

Speakers in alphabetic order:

W. van der Aalst, G. Breiter, D. Fahland, J.-C. Freytag, S. Glesner, S. Jablonski, D. Karagiannis, U. Leser, M. Montalli, C. Pautasso, W. Reisig, H. Schöning, S. Schulte, M. Weidlich, M. Weske

Prof. Wil van der Aalst, TU Eindhoven**Process Mining in Healthcare: Evidence-Based Process Management Based on Patient-Related Event Data*****Abstract***

Process mining provides new ways to utilize the abundance of data in enterprises. Suddenly many organizations realize that survival is not possible without exploiting available data intelligently. A new profession is emerging: the data scientist. Just like computer science emerged as a new discipline from mathematics when computers became abundantly available, we now see the birth of data science as a new discipline driven by the torrents of event data available today. These event data enable new forms of analysis facilitating process improvement. Process mining provides a novel set of tools to discover the real process, to detect deviations from some normative process, and to analyze bottlenecks and waste. Process mining will be an integral part of the data scientist's toolbox. However, lion's share of process mining focuses on the "as-is" situation rather than the "to-be" situation. Techniques like simulation can be used to do "what-if" analysis but are not driven by event data and as a result, improvements can be very unrealistic. Techniques for predictive analytics are data-driven but often focus on well-structured decision problems. Operational processes within complex organizations cannot be mapped onto a simulation model or simple decision problem. This talk introduces process mining and relates the topic to healthcare processes. It is based on the books "Process Mining: Discovery, Conformance and Enhancement of Business Processes" by Wil van der Aalst, Springer Verlag, 2011 (ISBN 978-3-642-19344-6) and "Process Mining in Healthcare: Evaluating and Exploiting Operational Healthcare Processes" by Ronny Mans, Wil van der Aalst, and Rob Vanwersch, Springer Verlag, 2015 (ISBN 978-3-319-16070-2).

Bio

Prof.dr.ir. Wil van der Aalst is a full professor of Information Systems at the Technische Universiteit Eindhoven (TU/e). He is also the Academic Supervisor of the International Laboratory of Process-Aware Information Systems of the National Research University, Higher School of Economics in Moscow. Moreover, since 2003 he has a part-time appointment at Queensland University of Technology (QUT). At TU/e he is the scientific director of the Data Science Center Eindhoven (DSC/e). His personal research interests include workflow management, process mining, Petri nets, business process management, process modeling, and process analysis. Wil van der Aalst has published more than 175 journal papers, 17 books (as author or editor), 400 refereed conference/workshop publications, and 60 book chapters. Many of his papers are highly cited (he one of the most cited computer scientists in the world and has an H-index of 118 according to Google Scholar) and his ideas have influenced researchers, software developers, and standardization committees working on process support. He has been a co-chair of many conferences including the Business Process Management conference, the International Conference on Cooperative Information Systems, the International conference on the Application and Theory of Petri Nets, and the IEEE International Conference on Services Computing. He is also editor/member of the editorial board of several journals, including Computing, Distributed and Parallel Databases, Software and Systems Modeling, the International Journal of Business Process Integration and Management, the International Journal on Enterprise Modelling and Information Systems Architectures, Computers in Industry, Business & Information Systems Engineering, IEEE Transactions on Services Computing, Lecture Notes in Business Information Processing, and Transactions on Petri Nets and Other Models of Concurrency.

In 2012, he received the degree of doctor honoris causa from Hasselt University in Belgium. In 2013, he was appointed as Distinguished University Professor of TU/e and was awarded an honorary guest professorship at Tsinghua University. In 2015, he was appointed as honorary professor at the National Research University, Higher School of Economics in Moscow. He is also a member of the Royal Netherlands Academy of Arts and Sciences (Koninklijke Nederlandse Akademie van Wetenschappen), Royal Holland Society of Sciences and Humanities (Koninklijke Hollandsche Maatschappij der Wetenschappen) and the Academy of Europe (Academia Europaea).

Dr. Gerd Breiter, IBM Böblingen

IT Operations Management in Hybrid Clouds

Abstract

Enterprises and service providers risk revenue, profit loss and customer dissatisfaction when applications and services don't meet consumer expectations. Operations is responsible for managing this risk, ensure availability of critical services, and ensure efficient utilization of IT and Network resources. IT Operations Management is enabling Operations to increase Effectiveness, Efficiency and Reliability by providing a consolidated view and actionable insight into the health and performance of applications and their associated IT and Network infrastructures. This Presentation focusses on selected aspects of IT Operations Management in Hybrid Clouds. After a short introduction it will discuss some concrete examples for the use of Analytics to maximize the availability of the services in Hybrid Cloud environments and minimize the cost of doing so. It then will discuss the buildout of IT Operations Management Services as SaaS services leveraging the upcoming Microservices paradigm highlighting some of the challenges in the Hybrid Cloud environment. Finally it will highlight some aspects of IT Operations Management in the Telco Industry around Telco Cloud and Real Time OSS.

Bio

Gerd Breiter *IBM Systems Middleware, IBM Germany Research and Development, P.O. Box 1380, 71003 Boeblingen, Germany (GBREITER@de.ibm.com)*. Mr. Breiter is an IBM Distinguished Engineer working in the IBM Research and Development Laboratory in Boeblingen, Germany.

As the Chief Architect for Consolidated Operations he is responsible for the Architecture and Strategy of IBM's portfolio for IT Operations Management for Hybrid Cloud Environments including Event Management, Analytics, Application Service Composition and IT Network Management.

With more than ten years of experience in Utility-, On Demand- and Cloud Computing Mr. Breiter is one of the key experts within the industry in this new compute paradigm.

He co-lead the definition of the Cloud Computing Reference Architecture (CC RA) and through his work on patterns and Software Defined Environments he was essential for the creation of the OASIS TOSCA (Topology and Orchestration Specification for Cloud Applications) Standard. His research has led to more than 30 patents, recognition as an IBM Master Inventor and election into the IBM Academy of Technology.

Prof. Dirk Fahland, TU Eindhoven

Artifact-centric modeling

Abstract

Service-oriented systems decompose information processing into interacting services. As a consequence many services found in reality have an inherent dependency on data shared with other services; the dependencies between are non-trivial and often comprise 1:n and m:n relations inherited from the underlying data model. For instance, healthcare procedures for lab tests and diagnostics update patient records and produce multiple test results for the same patient; changes on these records may trigger multiple consultation, treatment, and nursing procedures where the same record is used and updated multiple times.

In this lecture, we will discuss the dynamics of such service-oriented systems and present the artifact-centric paradigm for describing interactions of services and data. We investigate how the level of abstraction in artifacts impacts the ability to model and analyze such systems. We then introduce a new paradigm for artifact-centric modeling that enables faithfully capturing 1:n and m:n interactions between services and data. We present results from process mining that show that existing systems can indeed be described in this way.

Bio

Dr. Dirk Fahland is assistant professor at the Eindhoven University of Technology researching in the area of distributed systems, he received his Ph.D. in Computer Science from the Humboldt-Universität zu Berlin, Germany, and the Eindhoven University of Technology, the Netherlands, in 2010. His research interests include distributed processes and systems built from distributed components for which he investigates modeling systems (using process modeling languages, Petri nets, or scenario-based techniques), analyzing systems for errors or misperformances (through verification or simulation), and process mining/specification mining techniques for discovering system models from event logs and from database systems. He particularly focuses on distributed systems with multi-instance characteristics and their synchronizing and interacting behaviors. His results appeared in journals such as *Software & Systems Modeling*, *The Computer Journal*, *Data and Knowledge Engineering*, and *Information Systems*

Prof. Johann-Christoph Freytag, HU Berlin

SOC and Privacy

Abstract

The SOC paradigm allows programmers to compose services such that data flows from one service invocation to another in a producer/consumer manner. This exchange might also include personal data which needs special care to protect the privacy of individuals.

This tutorial begins with definitions for privacy before introducing the techniques for protecting privacy for tabular data as well as for data exchange in a distributed environment. We also show how to model certain problems by using graphs to decide whether or not a given privacy criteria is violated or not. The current approaches need further refinement and adaptation for SOC as we outline at the end of our tutorial.

Bio

Johann-Christoph Freytag, Ph.D. (Harvard University) is currently Full Professor for Databases and Information Systems (DBIS) at Humboldt-Universität zu Berlin. Before joining the department, Freytag spent eight years in industrial research at the IBM Almaden Research Center (1985-1987), at

the European Computer Industry Research Centre (ECRC), Munich (1987-1989), and at DEC's (Digital Equipment) Database System Research Center, Munich (1990-1993). He holds a Ph.D. in Applied Mathematics/Computer Science from Harvard University, MA.

Freytag's research interests include all aspects of query processing and query optimization in object-relational database systems, new developments in the area of database systems (such as semi-structured data and data quality), privacy in database systems, and various aspects of big data as well as applying database technology to domains such as GIS, genomics, and bioinformatics/life science. In the past Freytag received the IBM Faculty Award four times for collaborative work in the areas of databases, middleware, and bioinformatics/life science, as well as the HP Innovation Award of excellent cooperation in the area of databases and workflow systems twice. He organized the VLDB conference in Berlin in 2003 and was a member of the VLDB Endowment (2001-2007). Since 2009, Freytag heads the German database interest group of the GI (Fachbereich DBIS, Gesellschaft für Informatik).

Prof. Sabine Glesner TU Berlin

Verification of Embedded Real-Time Systems

Abstract

In real-time systems, it is essential that not only functional properties are met but also real-time constraints are fulfilled. Such systems are deployed in the medical-technical domain as well as in many other safety-critical areas, e.g. in automotive systems and airplanes. Since failures may lead to enormous costs or even loss of life, it is crucial to validate and verify real-time systems systematically.

Real-time systems are often embedded systems that control technical processes. The systems themselves consist typically of deeply integrated hardware and software components. It is a major challenge to develop automated quality assurance techniques that can be used for the verification and validation of complex embedded real-time systems. In this talk, we give an overview of our verification framework for safety and timing properties of hardware/software co-designed systems modeled in SystemC, using timed automata and the UPPAAL model checker.

Prof. Stefan Jablonski

Describing Multiple Perspectives in Declarative Process Modeling

Abstract

Declarative process management has qualified as effective means to manage agile processes. Agile processes are characterized – among other things – by a huge number of alternative process execution variants. There are not many approaches for the management of declarative processes developed so far. Besides, existing approaches neglect to a huge extent that processes are constituted by multiple perspectives (e.g. organizational perspective, data perspective).

In this lecture, we present an approach for modeling and executing agile processes. It is called DPIL (Declarative Process Intermediate language) and facilitates the description and execution of agile processes consisting of multiple perspectives. The lecture first motivates declarative process management then introduces how agile processes are modeled and executed in DPIL.

Bio

Stefan Jablonski is Full Professor at the University of Bayreuth, Germany. Since 2006 he is head of the Chair for Databases and Information Systems. From 1994 to 2005 he was heading as Full Professor the Research Group on Data and Process Integration Systems at the University of Erlangen-Nuernberg. From 1991 to 1994 he was managing a Research Group on Process Management at the Digital Equipment, Activity Management Group, Palo Alto, USA and Campusbased Engineering Center, Karlsruhe.

Stefan Jablonski holds a Doctoral Degree (Dr.-Ing.) in Engineering Science from the University of Erlangen-Nuernberg. He also holds a Diploma Degree in Computer Science from this university.

Stefan Jablonski's research focus lies firstly on process management. Therein, the development of conceptual foundations of process management, modeling and executing agile processes, and mining of agile processes are the current core areas. Meta modeling constitutes a second research focus. The development of domain specific modelling languages, the evaluation of meta models and the development of editors for domain specific languages are currently in the focus of this research realm. Besides, the development of virtual research environments for applications in science and cultural science forms a third research focus.

Prof. Dimitris Karagiannis University of Vienna

Integration of Conceptual Models and Data Services

Abstract

The continuous shift to concepts of service orientation is a fact - not only in the area of information and communication technologies but also in information systems engineering. Model-based approaches have been identified as a suitable means to bringing together application requirements and technology.

This talk presents an approach of how knowledge about these requirements laid down in form of meta-models can be aligned with concepts of service orientation in information technology. For this purpose an evolutionary process is introduced, which aids migration from existing meta-models to semantically annotated services by applying meta-model slicing techniques. The resulting data services are then passed back to the application environment where they may be reused for implementation task or for integration issues.

Bio

Prof. Dr. Dimitris Karagiannis studied Computer Science at the Technical University of Berlin and was a visiting scientist at research institutions in the USA and Japan. From 1987 to 1992 he was scientific director for Business Information Systems at the Research Institute for Applied Knowledge Management (FAW) in Ulm. Since 1993 he has been full professor at the Faculty of Computer Science at the University of Vienna. As head of the Research Group Knowledge Engineering his main research areas are Knowledge Management, Business Intelligence and Meta-Modelling. Besides his engagement in national and EU-funded research projects Dimitris Karagiannis is the author of research papers and books on Knowledge Databases, Expert Systems, Business Process Management, Workflow-Systems and Knowledge Management.

He established the Business Process Management Approach, which has been successfully implemented in several industrial and service companies and is the founder of the European software- and consulting company BOC (www.boc-group.com), which implements software tools based on the meta-modelling approach. 2012 he established the Open Models Laboratory (www.omilab.org), an open initiative for research and applications in modelling method engineering.

Prof Ulf Leser, HU Berlin

Scientific Workflows for Biomedical Research

Abstract

Biomedical research, both applied and fundamental, more and more depends on the computational analysis of large data sets. These data sets often are comprised of multiple heterogeneous data types, each with its own problems in terms of bias, error rates, or data quality in general. Comprehensively analyzing such heterogeneous sets requires complex pipelines of format conversions, data normalizations, statistical analysis steps, etc. Such pipelines often are called scientific workflows (SWF). In this tutorial, I give a brief introduction into SWFs, highlight their importance for biomedical research, and go into more details in selected topics such as workflow similarity search, scalable execution engines, and workflow languages.

Bio

Ulf Leser studied Computer Science at the Technische Universität München and obtained his Dr. Ing. from Technische Universität Berlin. Since 2002, he is a professor for Knowledge Management at Humboldt-Universität Berlin in Bioinformatics; before, he worked at the Max-Planck-Institute for Molecular Genetics in Berlin and for the software company PSI AG. His group on "Knowledge Management in Bioinformatics" at HU Berlin performs research especially in the areas of biomedical databases, scientific workflows, statistical analysis of high-throughput experiments, and biomedical text mining. The group participates in a number of interdisciplinary research projects (funded by DFG, EU, BMBF and BMWi) concerned with the analysis and management of next generation sequencing data in oncology and immunology, cancer-related knowledge bases, regulatory networks, and integrated analysis of multiple -omics technologies.

Dr. Marco Montali, University of Bolzano

A database perspective and modelling processes, data, and constraints

Prof. Cesare Pautasso, University of Lugano

Conversations over RESTful Web APIs

Abstract

The REST architectural style has made a strong impact on the way Web services are designed, built and also composed. Existing approaches to service API design focus on domain modeling and resource modeling, thus statically enumerating the interface features, but do not cover important dynamic aspects that help better understand how clients are supposed to use them. In this lecture we take a close look at the way clients interact with RESTful Web APIs by introducing the concepts of RESTful conversation and hypermedia flow. We show that there are many examples of recurring conversation patterns that can be found on the Web: from small indirect lookups based on hypermedia relationships, to the navigation within the elements of collection resources or the confirmation/cancellation of reserved resources within RESTful atomic distributed transactions. Capturing them helps to raise the abstraction level when modeling RESTful APIs and also provides a novel perspective to study the relationship between BPMN choreographies and Web resources, or what we call RESTful Business Process Management.

Bio

Cesare Pautasso is associate professor at the Faculty of Informatics at the University of Lugano, Switzerland. Previously he was a researcher at the IBM Zurich Research Lab (2007) and a senior researcher at ETH Zurich (2004-2007). He completed his graduate studies with a Ph.D. from ETH Zurich in 2004. His research group focuses on building experimental systems to explore the intersection of model-driven software composition techniques, business process modelling languages, and autonomic/Cloud computing, Web 2.0 Mashups, and Self-Organizing, Liquid Service Oriented Architectures.

His teaching, training, and consulting activities both in academia and in industry cover advanced topics related to emerging Web Technologies, Business Process Management and Enterprise Integration Architectures. His book on "SOA with REST" was published in 2012. He served as the program co-chair of ICWSM 2013, ECOWS 2010 and Software Composition 2008. He is currently running the ICWE 2015 Rapid Mashup Challenge and co-editing the IEEE Software Insights department. He has also started the series of International Workshops on RESTful Design (WS-REST) at the WWW conference. He regularly referees for Swiss, EU and US funding agencies. Since 2010 he is an advisory board member of EnterpriseWeb. More information can be found on <http://www.pautasso.info/> and you can follow him on @pautasso

Prof. Wolfgang Reisig, HU Berlin

Fundamentals of the paradigm of Service Orientation

Abstract

Classical computation theory abstracts computation processes to computable functions. This paradigm of computing fails for service-oriented (and a number of other) computational architectures. An adequate, unique theory for such architectures is missing; instead we witness a lot of different approaches and modeling techniques.

This talk surveys published proposals that attack the above problem. We try to discriminate fundamental notions and concepts such as *refinement* and *composition*, *concurrency*, and *locality*, as they prevail in different modeling techniques for Service oriented and other architectures.

Bio

Wolfgang Reisig is a full professor at the Computer Science Institute of Humboldt-Universität zu Berlin, Germany. He studied Physics and Computer Science in Karlsruhe and Bonn, where he graduated with a masters degree in 1974. He served as a research assistant and assistant professor at the University of Bonn and at RWTH Aachen, where he received his PhD in 1979. He was a visiting professor at Hamburg University 1983/1984, and a project manager at Gesellschaft fuer Mathematik und Datenverarbeitung (GMD) at St. Augustin. He received his Habilitation from the University of Bonn in 1987 and hold the position of a professor at Technical University of Munich, 1988-1993. Since 1993 he is a full professor at Humboldt-Universität zu Berlin. He twice kept the position of the manager of the institute (1994-1996 and 2002-2004) and was the Dean of the faculty of Natural Sciences II, 1996-1998.

Prof. Reisig was a senior research at the International Computer Science Institute (ICSI) in Berkeley, California in 1997, and got the "Lady Davis Visiting Professorship" at the Technion, Haifa (Israel) in 2000/2001. In the years 2002 and 2005 he received an IBM Faculty Award for his contribution to Cross-organizational Business Processes and the Analysis of Service Models. In 2006, he held the Beta Chair of Technical University of Eindhoven. Prof. Reisig has been a scientific visitor at Microsoft Research in Redmond WA for several months in 2007 and 2009. He is the speaker of the PhD school

Service-oriented Architectures for the Integration of Software-based Processes, exemplified by Health Care Systems and Medical Technology (SOAMED) since 2010.

Prof. Reisig is a member of a member of the European Academy of Sciences, Academia Europaea. He published and edited numerous books and articles on Petri Net Theory and Applications. He is a Member of the Petri Net Conference Steering Committee since 1982 and a co-editor of the journal „Software and Systems Modeling“.

Dr. Harald Schöning, Software AG, Darmstadt

From “smart data” to “smart services”

Abstract

The volume of data produced by machines, devices, social networks etc. increases day by day. However, these data are meaningless unless someone extracts information out of this haystack, i.e. makes the data “smart”. Smart data, again, is of limited value unless they are converted into value, typically by offering some “smart service” that uses the data to fit a customer’s need better, faster, or cheaper than any previous service. The talk will shed some light on the ecosystem around “smart services”.

Bio

Dr. Harald Schöning holds a diploma and a PhD in Computer Science from the University of Kaiserslautern, Germany. For more than twenty years, he has been working for Software AG, in various roles including developer, project lead, and chief architect, and in various areas, from databases over semantic technologies, to SOA and business process management and beyond. Today he is Vice President Research at Software AG. He is chairman of the German Software Cluster, chairman of the German education initiative Software Campus, member of the board of NESSI (Networked European Software and Services Initiative) and the Big Data Value Association BDVA and has served as expert and reviewer for the European Commission and German ministries in several contexts. Dr. Schöning has authored and co-authored several text books and many technical papers. He is inventor and co-inventor of more than 40 patents.

Dr. Stefan Schulte, Technical University of Vienna

Elasticity - Basics and Application Areas

Abstract

Elasticity is a multidimensional concern, covering not only resource elasticity, but also quality and cost elasticity. Further dimensions like data elasticity are also imaginable. In this talk, the basic ideas of elasticity are presented, with a specific focus on resource and quality elasticity. Amongst other topics, SYBL - a novel language for controlling elasticity in cloud applications - will be presented. The talk will also discuss applicability of elasticity in different application areas like business process enactment and stream processing and the benefits arising from it.

Bio

Dr.-Ing. Stefan Schulte is Assistant Professor (Tenure Track) at the Distributed Systems Group at TU Vienna. Until July 2011, Stefan headed the research group "Service-oriented Computing" at the Multimedia Communications Lab at Technische Universität Darmstadt, Germany. Stefan received a

diploma degree in economics and a Bachelor in computer science from the University of Oldenburg, Germany, and a Master of Information Technology (with Merit) from the University of Newcastle, New South Wales, in 2005 and 2006, respectively. From 2006 to 2010, he was a PhD student at the Multimedia Communications Lab. In 2010, Stefan finished his PhD on Web Service discovery at Technische Universität Darmstadt "mit Auszeichnung" (summa cum laude). Findings from his research have been published in more than 60 refereed scholarly publications. He serves as reviewer for prestigious conferences and journals, e.g., ACM Computing Surveys, ACM Transactions on the Web, or IEEE Transactions on Services Computing, as well as for research agencies like Luxembourg's Fonds National de la Recherche. Stefan is the project coordinator of the currently running EU FP7 STREP SIMPLI-CITY - The Road User Information System of the Future and of the EU Factories of the Future RIA Cloud-based Rapid Elastic Manufacturing (CREMA). He has acquired several projects sponsored by the industry, the German Federal Ministry of Economics and Technology and the European Union and was the overall proposal coordinator of the EU FP7 STREPs ADVENTURE, SIMPLI-CITY, and CREMA.

Prof. Matthias Weidlich, HU Berlin

Models and Methods for Complex Event Recognition

Abstract

Run-time monitoring of service execution has manifold applications in the health sector, reaching from the detection of critical deviations from common practice to the analysis of the performance of clinical pathways. In this context, complex event recognition enables the detection of relevant complex events in a continuous stream of low-level events, thereby providing the opportunity for reactive measures. In this talk, we will give an overview of existing models and methods for complex event recognition. Specifically, we cover the detection of (1) point-based complex events using automata and (2) interval-based events using the Event Calculus.

Bio

Matthias is a junior professor at Humboldt-Universität zu Berlin (HU) leading the Process-Driven Architectures group that is funded by an Emmy Noether grant from the German Research Foundation (DFG). In addition, he is a Visiting Researcher in the Department of Computing at Imperial College London, United Kingdom, where he was a research associate before joining HU in April 2015. Earlier, he held positions as a research fellow and adjunct lecturer at the Technion - The Israel Institute of Technology, Israel. He received his PhD in Computer Science from the Hasso Plattner Institute (HPI), University of Potsdam, Germany, in 2011. His research focuses on process modelling and analysis, event-based systems, data interoperability, and uncertainty management and his results appeared in journals, such as IEEE TSE, IEEE TKDE, Information Systems, and The Computer Journal. Matthias has taught at the Technion, imperial College, and HU in the area of process modelling and event-based systems.

Prof. Mathias Weske, HPI at University of Potsdam

From Process Modeling to Decision Modeling, and Execution

Abstract

The talk looks at two areas of modeling in information systems design, process modeling and decision modeling. Both disciplines have been active research areas for many years. However, only recently the relationship between modeling processes and modeling decisions has been addressed. A recent study showed that process models often encode decisions, for instance, to determine how to continue a given process after an exclusive or split. In application domains, such as finance, many decisions are encoded in process models, which makes it hard both to understand and to maintain these models. Based on fundamentals of process modeling and decision modeling, the talk discusses an approach to derive decision models from process models. The conceptual basis of this approach is presented and a case study is discussed that shows different ways of integrating process models and decision models. The talk concludes with a discussion on how decision can be executed using rules management systems.

Bio

Professor Dr. Mathias Weske is chair of the business process technology research group at Hasso Plattner Institute of IT Systems Engineering at the University of Potsdam, Germany. His research interests include business process management, decision management, event processing, and service oriented computing. He is an Area Editor of Elsevier's Information Systems journal and on the Editorial Board of Springer's Distributed and Parallel Databases journal. Since more than a decade, Dr. Weske regularly publishes in journals and conferences, and he is a founding member of the steering committee of the BPM conference series.