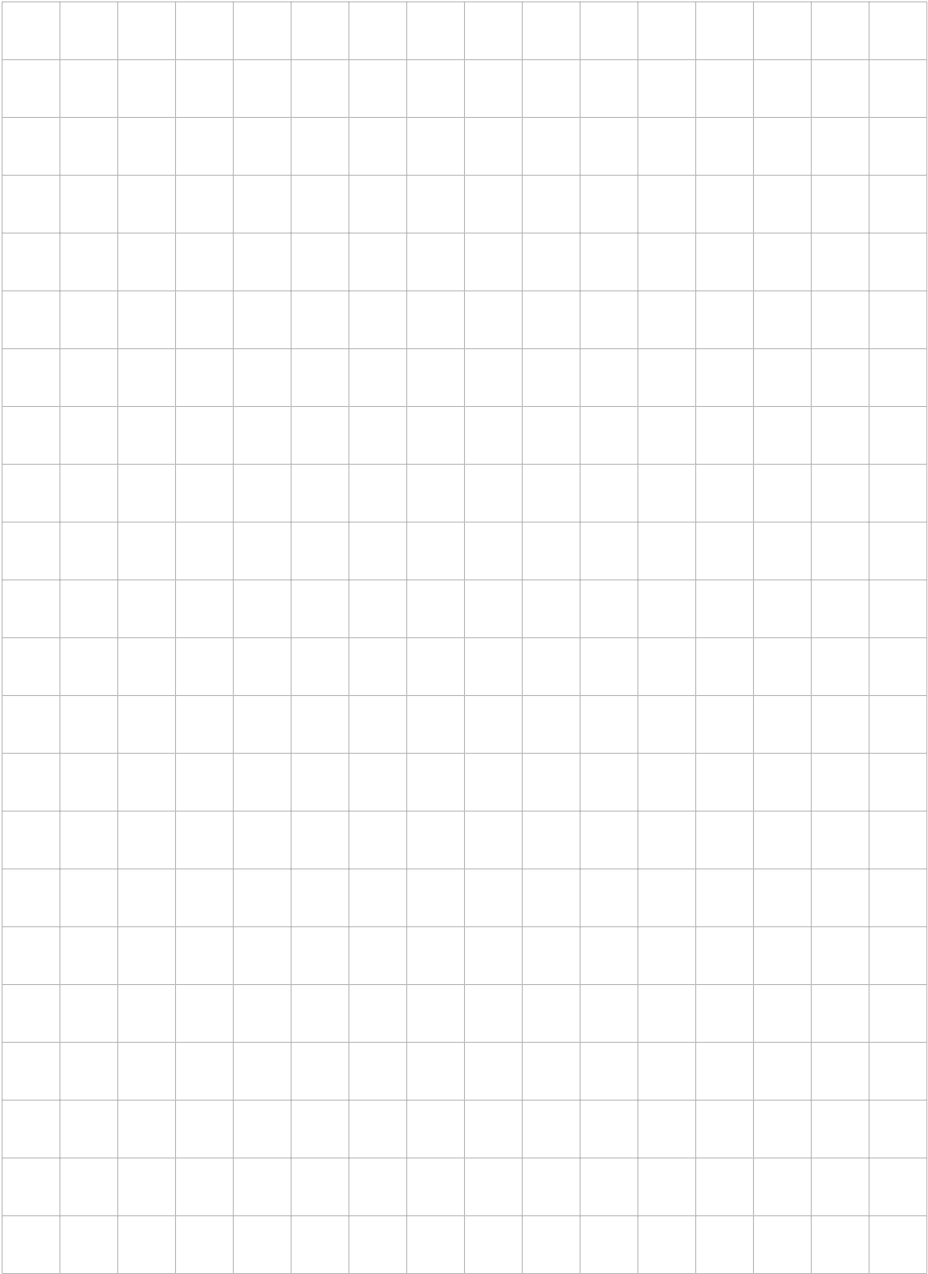
Hotel Avendi, Griebnitzsee landing





Notes





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