



Future Trends in Service-oriented Computing

7th Symposium of the
HPI Research School

June 14 - 15, 2012



Annual Symposium on
Future Trends in Service-Oriented Computing

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Notes

A large grid of small dots arranged in approximately 25 columns and 35 rows, intended for taking notes.

Hasso Plattner Institute for IT-Systems Engineering

The Hasso Plattner Institute for IT-Systems Engineering (HPI) at the University of Potsdam is unique in Germany for two key reasons: It was the first university institute in Germany financed entirely by private funds, and second, it is a prime example of a successful public-private partnership. The Hasso Plattner Institute offers the Bachelor's and Master's degree in "IT-Systems Engineering" that emphasizes the ability to design, develop, and control large, complex, and distributed IT systems. A particular specialty of the HPI is the strong engineering orientation that intensively incorporates industrial projects in its curriculum.

10 Research Groups shape the profile of the HPI in IT-Systems Engineering. At the HPI, 460 undergraduate and graduate students are currently enrolled and about 160 research assistants and Ph.D. students are researching in their respective field. Since October 2005, the HPI runs the Research School on "Service-Oriented Systems Engineering", an international Ph.D. school with 50 students in four different countries: Potsdam in Germany, Cape Town in South Africa, Haifa in Israel, and Nanjing in China.

The Hasso Plattner Institute tightly cooperates with scientific partners, both nationally and internationally. Among the partners - apart from renowned European universities - are the Stanford University, the Massachusetts Institute of Technology (MIT) in the US, as well as Technical University of Beijing in China. Furthermore, the HPI cooperates with renowned major IT companies, such as EMC, Fujitsu, HP, IBM, Microsoft, SAP, Siemens, T-Mobile, and others.

Agenda

Symposium on Future Trends in Service-Oriented Computing

Presentation Room: [HS 3](#) Lecture Building
Common Room: [H-E.43](#) Main Building June 14, 9:00 - 15:00 only

Thursday, June 14, 2012

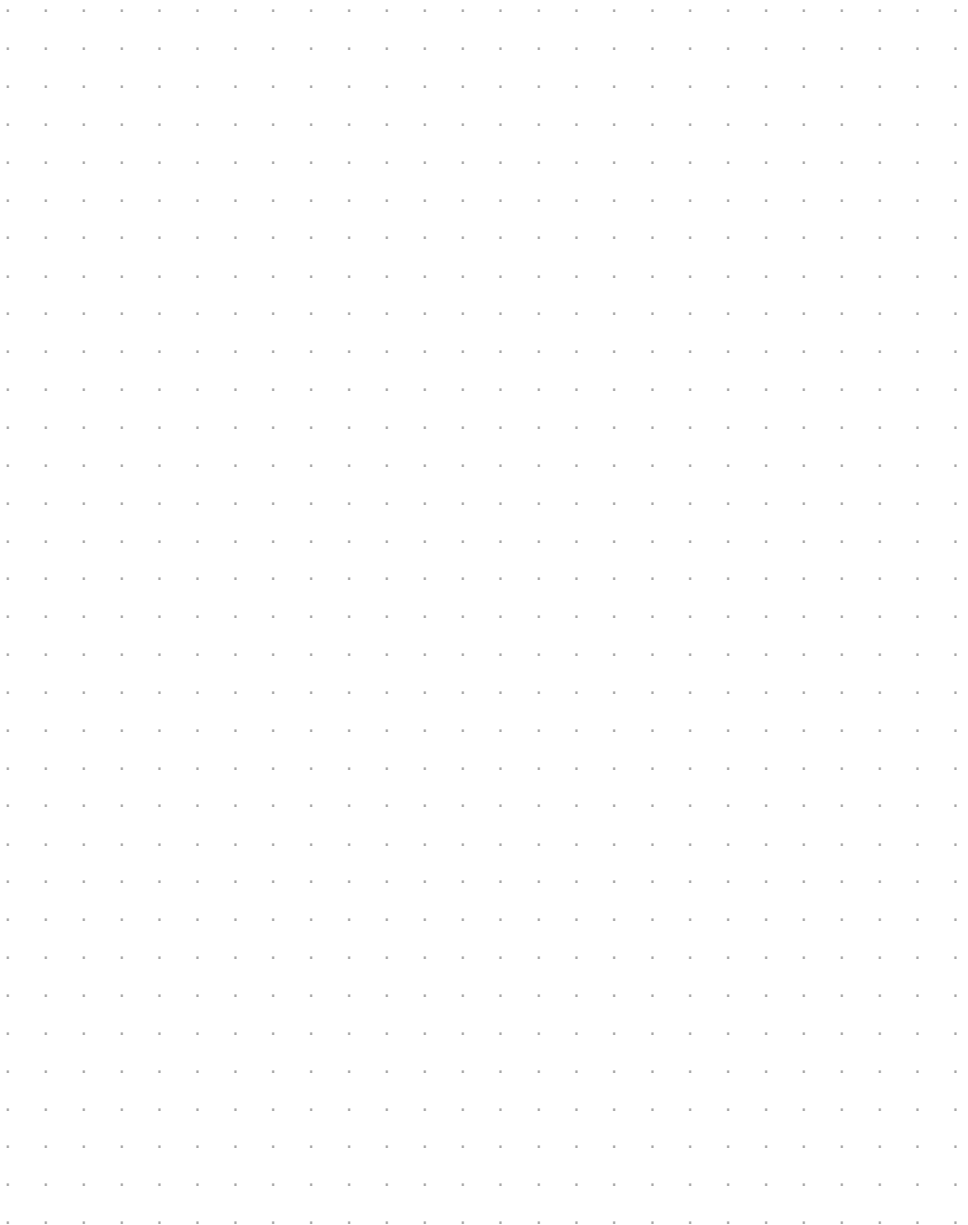
- 13:00 - 13:15 **Opening of the FutureSOC Symposium**
Prof. Dr. Christoph Meinel, Director of HPI
Prof. Dr. Andreas Polze, Speaker of HPI Research School
- 13:15 - 14:00 **Keynote**
[Sensors, Mobile Systems, Cloud, Social Networks and In-Memory DBs - The Future of Enterprise Computing](#) p. 9
Prof. Dr. Hasso Plattner, Chairman and Co-Founder SAP AG, Germany
- 14:00 - 14:15 Coffee Break
- 14:15 - 15:45 **Session 1**
[Business Process Compliance: Now and Beyond](#) p. 10
Prof. Dr. Stefanie Rinderle-Ma, Research Group Workflow Systems and Technology, University of Vienna, Austria
[Enabling Flexibility in Process-aware Information Systems](#) p. 11
Prof. Dr. Manfred Reichert, Institute of Databases and Information Systems, University of Ulm, Germany
[Unconventional Digital Library Systems for the Preservation of African Heritage](#) p. 12
Prof. Dr. Hussein Suleman, Department of Computer Science, University of Cape Town, South Africa
- 15:45 - 16:00 Coffee Break
- 16:00 - 17:30 **Session 2**
[Operating the Cloud - Windows Server 2012](#) p. 13
Dr. Alexander Schmidt, Windows Server Team, Microsoft Corporation, Redmond, USA
[Federated Identity and Access Management in SAP's Platform-as-a-Service Offering](#) p. 14
Martin Raepple, Area Product Owner, SAP AG, Germany
[Public, Private, Hybrid - Microsoft's Cloud Vision \(in German\)](#) p. 15
Heike Ritter, Technical Evangelist, Microsoft Deutschland GmbH, Munich, Germany
- 17:30 - 17:45 Coffee Break

17:45 - 19:15	Session 3	
	Test-driven Fault Navigation for Debugging Reproducible Failures	p. 16
	Michael Perscheid, HPI Research School	
	Processing Real-time Data Streams on Accelerator-based Systems	p. 17
	Uri Verner, HPI Research School at Technion, Israel	
	Modeling Context and Context-Awareness in Pervasive Computing using the Type Theory	p. 18
	HU Haixing, HPI Research School at Nanjing University, China	
	InstantLab 2.0 - A Platform for Operating System Experiments on Public Cloud Infrastructure	p. 19
	Prof. Dr. Andreas Polze, Operating Systems and Middleware, Hasso Plattner Institute, Potsdam, Germany	
19:30	Social Event	

Friday, June 15, 2012

9:00 - 9:45	Keynote	
	The Plural Architecture: Shared Memory Many-cores with Hardware Scheduling	p. 20
	Prof. Dr. Ran Ginosar, Technion, Israel	
9:45 - 10:00	Coffee Break	
10:00 - 11:00	Session 4	
	Solution Business at Fujitsu	p. 21
	Rupert Lehner, Senior Vice President Solution Business Group, Fujitsu Technology Solutions GmbH, Munich, Germany	
	Speech and Language Technologies for Africa	p. 22
	Dr. Audrey Mbogho, Department of Computer Science, University of Cape Town, South Africa	
11:00 - 11:15	Coffee Break	
11:15 - 12:05	Session 5	
	From Design of Technological to Control of Cellular Infrastructure: The Case for Heterogeneous Computing in Systems Biology	p. 24
	Dr. Zoran Nikoloski, Max Planck Institute of Molecular Plant Physiology, Potsdam, Germany	
	An Intermediation Framework for Applications to Support Health Behaviour Change: A Case of Type 2 Diabetes	p. 26
	Ntwa A. Katule, HPI Research School at University of Cape Town, South Africa	
12:05 - 12:50	Outlook on Future Collaboration	
	Research on Complex Network Analysis	p. 25
	Prof. Dr. Wang Chongjun, HPI Research School at Nanjing University, China	

Notes



Introduction: Hasso Plattner Institute

Bio

Christoph Meinel is full professor (C4) for computer sciences at HPI and University of Potsdam, holding a chair on „Internet Technologies and Systems“. His research focuses on Future Internet Technologies, in particular Internet and Information Security, Web 3.0: Semantic, Social and Service Web, as well as innovative Internet Applications, especially in the domains of e-Learning and Telemedicine. Apart from teaching in the HPI Bachelor and Master courses on IT-Systems Engineering he also teaches at the HPI School of Design Thinking. He is a visiting professor at the College for Computer Science at Beijing University of Technology in China and is a senior research fellow at the Interdisciplinary Center for Security, Reliability and Trust (SnT) at the University of Luxembourg (formerly LIASIT - Luxembourg International Advanced Studies in Information Technology). Since 2008, he is program director of the HPI-Stanford Design Thinking Research Program together with Prof. Larry Leifer from Stanford University.



Prof. Dr. Christoph Meinel

Director of the Hasso Plattner Institute, Germany



Prof. Dr. Andreas Polze

Speaker of the HPI Research School

Introduction: Future SOC Symposium

Bio

Prof. Dr. Andreas Polze is the Operating Systems and Middleware Professor at the Hasso Plattner Institute for Software Engineering at University Potsdam, Germany. He is also the head of the Ph.D. school on "Service-Oriented Systems Engineering" at HPI. 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 current 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. Andreas has acted as work component leader and member of scientific board in the 6th framework European Integration project "Adaptive Services Grid". Work in ASG has strong links to the Web Services community and industrial standardization efforts.

His current research interests include Predictable Service Computing, Adaptive System Configuration, and End-to-End Service Availability for standard middleware platforms. He is member of the GI and the IEEE. He currently is member of the program committees of ISORC (Intl. Symp. On Object-Oriented Real-Time Computing) and WORDS (Workshop on Real-Time Dependable Systems). Andreas Polze has (co-) authored more than 60 papers in scientific journals and conference proceedings. He has contributed to five books.

Together with Mark Russinovich and David Solomon, Andreas Polze is one of the co-authors of the Windows Curriculum Resource Kit (CRK), the top-download at the Microsoft faculty resource center. Additional projects are centered around the Windows Research Kernel (WRK). Andreas Polze has been funded through the Rotor-I and Rotor-II projects. He received a Phoenix Direct Funding award in 2007 for his research on Phoenix for Real-time Robotics and Process Control. Funded by ZAB/ILB, current research in context of the Fontane telemedicine project is focused on prioritizing middleware for monitoring patients with heart insufficiencies in rural Brandenburg.

Sensors, Mobile Systems, Cloud, Social Networks and In-Memory DBs - The Future of Enterprise Computing

Bio

Prof. Dr. h.c. Hasso Plattner is a co-founder of SAP AG, where he served as the CEO until 2003 and has since been chairman of the supervisory board. SAP AG is today the leading provider of enterprise software solutions. In his role as chief software advisor, he concentrates on defining the mid- and long- term technology strategy and direction of SAP.

Hasso Plattner received his diploma in communications engineering from the University of Karlsruhe. In recent years, he has been focusing on teaching and research in the field of business computing and software engineering at large. In 1998, he founded the Hasso-Plattner-Institute (HPI) in Potsdam, Germany. At the HPI, approximately 460 students are currently pursuing their Bachelors' and Masters' degrees in IT-Systems Engineering with the help of roughly 50 professors and lecturers. The HPI currently has about 100 PhD candidates.

Hasso Plattner leads one of the research groups at HPI which focuses mainly on In-Memory Data Management for Enterprise Applications and Human-Centered Software Design and Engineering.



Prof. Dr. Hasso Plattner

*Chairman and
Co-Founder SAP AG,
Germany*



**Prof. Dr. Stefanie
Rinderle-Ma**

*Research Group
Workflow Systems
and Technology*

*University of Vienna,
Austria*

Business Process Compliance: Now and Beyond

Nowadays it is mandatory for almost any enterprise to prove that its business processes comply with certain regulations such as laws, medical guidelines, or security policies. This is typically achieved by (manual) audits which are often complex and expensive. Hence, many approaches have been proposed for the (semi-)automatic application of compliance checks for business processes during the last years. This talk presents our experiences obtained from recent projects on solving problems on business process compliance in different domains (e.g., healthcare). Looking beyond compliance verification at process design time, topics such as monitoring, security, and semantic log purging will be elaborated that pose new exciting challenges.

Bio

Stefanie Rinderle-Ma has been working as full professor and head of the research group Workflow Systems and Technology (WST) at the Faculty of Computer Science, University of Vienna since 2010. From 2000 to 2009, Stefanie worked as a research assistant at the Database and Information Systems Department, University of Ulm, Germany, where she obtained her doctoral and habilitation degree in Computer Science in 2004 and 2009, respectively. Stefanie spent her postdoctoral stays at the University of Twente and Technical University of Eindhoven in the Netherlands, and University of Ottawa in Canada. Stefanie has published more than 120 publications in journals, workshops, and conferences with over 2200 citations. Her group is currently involved in FP7 project ADVENTURE on virtual factories of the future, D-A-CH project C3Pro on change and compliance for collaborative processes, as well as the EBMC2 research cluster project on compliance of skin cancer treatment processes. Stefanie also serves as a key researcher at the Secure Business Austria (SBA) competence center in Vienna. Her research interests include adaptive process management technology, business process compliance, business intelligence, as well as human-centered and security aspects in process-aware information systems.

Enabling Flexibility in Process-Aware Information Systems

In today's dynamic business world, the success of a company increasingly depends on its ability to react to changes in its environment in a quick and flexible way. Companies have therefore identified process agility as a competitive advantage to address business trends like increasing product and service variability or faster time-to-market, and to ensure business-IT-alignment. Along this trend, a new generation of information systems has emerged-so-called process-aware information systems (PAIS), like workflow management systems or service orchestration engines.

This talk addresses these flexibility needs and provides an overview of PAIS with a strong focus on methods and technologies fostering flexibility for all phases of the process lifecycle. This includes flexibility support for pre-specified processes, the currently predominant paradigm in the BPM field as well as for loosely specified processes, which only partially specify the process model at build-time, while decisions regarding the exact specification of certain model parts are deferred to the run-time.

Bio

Manfred Reichert holds a PhD in Computer Science and a Diploma in Mathematics. Since January 2008 he has been appointed as full professor at Ulm University, Germany. Before, he was working as associate professor at the University of Twente (UT) in the Netherlands. At UT he was also leader of the strategic research orientations on "E-health" and on "Applied Science of Services", and member of the Management Board of the Centre for Telematics and Information Technology (CTIT) --- CTIT is the largest ICT research institute in the Netherlands comprising more than 350 researchers.

Manfred's major research interests are next generation process management technology (e.g., adaptive processes, process lifecycle management, data-driven and object-centric processes, mobile process support), service-oriented architectures (e.g., service interoperability, service evolution, service variability), and advanced applications for ICT solutions (e.g., e-health, automotive engineering). Together with Peter Dadam he pioneered the work on the ADEPT process management system and is co-founder of the AristaFlow GmbH. He has been participating in numerous research projects in the BPM area and contributed some of the most recognized papers in this field. He was PC Co-chair of the BPM'08 and CoopIS'11 conferences and General Chair of the BPM'09 conference.



Prof. Dr. Manfred Reichert

Institute of Databases and Information Systems

University of Ulm, Germany



**Prof. Dr. Hussein
Suleman**

*Department of
Computer Science*

*University of Cape
Town, South Africa*

Unconventional Digital Library Systems for the Preservation of African Heritage

Digital library systems are software systems that manage information, such as the ACM Digital Library and Google's search services. In Africa, such systems are often used to manage university document collections and archives of cultural heritage. However, these projects often face difficulties because of the lack of human, computational, communication and financial resources. In order to address these constraints, an alternative architecture for digital library systems has been proposed, with a specific focus on simplicity and resource-aware systems. Early experiments have shown that it is indeed feasible to construct such systems and that the design philosophy can yield benefits even in the non-developing world.

Bio

Hussein Suleman is an Associate Professor in Computer Science at the University of Cape Town, where he directs the research of the Digital Libraries Laboratory. He completed his undergraduate degrees and MSc at the then University of Durban-Westville and finished a PhD at Virginia Tech in the USA in 2002, in the area of component-based digital libraries. He actively advocates for Open Access in South Africa, and works closely with the Networked Digital Library of Theses and Dissertations (NDLTD), which promotes/supports the adoption of electronic theses and dissertations and generally digital libraries worldwide. He currently manages the South African ETD portal as well as the international ETD Union Archive. Hussein's main research interests are in digital libraries, information retrieval, Internet technology and high performance computing.

Operating the Cloud - Windows Server 2012

Cloud computing, both private and public, is fundamentally shifting the IT industry, much like as multi-core architectures are affecting the way we think about writing programs. In a similar fashion, new applications, designed with the Cloud in mind, can benefit from the Cloud's almost infinite amount of resources and the ability to scale up and down as necessity demands. However, there are many legacy applications that, for various reasons, cannot easily be migrated into public Cloud environments.

Windows Server 2012, which will be publicly released later this year, is designed and optimized for the Cloud. In this talk, we will address Cloud computing from a management perspective and introduce new features of the Windows Server 2012 operating system that allow for building and operating a Cloud infrastructure both off and on premises. In this regard, we will present Windows PowerShell as the new central automation interface to uniformly manage system services, which are needed as foundation for each Cloud infrastructure, efficiently across machine boundaries.

Bio

Alexander Schmidt works with the Manageability team inside the Windows Server group at Microsoft. Prior to that he worked with the Operating Systems and Middleware group at Hasso Plattner Institute where he received his PhD in 2011. Alexander is also an alumni of the HPI Research School on Service-oriented Systems Engineering.



Dr. Alexander Schmidt

Windows Server Team

*Microsoft Corporation,
Redmond, USA*



Martin Raepfle

*Area Product Owner,
SAP AG, Germany*

Federated Identity and Access Management in SAP's Platform-as-a-Service Offering

Following the Platform-as-a-Service (PaaS) model, SAP NetWeaver Neo delivers the platform for all SAP Java based on-demand applications and infrastructure offerings. It provides a trusted, secure, modular, open source and open standards based Cloud platform for the large community of Enterprise Java developers. This session explains how SAP NetWeaver Neo enables Identity Federation and Single Sign-On in the Cloud to share identities securely across disparate networks and applications, based on predominant standards such as the Security Assertion Markup Language (SAML). The session also discusses the user provisioning model, federated authorization management, and the programming model in SAP NetWeaver Neo to enforce authentication and authorizations.

Bio

As the Product Owner for Security and Identity Management for SAP's Platform-as-a-Service solution, Martin Raepfle is responsible for the success, quality, cost management and delivery of the product over the whole product lifecycle. He defines the product's security roadmap and manages the product backlog for the development teams. Prior to his product owner role, Martin represented SAP in international standard bodies, being responsible for SAP's strategy with regard to Web Services Security standards, from their initial development to full product support. Martin has been active regarding the development of various Web Services specifications, such as WS-Security Policy or the Service Provisioning Markup Language (SPML), and their submission to the Organization for the Advancement of Structured Information (OASIS). Other activities include work on Web services interoperability as part of the Web Services Interoperability Organization (WS-I) and in terms of joint projects with technology partners. Before Martin joined SAP in 2005, he has held positions with CSC and IBM as an IT Architect and Consultant. Martin has over 17 years of experience in applying information technology in a wide range of industries including telecommunications, financial services, manufacturing and transport. Martin speaks frequently at international conferences and authored books and articles on IT security.

Public, Private, Hybrid - Microsoft's Cloud Vision

Note: This talk is given in German.

Die Zukunft liegt in der Cloud. Ob wir über Flexibilität der Resource, über die Möglichkeit neue Services zu integrieren oder über Wirtschaftlichkeit sprechen, es gibt die unterschiedlichsten Motivationen, auf Cloud Technologien zu setzen -nicht immer ohne Hindernisse.

Cloud Computing bietet unterschiedliche Modelle wie PaaS, IaaS, SaaS. Auch verschiedene Formen, in denen Cloud-Ressourcen zur Verfügung gestellt werden - Public, Private und Hybrid Cloud - doch was steckt hinter all den Begriffen und für wen ist was das Richtige?

In diesem Vortrag wird auf die verschiedenen Modelle und Formen der Cloud eingegangen, welche unterschiedlichen Einsatzszenarien sich in der Praxis dadurch ergeben, warum Cloud Computing wichtig ist und welche Trends sich zeigen.

Bio

Heike Ritter ist Technical Evangelist in der Developer Platform & Strategy Group bei der Microsoft Deutschland GmbH. Derzeit konzentriert sie sich auf den Bereich Public Cloud, mit Schwerpunkt Windows Azure. Sie ist seit 1995 in der IT-Branche in unterschiedlichen Bereichen tätig, immer mit Schwerpunkt auf Microsoft Technologien. Im Januar 2008 wechselte sie zur Microsoft Deutschland GmbH und startete dort im EMEA Premier Support als SharePoint Engineer, wo sie weitere zahlreiche Erfahrungen sammeln konnte.



Heike Ritter

Technical Evangelist

*Microsoft Deutschland
GmbH, Munich,
Germany*



Michael Perscheid

*HPI Research School,
Germany*

Test-driven Fault Navigation for Debugging Reproducible Failures

Debugging failing services is often a laborious and time-consuming activity since the search for failure causes requires deep knowledge of the service implementation and its behavior. To decrease the required debugging effort, techniques such as spectrum-based fault localization and dynamic invariant detection reveal anomalies that may help in identifying failure causes. By comparing coverage and state of passed and failed test cases, such approaches produce prioritized lists of suspicious statements which restrict the search space and lower speculations. Unfortunately, anomalies are not defects—developers only have numerous loosely coupled starting points that must tediously be debugged one by one until they find root causes.

We present test-driven fault navigation as an interconnected debugging guide that integrates anomalies into a breadth first search for root causes. Based on test cases as descriptions of reproducible failures, developers systematically generate and evaluate failure cause hypotheses by isolating suspicious system entities, identifying most qualified colleagues for help, and debugging emphasized infection chains back in time. We implement test-driven fault navigation in our Path tool suite and limit its computation costs with the help of our incremental dynamic analysis. This lightweight analysis automatically splits, depending on developers' needs, the dynamic analysis over multiple runs and so ensures a feeling of immediacy when debugging with our tools. Thus, we answer quickly where to start debugging, who understands failure causes best, what happened before failures, how infection chains come to be, and which program entities are in question.

Bio

Michael Perscheid is a Ph.D. student at the Hasso Plattner Institute (HPI), University of Potsdam. Since 2008, he is a member of the HPI Research School on "Service-Oriented Systems Engineering" and works with the Software Architecture Group led by Prof. Dr. Robert Hirschfeld. His research interests include debugging, testing, and program comprehension.

Processing Real-time Data Streams on Accelerator-based Systems

Data stream processing applications such as stock exchange data analysis, VoIP streaming, and sensor data processing pose two conflicting goals: limited per-stream latency and high throughput. Manycore programmable accelerators such as modern GPUs hold high potential to speed up computations. However their use for hard-real time stream processing is complicated by slow communications with CPUs, variable throughput changing non-linearly with the input size, and weak consistency of their local memory with respect to CPU accesses. Furthermore, their coarse grain hardware scheduler renders them unsuitable for unbalanced multi-stream workloads. I will present general, efficient and practical algorithms for hard real-time stream scheduling in heterogeneous systems.

Bio

Uri graduated cum-laude with a B.Sc. in Computer Science from the Technion in 2009. He then continued his education in the direct-track PhD program in Computer Science at the Technion - Israel Institute of Technology. He is an expert in GPU computing and hybrid CPU/GPU solutions. His research interests are scheduling in heterogeneous systems, real-time systems, GPU computing and massive stream processing. Currently, he explores methods for increasing the throughput of hard real-time data stream processing systems. His paper describing such methods for systems with multiple CPUs and GPUs was recently published in SYSTOR'12. Uri is a member of the ENCORE FP7 project, he is involved in teaching academic courses and supervising academic projects, and worked as a software engineer for several high-tech companies.



Uri Verner

*HPI Research School
at Technion, Israel*



HU Haixing

*HPI Research School
at Nanjing University,
China*

Modeling Context and Context-Awareness in Pervasive Computing using the Type Theory

The pervasive computing, or ubiquitous computing, is a post-desktop model of human computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. A context is any information that can be used to characterize the situation of an entity. An entity is a person, place or object that is considered relevant to the interaction between a user and a device, including the user and the device themselves. A system is context-aware if it uses contexts to provide relevant information or services to the user, where relevancy depends on the user's task.

The key problems in the implementation of a context-aware computing system are: How to represent the context? How to compose existing contexts to generate new contexts? How does the device take different actions according to different contexts? How could the different devices cooperate between each other?

In this talk we will present a way to model the context and context-aware computing using the type theory. We use the typed term to represent the context, as well as the action of a device; and use the propositions (corresponds to types in the type theory) to represent the rules of the device. Thus the responds of devices to contexts and the cooperation between devices are reduced to the logical deductions in the type theory.

Bio

Haixing Hu is a Ph.D. candidate of computer science in Nanjing University. He also received his bachelor and master degrees in computer science from Nanjing University. He has visited the VERIMAG laboratory in University Joseph Fourier of France and finished his master degree thesis there. His research direction is formal method, especially the type theory. Recently he has moved his research interests to the quantum logic and the quantum algorithm.

InstantLab 2.0 - A Platform for Operating System Experiments on Public Cloud Infrastructure

More than 5 years of experience with the Windows Research Kernel in teaching operating system graduate classes have revealed several issues: the infrastructure needed for conducting those experiments is an ever-changing target. On the one hand, hardware has to be maintained and updated appropriately; on the other hand, the variety of platform versions we had to deal with is constantly increasing. To remedy these issues we propose migrating OS experiments and research into the Cloud.

InstantLab 2.0 is our approach for conducting operating system experiments - such as extending the kernel with new system calls - in the cloud, which relieves faculty and students from the maintenance, versioning, and configuration overhead. There are many cloud offerings where a certain amount of cloud computing resources is provided to users for free: IT companies have an interest to acquaint users with their technologies as potential customers. We propose an architecture to automatically provision experiments on public cloud infrastructure and manage access to resources based on a user rating, derived from the users interaction history.



Prof. Dr. Andreas Polze

Operating Systems and Middleware

Hasso Plattner Institute, Potsdam, Germany



Prof. Dr. Ran Ginosar

*Department of
Electrical Engineering*

Technion, Israel

The Plural Architecture: Shared Memory Many-cores with Hardware Scheduling

The Plural many-core architecture combines hundreds of simple cache-less cores, many shared memory banks, a hardware scheduler, and two custom active networks-on-chip: cores-to-memories and cores-to-scheduler. A theoretical model (almost) justifies increasing the number of cores while making them smaller and slower, maximizing performance-to-power ratio. Several benchmark simulations are demonstrated, showing close to linear speedup and high performance-to-power ratio. A de-synchronized PRAM-like task-based non-CSP and non-locking programming model for shared memory enables fine-grain parallelism.

Bio

Prof. Ran Ginosar received BSc from the Technion and PhD from Princeton University. He has conducted research at Bell Laboratories, at the University of Utah and at Intel Research Laboratories in Oregon, USA. He is member of the faculty of EE and CS departments at the Technion, and heads the VLSI Systems Research Center. He has also co-founded several start-up companies in the area of VLSI and parallel processing. His research interests focus on VLSI, asynchronous logic and parallel processing architectures.

Solution Business at Fujitsu

In our business environment it is not only cloud that concerns you. The topics of consolidation, virtualization and automation in the data center as well as client environment are still important topics. Alternative provision and delivery models from Managed Services through to Infrastructure as a Service are now rivaling the ranking of normal operating models. Social media is making inroads into company practice. Mobility challenges are growing in the face of the increasing use of private devices at work. And due to the ever-increasing flows of data hardly an IT manager is spared from becoming intensively occupied with the topic of data security and availability.

Fujitsu introduce transparency into this extreme diversity. How we will take up these challenges - and open up the possibilities, alternatives and options to overcome them with the right solutions and innovative technologies for the mission critical business cases of our customers.

Bio

Rupert Lehner is Head of the newly-formed Solution Business Group at Fujitsu Technology Solutions. He was appointed to this role in May 2012, having previously held a series of interim management roles including head of the Western Europe sales cluster and head of Sales Cluster Germany.

Based at Fujitsu Technology Solutions' headquarters in Munich, Germany, Rupert is in charge of expanding the company's range of software solutions. The new Solutions Business Group covers software and solutions including FlexFrame, ServerView, DI Blocks and Resource Orchestrator. It also encompasses Fujitsu's Cloud offerings, including the Business Solutions Store.

Rupert, who studied Business Administration at the University of Erlangen-Nuremberg in Germany, began his career in 1990 when he joined Siemens AG in Nuremberg. Since then he has held various roles with Fujitsu Siemens Computers and Fujitsu Technology Solutions.



Rupert Lehner

*Senior Vice President
Solution Business
Group*

*Fujitsu Technology
Solutions GmbH,
Munich, Germany*



Dr. Audrey Mbogho

*Department of
Computer Science*

*University of Cape
Town, South Africa*

Speech and Language Technologies for Africa

In recent years, there has been a surge in speech-related innovation from various quarters. Advancements in hardware technologies have made it possible to tackle problems that were previously intractable. Processor speeds and memory capacities have increased greatly. Miniaturization, in addition, has made this computing power available in devices that are small and affordable to the masses. Computer science research has produced algorithms that are efficient and highly accurate in processing speech, albeit within certain constraints. While the general problem of speech recognition remains intractable, limiting the problem to specific domains has given excellent results, and great strides have been made in implementing reliable speech recognition applications. For example, in the developed world, customer service at banks, credit card companies, and the like, is largely automated, with callers stating their needs verbally to machines and getting appropriate responses. Furthermore, responses are human-like and no longer in the robotic monotone made famous by sci-fi movies. Google Voice Search¹ is a recent highly successful application of speech recognition. It allows mobile device users to speak their search queries. Siri², the digital assistant on Apple's iPhone 4S, communicates through speech quite intelligently. These innovations, which are rapidly catching on with other makers of cellular phones, are very convenient for such devices which are difficult to type into due to their small size. We can expect that speech technology will be standard on mobile devices of the future.

Unfortunately, in the developing world, the infamous digital divide is being widened further by these advances. While applications such as those cited above are truly astounding, they are not usable by everyone, everywhere. Where English is spoken in Africa, accents present a serious challenge, so that within the same country, there are those who can use these systems, but most can't, with the latter group quite possibly being the one that is most in need of such a technology. Ideally, the matter of foreign accents should not even arise; each person should be able to communicate with a computing device in his or her own native language.

¹ <http://www.google.com/mobile/voice-search/>

² <http://www.apple.com/iphone/features/siri.html>

While people in the developed world may already be using Google voice search to locate services quickly and easily, this is not possible for many in Africa. And yet such capabilities are needed more in Africa where literacy levels are lowest. A person in the developed world is likely to be literate, and using Google voice search is just one of the many options at his or her disposal. On the other hand, a semi-literate person in the developing world needing information about HIV/AIDS or diabetes management may have no options other than to speak her requests—this is the person who truly needs speech recognition, and yet this is the person who does not have access to this technology. This is because there has not been much done to include African languages, as well as other languages of the developing world, in speech research.

This situation is changing, as more and more researchers begin to look into this problem. This talk will survey ongoing research and innovation efforts on African languages and languages spoken in Africa.

Bio

Dr. Audrey Mbogho is a Senior lecturer in the Department of Computer Science at the University of Cape Town in South Africa. She obtained her PhD from the City University of New York in the USA. Her research interests are in the area of natural interaction modalities. Specifically she is interested in devices for human computer interaction which focus on special-needs users, encompassing not only those with disabilities but also those in situations that make computer use difficult. Traditional modes of interacting with computers (keyboard, mouse and GUI) prove inadequate for users with physical challenges such as blindness, for users with limited literacy, for users of small or embedded computers, and for users in special environments such as underwater. Dr. Mbogho is interested in experimenting with novel means of interaction, such as speech recognition and computer vision. Techniques in these fields, and in the broader field of machine learning, have the potential to allow humans to interact with computers in much the same way as they do with one another—through speech and vision. She believes that these means of interaction have the potential to lift the barriers and bring the benefits of computer technology to sections of the society that would otherwise remain excluded and underserved.



Dr. Zoran Nikoloski

*Max Planck Institute
of Molecular Plant
Physiology, Potsdam,
Germany*

From Design of Technological to Control of Cellular Infrastructure: The Case for Heterogeneous Computing in Systems Biology

Optimization techniques have been widely used to design efficient technological infrastructure networks, from highway systems to the Internet. With the advent of high-throughput technologies for monitoring living systems, from whole organisms to organs, tissues, and individual cells, it has become apparent that optimization principles govern most if not all cellular processes. I will present a broad overview of how techniques of optimization can be used in combination with large data compendia to understand and re-engineer living systems with the ultimate goal of facilitating controllability. The overview of questions, approaches, and challenges emphasizes the important role that heterogeneous computing has started to play in the development of modern computational systems biology.

Bio

Dr. Zoran Nikoloski received a PhD degree in computer science from the University of Central Florida, Orlando, USA in 2005. From 2004 to 2007, he was a postdoctoral researcher in the Department of Applied Mathematics, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic. He is currently a Group Leader at the Max-Planck Institute for Molecular Plant Physiology, Potsdam-Golm, Germany, heading the group on Systems Biology and Mathematical modeling. His general research interests concern Computational Biology, Bioinformatics, Applied Mathematics, Quantitative Methods in Operations Research and Model Design, and Network Design and Optimization.

Research on Complex Network Analysis

With the continued development of those virtualized platform such as Facebook and Ren-Ren, people have more exchange ways. Thus, more and more researchers from different research areas, such as sociology, psychology, computer science and so on, are attracted by social network analysis. The main reason, we think, is that effectively analyzing the social network could clearly discover, understand and reveal the rule or nature of persons, we have techniques to support effectively support for commerce recommendation, public opinion analyze and so on.

A brief introduction of complex network analysis, social network analysis and relation mining will be given. The main research hotspots and several challenges will be presented. Then some of our research work and research motivation on complex network analysis will be given, including some algorithm research and some application examples and systems.

At the end of this talk, HPI-Nanjing and its main research on massive data analysis and knowledge discovery will be briefly presented.

Bio

Dr. Wang Chong-Jun was graduated from Nanjing University and got Ph.D in 2004, he is now a full-time associate professor of Department of Computer Science and Technology, Nanjing University. He is also one of the seven professors at HPI-Nanjing. His research interest includes agent & multi-agent systems, complex network analysis & relation mining, intelligent information processing and intelligent systems. He has published more than 60 papers and been engaged in more than 20 projects. Many research results had been industrialized.



Prof. Dr. Wang Chongjun

*HPI Research School
at Nanjing University,
China*



Ntwa A. Katule

*HPI Research School
at University of Cape
Town, South Africa*

An Intermediation Framework for Applications to Support Health Behaviour Change: A Case of Type 2 Diabetes

Personal informatics applications (PIAs) are software systems that enable individuals to reflect and learn from their collected personal data for the purpose of improving self-understanding in order to instigate adoption of positive behaviours. PIAs offer useful ways of using information and communication technology in health self-management especially in management of chronic diseases. Mobile phone is a promising platform for these applications that can be used in self-management applications because of its wide proliferation in the society.

Many HCI researchers are now concerned with how these personal informatics applications should be developed to support their users in changing behaviour. The focus has been on how both data collection and behaviour reflection are supported. The interest has gone far into integrating these applications with social network platforms. All these efforts are in developed countries of where literacy and access to technology are not the major problems. In low income communities of developing countries, access constraints related to lack of literacy, lack of ownership due financial constraints, and lack of skills to operate ICTs' tools has resulted into these technologies being shared by many people. One aspect of sharing is known as intermediation. Intermediation is whereby a targeted user is facilitated to interact with a computing application through a third party user who is not the intended user of that application. Existing personal informatics applications have not been designed to support usage in the context of intermediation.

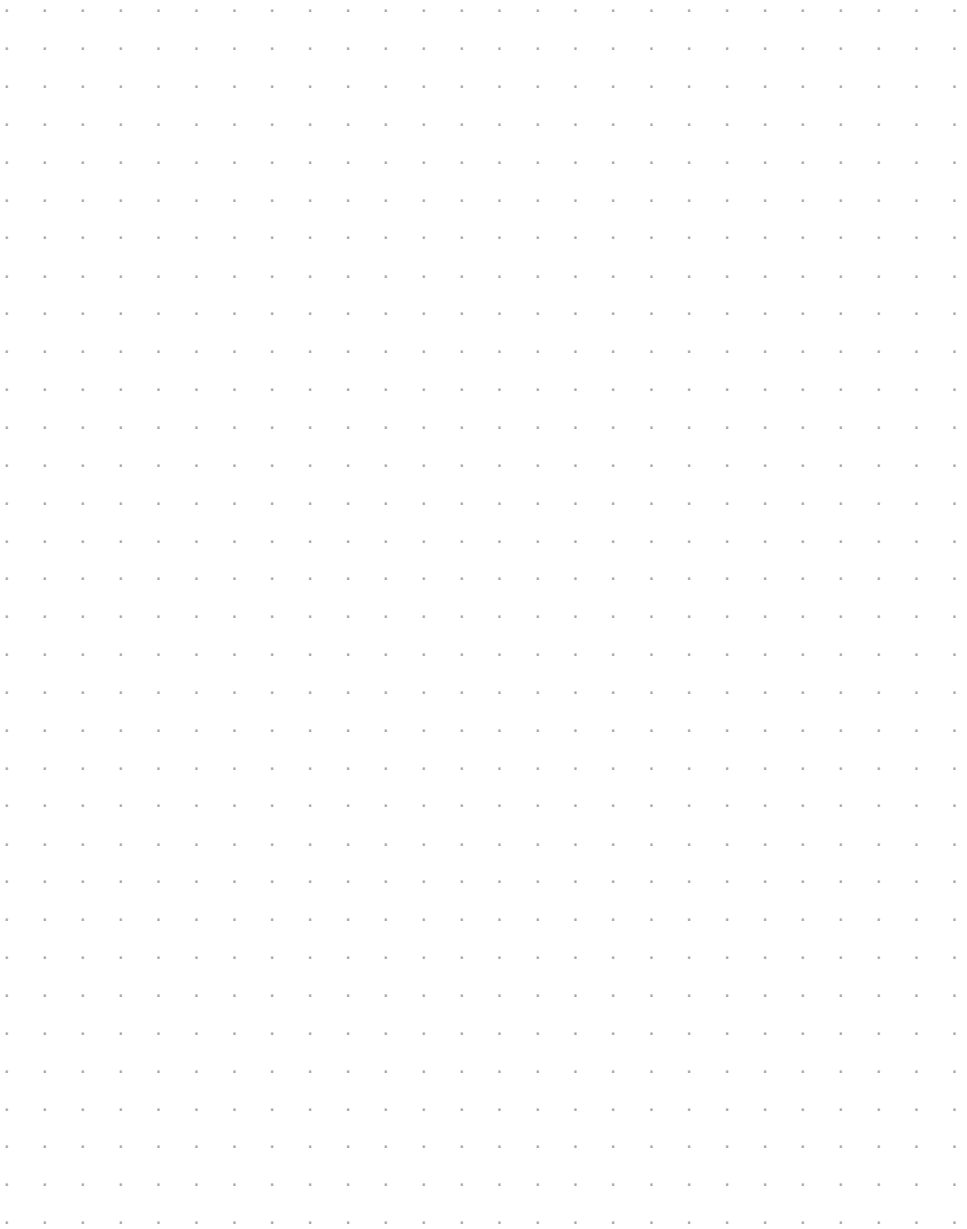
Therefore, this research investigates an appropriate framework for interaction through intermediation in the context of personal informatics applications targeting health behaviour change in chronically ill patients. A case study is on type 2 diabetes, as it is now a highly prevalent disease in developing countries due to adoption of a sedentary lifestyle by people. This work will look at how best patients need to be supported in order induce a positive behaviour change while being helped by intermediary users to interact with the application. The targeted behaviours are eating habits, and physical exercise. An application implementing such a framework will be evaluated for its usability and its impact on behaviour change.

Bio

My Name is Ntwa A. Katule, a Tanzania citizen by birth. I have a BSc with majors in computer science and applied mathematics from University of Kwa Zulu Natal where I graduated in 2005, and MSc in computer science from University of Dar es salaam where I graduated in 2009. My research interests include software engineering, mobile health, persuasive technologies, and human computer interaction. Something that I enjoy most in computer science is development of software artefacts to help people in solving real world problems.

My PhD topic falls under three themes which are behaviour change, chronic diseases management, and human computer interaction in developing world. I am being supervised by three supervisors, Dr Hanh Lee and Prof. Gary Marsden from computer science department, and Dr Ian Ross from the medical school of University of Cape Town. We are trying to see if personal informatics applications to enable users to track and review information related to their personal health, can be developed for the context of where access to technology can be hampered by access constraints such as lack of literacy, lack of skills to operate technology, and lack of access due to financial reasons. Our research is looking at one aspect of sharing devices, which is known as usage through intermediation. The concern is how a technology can be designed to support behaviour change in the context of patients using it through intermediation. My motivation to work on this area is due the fact that, chronic diseases are becoming highly prevalent in developing world countries and tools to support self-management in this context are not available. The existing tools were not designed for this context therefore they tend to ignore a lot of contextual considerations.

Notes



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, PhD 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 group are supporting pillars for our PhD 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 college, the different groups at HPI work on the following topics:

Human Computer Interaction and Computer Vision as Service

Prof. Dr. Patrick Baudisch

Service-Oriented Geovisualization Systems

Prof. Dr. Jürgen Döllner

Tools and Methods for Software Engineering in Service-Oriented Systems

Prof. Dr. Robert Hirschfeld

Security Engineering of Service-Based IT-Systems

Prof. Dr. Christof Meinel

Service-Oriented Information Integration

Prof. Dr. Felix Naumann

Evolutionary Transition of Enterprise Applications to Service-Oriented

Prof. Dr. h.c. Hasso Plattner

Operating System Abstractions for Service-Oriented Computing

Prof. Dr. Andreas Polze

Services Specification, Composition, and Enactment

Prof. Dr. Mathias Weske

Quantitative Evaluation and Optimization of Service-Oriented Systems

Prof. Dr. Werner Zorn

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

http://www.hpi.uni-potsdam.de/research_school

Expansion of the Research School "Service-oriented Systems Engineering"

8 PhD. Grants available - starting October 1, 2012

Hasso Plattner Institute (HPI) is a privately financed institute affiliated with the University of Potsdam, Germany. The Institute's founder and benefactor Professor Hasso Plattner, who is also co-founder and chairman of the supervisory board of SAP AG, has created an opportunity for students to experience a unique education in IT-Systems Engineering in a professional research environment with a strong practice orientation.

In 2005, HPI initiated the research school in "Service-Oriented Systems Engineering" under the scientific supervision of Professors Jürgen Döllner, Holger Giese, Robert Hirschfeld, Christoph Meinel, Felix Naumann, Hasso Plattner, Andreas Polze, Mathias Weske and Patrick Baudisch.

We are expanding our research school and are currently seeking

- **8 Ph.D. students** (monthly grants 1400-1600 Euro) and
- **2 Postdocs** (monthly grant 1800 Euro)

Positions will be available starting October 1, 2012. The grants are not subject to income tax.

The main research areas in the research school at HPI are:

- Self-Adaptive Service-Oriented Systems
- Operating System Support for Service-oriented Systems
- Architecture and Modeling of Service-oriented Systems
- Adaptive Process Management
- Services Composition and Workflow Planning
- Security Engineering of Service-Based IT Systems
- Quantitative Analysis und Optimization of Service-Oriented Systems
- Service-oriented Systems in 3D Computer Graphics
- Service-oriented Geoinformatics
- Human-Computer Interaction for Service-oriented Systems

Prospective candidates are invited to apply with:

- Curriculum vitae and copies of degree certificates/transcripts,
- A short research proposal,
- Writing samples/copies of relevant scientific papers (e.g. thesis, etc.),
- Letters of recommendation.

Please submit your applications by August 1, 2012 to the coordinator of the research school:

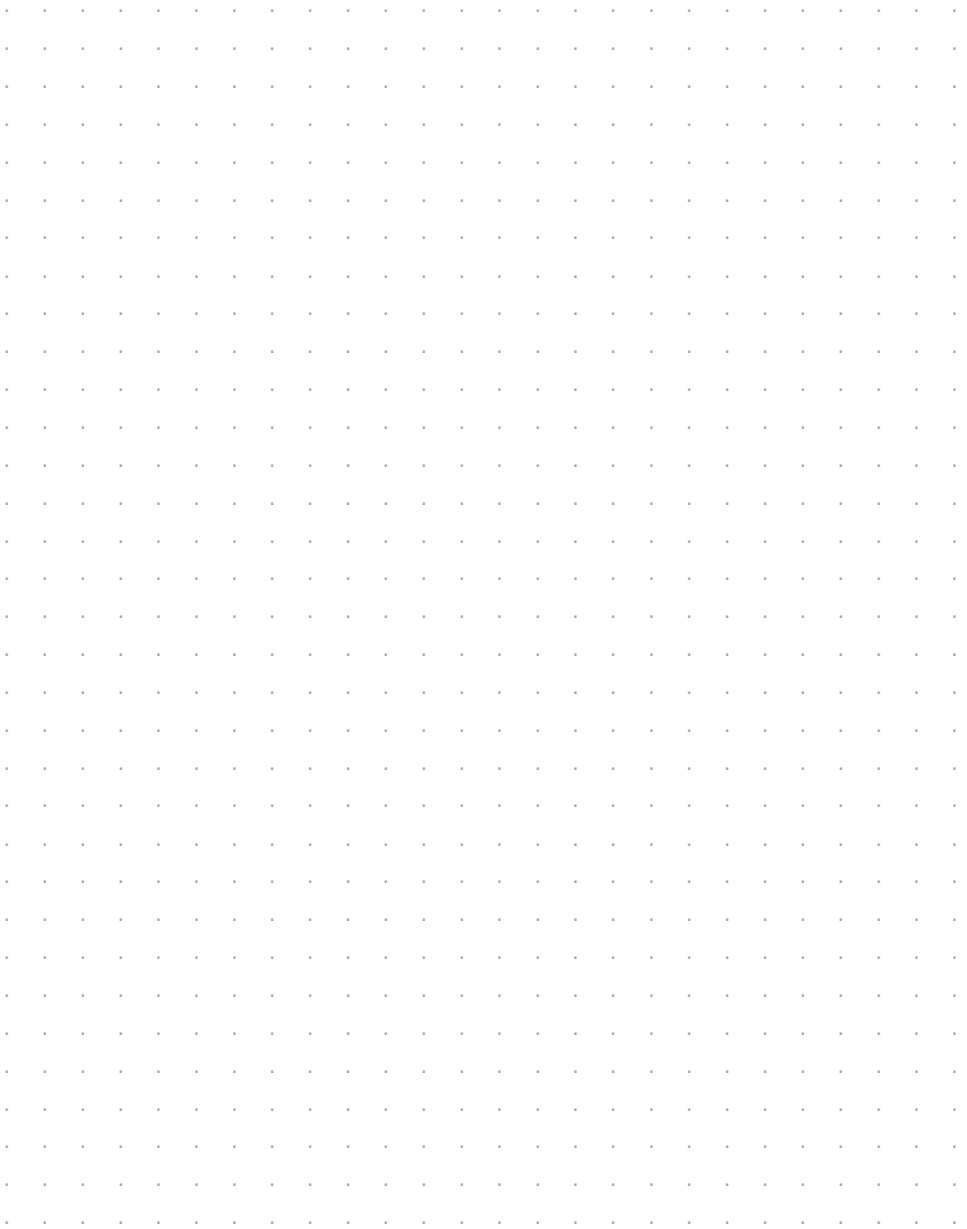
Prof. Dr. Andreas Polze
Hasso-Plattner-Institute, Universität Potsdam
Postfach 90 04 60, 14440 Potsdam, Germany


Successful candidates will be notified by September 15, 2012 and are expected to enroll into the program on October 1, 2012.

For additional information visit <http://kolleg.hpi.uni-potsdam.de>

or contact the office: Telephone +49-331-5509-220
Telefax +49-331-5509-229
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Notes





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