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2007 **ICST** Second International Conference on Evaluation Methodologies and Tools (And Performance Workshops)



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# Welcome to ValueTools 2007







## **Second International Conference on Performance Evaluation Methodologies and Tools**



In recent years, a range of performance evaluation methodologies and tools has been developed within disparate research communities for the purposes of evaluation, design, and model reduction. The aim of the Performance Evaluation Methodologies and Tools conference is to build bridges between these communities, bringing theory and practice together in order to:

- compare and debate the complete range of performance evaluation methodologies and their implementation into tools
- promote interdisciplinary flow of technical information among industry systems designers and researchers.

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# Chair Messages

Message from the ValueTools 2007 Chairs

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## Message from the ValueTools 2007 Chairs

We are very pleased to welcome you all to ValueTools 2007 in the city of Nantes,

In recent years, a range of performance evaluation methodologies and tools has been developed within disparate research communities for the purposes of evaluation, design, and model reduction. The aim of the \*Performance Evaluation Methodologies and Tools\* (ValueTools) conference is to build bridges between these communities, which often operate in closed groups with little opportunity for interaction and cross-fertilization, and to bring theory and practice closer together in order to:

- compare and debate the complete range of performance evaluation methodologies and their implementation through specific tools
- promote an interdisciplinary flow of technical information among industry systems designers and researchers.

The event is the second of a series initiated in 2006 in Pisa, Italy. The ValueTools conference is organized over three days, from the 23rd of October to the 25th, with four associated workshops, two of them being held on the 22nd:

- GameComm: The First International Workshop on Game theory for Communication networks:
- NSTools: The First International Workshop on Network Simulation Tools;

and the two others on the 26th:

- Inter-Perf: Workshop on interdisciplinary systems approach in performance evaluation and design of computer & communication systems
- SMCtools: International Workshop on Tools for solving Structured Markov Chains.

ValueTools starts with a keynote speech presented by Bruce Hajek, Professor of Electrical and Computer Engineering at the University of Illinois, Urbana-Champaign, USA. There are also two additional plenary talks, from Jean-Yves Le Boudec, Professor at the Ecole Polytechnique Fédérale de Lausanne, Switzerland, and Laurent Massoulié, from Thomson Research, Paris, France. The first plenary talk is related to and precedes an invited session on statistical physics applied to networking which is part of the conference program.

There are 45 paper presentations selected from 83 submissions having undergone a full review process. All papers in the invited sessions have also undergone the exact same process. The final program shows a real international scope, with authors from five continents. From all presented papers, a number with particular merit has been selected and extended versions of these papers will be published in Performance Evaluation Journal.

The success of ValueTools 2007 is largely due to the Publicity Chair, Armin Zimmerman, the Proceedings Chair, Sara Alouf, the Sponsorship Chair, Gerardo Rubino, and to the technical program committee and numerous reviewers who devoted much of their time and effort to provide a high quality technical program. To them we express our sincere thanks and deepest gratitude. We also want to mention the ICST staff, particularly Karen Decker and Zita Rozsa, as well as the assistance of INRIA staff, especially Elisabeth Lebret.



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We would also like to acknowledge the technical cooperation of ACM Sigmetrics and Sigsim, and the support of ACM for providing the electronic version of the proceedings. Many thanks go to our sponsors: Fondation Métivier, France Telecom, INRIA, Pôle Image & Réseaux, Région Pays de Loire, Nantes Métropole and Université de Rennes 1

Peter Glynn, General Chair Bruno Tuffin, Vice-General Chair Christos Cassandras, Alexandre Proutière and Kishor Trivedi, TPC Chairs Tania Jimenez, Workshops Chair



Peter Glynn ValueTools 2007 General Chair

### Biography

Peter Glynn received his Ph.D. in operations research from Stanford University, after which he joined the faculty of the University of Wisconsin at Madison. After five years there, he returned to Stanford, where he is Thomas Ford Professor of Engineering and is a professor in the Department of Management Science and Engineering. He currently also serves as Director of Stanford's Institute for Computational and Mathematical Engineering. Peter is a Fellow of the Institute of Mathematical Statistics and has research interests that include stochastic modeling, Monte Carlo simulation and computational probability, statistical inference for stochastic processes, and performance engineering for communications networks. He is also a co-author, with Soren Asmussen, of "Stochastic Simulation: Algorithms and Analysis". His webpage can be found here.



Bruno Tuffin Vice-General Chair

### Biography

BRUNO TUFFIN received his PhD degree in applied mathematics from the University of Rennes 1 (France) in 1997. Since then, he has been with INRIA in Rennes. He spent 8 months as a postdoc at Duke University in 1999. His research interests include developing Monte Carlo and quasi-Monte Carlo simulation techniques for the performance evaluation of telecommunication systems, and developing new Internet-pricing schemes. He is currently Associate Editor for INFORMS Journal on Computing. His web page can be found here.



Christos Cassandras TPC Chair

### Biography

Christos G. Cassandras is Professor of Manufacturing Engineering and Professor of Electrical and Computer Engineering at Boston University. He is also co-founder of Boston University's Center for Information and Systems Engineering (CISE). He received degrees from Yale University (B.S., 1977), Stanford University (M.S.E.E., 1978), and Harvard University (S.M., 1979; Ph.D., 1982). In 1982-84 he was with ITP Boston, Inc. where he worked on the design of automated manufacturing systems. In 1984-1996 he was a faculty member at the Department of Electrical and Computer Engineering, University of Massachusetts/Amherst. He specializes in the areas of discrete event and hybrid systems, stochastic optimization, and computer simulation, with applications to computer and sensor networks, manufacturing systems, and transportation systems. He has published over 250 refereed papers in these areas, and three books. He has guest-edited several technical journal issues and serves on several journal Editorial Boards. Dr. Cassandras is currently Editor-in-Chief of the IEEE Transactions on Automatic Control and has served as Editor for Technical Notes and Correspondence and Associate Editor. He is a member of the IEEE CSS Board of Governors, chaired the CSS Technical Committee on Control Theory, and served as Chair of several conferences. He has been a plenary speaker at various international conferences, including the American Control Conference in 2001 and the IEEE Conference on Decision and Control in 2002. He is the recipient of several awards, including the Distinguished Member Award of the IEEE Control Systems Society (2006), the 1999 Harold Chestnut Prize (IFAC Best Control Engineering Textbook) for Discrete Event Systems: Modeling and Performance Analysis, and a 1991 Lilly Fellowship. He is a member of Phi Beta Kappa and Tau Beta Pi. He is also a Fellow of the IEEE.



Alexandre Proutière

### Biography

Alexandre Proutiere is a senior researcher in the Systems and Networking group at Microsft Research, Cambridge (UK). His research interests are in the design and the performance evaluation of computer networks, with a specific interest in resource allocation and control in wireless systems. Before joining MSR in june 2007, he was with France Telecom R&D and Ecole Normale Superieure (Paris), working on developing a traffic theory for the Internet. He received his PhD in Applied Mathematics from Ecole Polytechnique (Palaiseau, France) in 2003, graduated in Applied Mathematics from Ecole Normale Superieure (Paris) and qualified as an engineer at Ecole Nationale Superieure des Telecommunications (Paris). He is with Thomas Bonald the recipient of the Best Paper Award of ACM Sigmetrics / Performance in 2004. Alexandre was the co-chair (with Sem Borst) of the first and second workshops on resource allocation in wireless networks RAWNET'05. RAWNET'06.



Kishor Trivedi



Tania Jimenez Workshops Chair

Kishor S. Trivedi holds the Hudson Chair in the Department of Electrical and Computer Engineering at Duke University, Durham, NC. He is a Fellow of the Institute of Electrical and Electronics Engineers. He spent this summer at the WebSphere Technical Institute and the Center of Advanced Studies as a Visiting Researcher. He has been working on High Availability and Software Reiuvenation.

## Biography

Tania Jiménez received her Ph.D. from University of Nice Sophia-Antipolis, France in 2000. Her research interests include simulation as well as optimization and control of telecommunication networks. She is at present a research engineer at Avignon University, in the Informatics Lab.

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# Message from the NSTools Workshop Chairs

In recent years, tremendous advances have taken place in the field of computer networking; these have been driven by the novel applications that were introduced to, and quickly adopted by, a very large number of people in the world: pervasive and peer-to-peer communications, large-scale wireless sensor networks, and enhanced versions of existing services, such as Voice over IP and Digital Video Broadcasting are some of the fields that have driven this extraordinary evolution.

The price that has been paid in the name of acceptable performance and usability is that of the increased complexity of devices, protocols, and applications: new features have brought in new layers and new protocols while cross-layer optimizations have slowly but surely led numerous layers to be merged together, hence making the traditional simplistic layered view of networks mostly obsolete. It is in this context that interest in the analysis of cross-layer interactions and non-steady state dynamics has soared, leading a lot of the research community to abandon traditional analytical models and to focus on the use of new evaluation tools, more faithful to the "real world": experimentation testbeds, but also, simulation tools, and, the coupling between the two are becoming more important everyday. It is thus our hope that the presentations in this workshop will help foster and develop both within academia and industry the use of these new analytical tools as a means of designing and evaluating complex network protocols.

For this first edition of the International Workshop on Network Simulation Tools (NSTools'07), we received 40 full-paper submissions, the authors' affiliations covering all five continents. Selecting only 10 papers was a long and painful process but we believe that these papers cover a large panel of the typical problems encountered during the use of simulation tools. To encourage discussion among the researchers working in each specific area and the audience, we chose to devote each three- or four-paper session to one of the three topics: the evaluation of simulation accuracy, domain-specific modelisation choices, and the development of ad hoc tools.

First of all, we would like to acknowledge all the members of the Technical Program Committee for their effort in completing a large number of reviews in such a short time and thank them for contributing the quality of the submitted papers by providing detailed and constructive comments in their reviews. We would next like to thank Prof. Rajive Bagrodia, who accepted to open the workshop by presenting his recent work "WHYNET: An Extensible Framework for InSitu Evaluation of Heterogeneous Mobile Wireless Systems". Many thanks to Tania Jimenez and Sara Alouf for their prompt advice and help at each step of the organization of this workshop. Finally, we thank the Valuetools steering committee and our sponsors, who made this workshop possible.



Mathieu Lacage NSTools Workshop

Mathieu Lacage works at the INRIA Sophia-Antipolis as a software engineer within the Planete Team. His main focus is the development of Network Simulation tools and, more generally, the development of tools to facilitate the design, prototyping, testing and validation of new network protocols and architecture.



Claudio Cicconetti NSTools Workshop Co-Chair

## Biography

Claudio Cicconetti is working as a researcher of the Department of Information Engineering of the University of Pisa, Italy, where he recently received his PhD. His main research field concerns Quality of Service at the MAC layer in centralized and distributed wireless networks.

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# Message from the SMCTools Workshop Programme Chairs

Markov chains gained much attention during the last decades as a modeling tool for quantitative analysis of systems from various application areas like computer communications, manufacturing, and biology. However, Markov chain analysis suffers from the so called state space explosion problem and therefore is only usable if advanced efficient solution methods and the corresponding implementations of algorithms are available. The goal of SMCTools is the presentation of novel results and experiences with advanced structured methods to analyze large Markov models. Special emphasis is given to the presentation of results that may help to design and realize software tools for the analysis of Markov models. This year's program contains 12 papers selected after a reviewing process from the papers submitted to the workshop. These papers are accompanied by an invited paper by Jane Hillston from the University of Edinburgh which considers a very important and fairly new application area for Markov models, namely the analysis of biochemical signaling pathways.

The remaining papers can be classified into five thematic sessions. The first session with two papers considers different aspects of building tools for Markov chain analysis. The second session with four papers is devoted to the analysis of Markov decision processes which are becoming more and more important in various application areas. The following session with one paper is on phase type distributions, an important model to describe relatively complex processes with Markov chains. Applications of structured Markov models are the topic of the next session. All papers in this session can be very roughly classified into the area of networks, although the specific topics differ significantly. The last session includes two papers on stochastic automata networks, a model which allows a very compact description of complex interacting processes. Altogether we believe that we have a very interesting program for the workshop that covers different and important aspects arising in contemporary research on structured Markov chains. We are grateful to all authors who submitted their work to SMCTools and the members of the PC who provided useful and detailed reviews in an extremely short time. Furthermore, we thank Tania Jimenez and the other ValueTools organizers who did a great job in answering questions and providing all the necessary information to compile the workshop program.

Finally, we would like thank everybody who is going to attend SMCTools and we hope and believe that we will have an enjoyable and interesting time in Nantes.

Peter Buchholz Tugrul Dayar



Tugrul Dayar SMCTools Workshop Programme Chair



Peter Buchholz SMCTools Workshop Programme Chair

Tugrul Dayar received his B.S. degree in computer engineering from Middle East Technical University, Ankara, Turkey, in 1989, and the M.S. and Ph.D. degrees in computer science from North Carolina State University, Raleigh, NC, in 1991 and 1994, respectively. Since 1995, he has been with the Department of Computer Engineering at Bilkent University, Ankara, Turkey. His research interests are in the areas of performance modeling and analysis, numerical linear algebra for stochastic matrices, scientific computing, and computer networks. He is a member of Upsilon Pi Epsilon, IEEE Computer Society, ACM Special Interest Group on Measurement and Evaluation, SIAM Activity Group on Linear Algebra, and AMS. His research is currently supported by the Turkish Academy of Sciences grant TÜBA-GEBIP.

### Biography

Peter Buchholz holds a Diploma degree in computer science (Dipl. -Inform., 1987), a Doctoral degree (Dr.rer.nat., 1991) and a Habilitation degree (1996), all from the University of Dortmund, where he is currently a professor for modeling and simulation. Previously, he has been an associative professor for modeling and simulation at Dresden University of Technology. His research interests include techniques for performance and functional analysis of discrete event dynamic systems, especially he worked on the development of numerical analysis techniques for large Markov chains. Furthermore, he developed software tools for the qualitative and quantitative analysis of complex systems and applied the analysis techniques and tools to applications from various areas including communication systems and logistic networks. In the mentioned areas, he has published more than 70 papers in refereed journal or conference proceedings and has served on various program committees of international conferences.

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	Dutch Center for Mathematics and Computer Science (CWI)	Netherlands
Pavan Nuggehalli	Indian Institute of Science	India
Lacra Pavel	University of Toronto	Canada
Nahum Shimkin	The Technion	Israel
Sheng Zhong	University of New York at Buffalo	USA
		Тор

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# **Keynote Speakers**

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**NSTools Workshop Keynote Speaker** 

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## ValueTools 2007 Keynote Speaker



Bruce Haiek Department of Electrical and Computer Engineering, University of Illinois Urbana-Champaign, USA

## Abstract

Equilibrium in Allocation Games, and What it Takes to Get There

Game theory has recently been proposed for modeling and solving various allocation problems arising in communication networks and other distributed systems. Relevant issues are (1) the notion of equilibrium or solution used (such as Nash equilibrium or Bayes-Nash equilbrium), (2) assumptions and/or requirements regarding information exchange, (3) computational complexity of implementation, and (4) the social benefit (efficiency) of the resulting allocation, and how the benefit is allocated among the participants. This talk will focus primarily on the information needs, and in particular, how the information requirements tend to increase with the generality of user valuation functions. (Based in part on recent work with Sichao Yang.)

## Biography

Bruce Hajek is a Professor of Electrical and Computer Engineering and Research Professor in the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign, where he has been on the faculty since 1979. He received a BS in Mathematics and MS in Electrical Engineering from the University of Illinois and the Ph. D. in Electrical Engineering from the University of California at Berkeley. Prof. Hajek's research interests include communication networks, wireless communications, information theory, stochastic analysis, and optimization. He served as Editor-in-Chief for the IEEE Transactions on Information Theory, and as President of the IEEE Information Theory Society. He received the Institute of Electrical and Electronics Engineers (IEEE) Kobayashi Award for Computer Communication and is a member of the US National Academy of Engineering. Bruce Hajek's homepage.

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# ValueTools 2007 Invited Plenary Speakers

Jean-Yves Le Boudec Ecole Polytechnique federale de Lausanne (EPFL), Switzerland



A Generic Mean Field Convergence Result for Systems of Interacting Objects

We consider a model for interacting objects, where the evolution of each object is given by a finite state Markov chain, whose transition matrix depends on the present and the past of the distribution of states of all objects. This is a general model of wide applicability; we mention as examples: TCP connections, HTTP flows, robot swarms, reputation systems. We show that when the number of objects is large, the occupancy measure of the system converges to a deterministic dynamical system (the ``mean field") with dimension the number of states of an individual object. We also prove a fast simulation result, which allows to simulate the evolution of a few particular objects imbedded in a large system. We illustrate how this can be used to model the determination of

Jean-Yves Le Boudec is full professor at EPFL and fellow of the IEEE. He graduated from Ecole Normale Superieure de Saint-Cloud, Paris, where he obtained the Agregation in Mathematics in 1980 (rank 4) and received his doctorate in 1984 from the University of Rennes, France. From 1984 to 1987 he was with INSA/IRISA, Rennes. In 1987 he joined Bell Northern Research, Ottawa, Canada, as a member of scientific staff in the Network and Product Traffic Design Department. In 1988, he joined the IBM Zurich Research Laboratory where he was manager of the Customer Premises Network Department. In 1994 he joined EPFL as associate professor.

His interests are in the performance and architecture of communication systems. In 1984, he developed analytical models of multiprocessor, multiple bus computers. In 1990 he invented the concept called "MAC emulation" which later became the ATM forum LAN emulation project, and developed the first ATM control point based on OSPF. He also launched public domain software for the interworking of ATM and TCP/IP under Linux. He proposed in 1998 the first solution to the failure propagation that arises from common infrastructures in the Internet. He contributed to network calculus, a recent set of developments that forms a foundation to many traffic control concepts in the internet, and co-authored a book on this topic. He earned the Infocom 2005 Best Paper award with Milan Vojnovic of Microsoft Research for elucidating the perfect simulation and stationarity of mobility models.

He is or has been on the program committee or editorial board of many conferences and journals, including Sigcomm, Sigmetrics, Infocom, Performance Evaluation and ACM/IEEE Transactions on Networking.

Jean-Yves Le Boudec's homepage.

# Laurent Massoulie Thomson Research, Paris,

## Abstract

# Epidemic Dissemination and Efficient Broadcasting in Peer-to-Peer Systems

In this talk we will discuss several epidemic dissemination strategies for broadcasting information in real time to members of a peer-to-peer system. In the context of access bandwidth constraints, a delay-optimal scheme that achieves a streaming rate of (1-1/e) times the optimal rate will be described. For access as well as network bandwidth constraints, rate optimal schemes will be described. A byproduct of the latter optimality result is a novel, analytic proof of a theorem of Jack Edmonds (1973) characterizing the optimal broadcast rate in an arbitrary network.

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# GameComm Workshop Keynote Speaker



Thomas L. Vincent

Abstract

The evolutionary game has to do with the survival of a given strategy within a population of individuals using potentially many different strategies. It is not unlike a mathematical game in the sense that it has players (individual organisms), strategies (heritable phenotypes), strategy sets (strategies available to a particular organism), and payoffs (individual fitness). An organism's strategy is passed on from generation to generation. In so doing, the organism's fitness, as a function of all strategies used in the population, determines how its strategy frequency changes within the population. The solution to the evolutionary game, as formulated by Maynard Smith, is a strategy that is resistant to invasion by alternative strategies and is called an evolutionarily stable strategy (ESS). The G-function method for finding an ESS is presented. The ESS solution for several games along with group optimal and Nash solutions are presented in order to illustrate the ESS concept and how it differs from traditional game solutions. We begin with familiar matrix games and show how they can be put into an evolutionary game setting. Two communication network games, the forwarder's dilemma game and the multiple access game, are formulated as evolutionary games to demonstrate the approach and solution methods. We then generalize the forwarder's dilemma game in terms of a cost-benefit game and show how cooperation can evolve in such a game. This will involve many interesting features of the adaptive landscape associated with evolutionary games. These include convergent stable maximums and minimums, unstable maximums and minimums, speciation, and ESS coalitions of more than one strategy. We conclude with a brief look at additional applications ranging from modeling cancer to the evolution of coexistence in flour beetles.

Contact

The University of Arizona Aerospace and Mechanical Engineering Tucson AZ 85721-0119, USA

## Inter-Perf Workshop Keynote Speakers



Sonja Buchegger Deutsche Telekom Laboratories, Berlin, Germany



### Fair Division and Collective Welfare in Self-Organized Networks

Networks that rely on little or no infrastructure, such as mobile ad-hoc, peer-to-peer, wireless mesh or vehicular networks, have to cooperate to communicate and share ressources and workloads in a distributed way. Ideally, this division of benefits and chores is fair - for a definition of fairness appropriate for a given scenario - for individual nodes while yielding a high performance for the overall network. To improve network design in terms of both individual and collective performance, we first need means for evaluation. To that end, we can take tools already available in other disciplines. For example, it turns out that in self-organized networks, the performance a node perceives often depends on its position within the network topology. Social network analysis provides graph-theoretical metrics that allow us to quantify the position of an individual node as well as the distribution in the whole network. Economics gives us metrics and methods for equity. Combining such metrics, we can understand better how choices of mechanisms and topologies impact the total performance as well as its distribution over the network nodes.

## Biography

Sonja Buchegger is a senior research scientist at the Deutsche Telekom Laboratories, Berlin. In 2005 and 2006, she was a post-doctoral scholar at the School of Information, University of California at Berkeley. She received her Ph.D. in Communication Systems from EPFL, Switzerland, in 2004, a graduate degree in Computer Science in 1999, and undergraduate degrees in Computer Science in 1996 and in Business Administration in 1995 from the University of Klagenfurt, Austria. In 2003 and 2004 she was a research and teaching assistant at EPFL and from 1999 to 2003 she worked at the IBM Zurich Research Laboratory in the Network Technologies Group. Her current research interests are in economics and security of self-organized networks.



Devavrat Shah MIT



## Network gossip algorithms

Algorithms are key operational building block of networks such as the Internet, a peer-to-peer network or a sensor network. A network demands a lot out of these algorithms: they need to utilize network resources efficiently while being simple-to-implement and distributed.

In this talk, we will describe gossip or randomized message-passing based frame-work for designing implementable high-performance network algorithms. In the first part of the talk, a distributed counting algorithm built upon property of exponential distribution is described. The running time of the algorithm is related spectral property of the underlying netowrk graph in a natural manner. In the second part of the talk, we describe the use of the counting algorithm as a sub-routine for a class of network problems including scheduling and resource allocation.

## Biography

Devavrat Shah is currently an assistant professor with the department of EECS, MIT and a member of Laboratory for Information and Decision Systems (LIDS) as well as Operations Research Center (ORC). His research interests are in the network algorithms & stochastic networks, network information theory and message-passing algorithms.

He received his BTech degree in Computer Science & Engg. from IIT-Bombay in 1999 with the honor of the President of India Gold Medal. He received his Ph.D. from the Computer Science at Stanford University in 2004. He was a post-doc in the Statistics department at Stanford in 2004-05. He also spent time at MSRI, Berkeley while he was a post-doc.

He was co-awarded the IEE INFOCOM best paper award in 2004 and the ACM SIGMETRIC/Performance best paper award in 2006. He received the 2005 George B. Dantzig best disseration award from INFORMS. He received NSF CAREER award in 2006.

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## **NSTools Workshop Keynote Speaker**



Prof. Rajive Bagrodia

Abstract

The design and implementation of wireless systems has been impeded by the lack of an evaluation framework that can provide an accurate understanding of middleware and application performance in the context of their interactions with system hardware and software, network architecture and configuration and wireless channel effects. In this talk we present a novel evaluation paradigm wherein the applications, middleware or subnetworks can be evaluated in-situ, in other words, as operational software that interfaces with the operating system and other applications, thus offering a fidelity equivalent to physical deployment. The physical environment in which such systems operate is modeled using high-fidelity simulations. This approach combines the fidelity of physical test beds with the benefits of scalability, repeatability of input parameters, and comprehensive parameter space evaluation - the known limitations of a physical test-bed. The framework design is extensible in that it allows configuring the desired components of a system with different modalities to suit a particular evaluation criterion. The implementation also addresses the key challenges in the interaction of the framework sub-components: seamless interfaces, time synchronization and preserving causality constraints. The benefits and applicability of the framework to diverse wireless contexts is demonstrated by means of case studies in diverse wireless networks. In one case study, we show that a design that apparently exhibits a 400% improvement in network metrics using traditional analysis methodology, may be actually degrading the application metric by 50%

Joint work with Maneesh Varshney. Work Funded by National Science Foundation and US Army MURI Award.

Contact

Mobile Systems Lab UCLA Computer Science Department Los Angeles, CA, USA

http://pcl.cs.ucla.edu/~rajive/

Biography

Rajive Bagrodia is a Professor of Computer Science at UCLA and a founder CEO of Scalable Network Technologies. He obtained a Bachelor of Technology in Electrical Engineering from the Indian Institute of Technology, Bombay and his Ph.D. in Computer Science from the University of Texas at Austin. Professor Bagrodia's research interests include network simulation and analysis, parallel simulation, wireless networks, and nomadic computing. He has published over 150 research papers in refereed journals and international conferences on the preceding topics. The research has been funded by a variety of government and industrial sponsors including the National Science Foundation, Office of Naval Research, DARPA, Rome Laboratory, and Rockwell International. He served as the Program Chair and General Chair respectively for the 1993 and 1994 Workshop on Parallel and Distributed Simulation, and has been a member of the Technical Program Committee of numerous conferences including Infocom, Mobicom, WSC, and PADS. He is an associate editor of the ACM Transactions on Modeling and Computer Systems (TOMACS). He was selected as a Presidential Young Investigator by the National Science Foundation and has won multiple teaching awards including the TRW Outstanding Young Teacher award. He has also won a number of Best Paper awards including the PADS 2001 and 2004 workshops.

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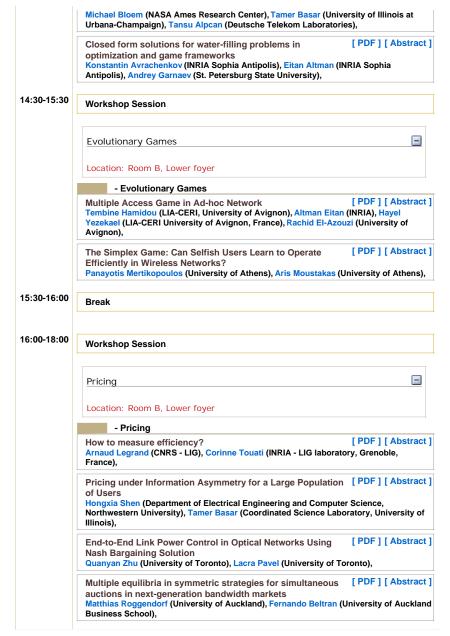
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# Monday, 22nd

Time	Event
09:00-09:30	Welcome Speech
	,
09:30-10:30	Keynote Speech
	Evolutionary Game Theory by Prof. Thomas L. Vincent
	(The University of Arizona Aerospace and Mechanical Engineering Tucson, AZ, USA)
	Location: Room B, Lower foyer
10:30-11:00	Coffee Break
11:00-12:30	Workshop Session
	_
	Information Theory and Power Control
	Location: Room B, Lower foyer
	- Information Theory and Power Control
	Power allocation game for fading MIMO multiple access [PDF] [Abstract] channels with antenna correlation Samson Lasaulce (CNRS), Alberto Suarez (Eurecom), Merouane Debbah (Supelec), Laura Cottatellucci (Eurecom),
	Distributed Subchannel Assignment in a Multiuser MIMO [PDF] [Abstract] Relay Tiina Heikkinen (University of Helsinki), Ari Hottinen (Nokia Research Center),
	Information Theoretic Aspects of Fairness Criteria in Network [PDF] [Abstract] Resource Allocation Problems Masato Uchida (Kyushu Institute of Technology, Network Design Research Center),
12:30-13:30	Lunch
	Lutton
13:30-14:30	Workshop Session
	Information Theory and Power Control (continued)
	Location: Room B, Lower foyer
	- Information Theory and Power Control (continued)
	A Stackelberg Game for Power Control and Channel [PDF] [Abstract] Allocation in Cognitive Radio Networks



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## Monday, 22nd

Time	Event		
09:00-09:30	Welcome Speech		
09:30-10:30	Keynote Speech		
	WHYNET:		
	An Extensible Framework for InSitu Evaluation of Heterogeneous Mobile Wireless Systems		
	by Prof. Rajive Bagrodia Location: Room C, Lower foyer		
	Eccation. Noom C, Lower Toyer		
10:30-11:00	Coffee Break		
11:00-12:30	Workshop Session		
	Simulation Accuracy		
	Simulation Accuracy		
	Location: Room C, Lower foyer		
	- Simulation Accuracy		
	Speed and Accuracy of Network Simulation in the SimGrid [PDF] [Abstract] Framework Henri Casanova (University of Hawaii at Manoa), Kayo Fujiwara (University of Hawaii at Manoa),		
	Evaluating the goodness of MANETs performance results [PDF] [Abstract] obtained with the ns-2 simulator Pietro Manzoni (Universidad Politecnica de Valencia), Jorge Hortelano (Universidad Politecnica de Valencia), Marga Nácher (Universidad Politecnica de Valencia), Juan-Carlos Cano (Universidad Politecnica de Valencia), Carlos Calafate (Universidad		
	Politecnica de Valencia),		
	A Discrete-event Simulation Tool for the Analysis of [PDF] [Abstract] Simultaneous Events Patrick Peschlow (University of Bonn), Peter Martini (University of Bonn),		
12:30-13:30	Lunch		
13:30-15:30	Workshop Session		
	Simulation Models		
	Location: Room C, Lower foyer		
	- Simulation Models		
	· ·		

[ PDF ] [ Abstract ] NSOSS – The Non-Synchronized Optical Switch Simulator Miklos Kozlovszky (BUTE - Budapest University of Technology and Economics), Tibor Berceli (BUTE - Budapest University of Technology and Economics), Viktor Kozlovszky (Budapest Tech), [ PDF ] [ Abstract ] ns2-MIRACLE: a Modular Framework for Multi-Technology and Cross-Layer Support in Network Simulator 2 Marco Miozzo (Consorzio Ferrara Ricerche), Nicola Baldo (Department of Information Engineering, University of Padova), Federico Maguolo (Department of Information Engineering, University of Padova), Michele Rossi (Department of Information Engineering, University of Padova), Michele Zorzi (Department of Information Engineering, University of Padova), [ PDF ] [ Abstract ] Simulation of Peer-to-peer streaming over large-scale networks using OPSS Francesca Lo Piccolo (Università di Roma Tor Vergata), Lorenzo Bracciale (Università di Roma Tor Vergata), Dario Luzzi (Università di Roma Tor Vergata), Stefano Salsano (Università di Roma Tor Vergata), [ PDF ] [ Abstract ] Modeling the Underwater Acoustic Channel in ns2 Albert Harris III (University of Illinois at Urbana-Champaign), Michele Zorzi (University of Padova), 15:30-16:00 Coffee Break 16:00-17:30 Workshop Session = Simulation Tools Location: Room C, Lower foyer - Simulation Tools Enabling cross layer design: adding the MadWifi extensions [PDF] [Abstract] to Nsclick Nico Letor (Universiteit Antwerpen), Chris Blondia (Universiteit Antwerpen), Peter de Cleyn (Universiteit Antwerpen), [ PDF ] [ Abstract ] User-level Performance Evaluation of VoIP Using ns-2 Claudio Cicconetti (University of Pisa), Andrea Bacioccola (University of Pisa), Giovanni Stea (University of Pisa), [ PDF ] [ Abstract ] SYNTONY: Network Protocol Simulation based on Standard-conform UML 2 Models Isabel Dietrich (University of Erlangen), Volker Schmitt (University of Erlangen), Falko Dressler (University of Erlangen), Reinhard German (University of Erlangen), Top

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# Tuesday, 23rd

Time

08:15-08:50

08:50-09:00	Opening, Best Paper and Best Student Paper awards			
09:00-10:00	Keynote Speech			
	Equilibrium in Allocation Games, and What it Takes to Get There by Bruce Hajek (UIUC, USA) Chair: Peter Glynn (Stanford University, USA) Location: Lecture room BC, Lower foyer			
10:00-10:30	Coffee Break			
10:30-12:30 Parallel Sessions 1 and 2				
	Optimization and Games I	nents 🖃		
	Chair: Corinne Touati (INRIA, France) Location: Lecture room BC, Lower foyer  Chair: Krzysztof Pawlikow (University of Canterbury New-Zealand) Location: Lecture room E, Lower	,		
	Chair: Corinne Touati (INRIA, France) - Optimization and Games I			
		Abstract ]		
	Stackelberg Approach for Pricing Differentiated Services [PDF] [Abstract] Bruno Tuffin (IRISA/INRIA), Eitan Altman (INRIA), Richard Marquez (Cinvestav-IPN, Secci\&Isquoon de Mecatr\&Isquoonica), Rachid El-Azouzi (Universite d&IsquoAvignon), David Ros (GET/ENST Bretagne),			
	Optimal Cluster-head Deployment in Wireless Sensor [PDF] [Abstract] Networks with Redundant Link Requirements Xu Ning (Boston University), Christos Cassandras (Boston University),			
	Cooperative and Non-cooperative control for Slotted Aloha [PDF] [Abstract] with random power level selections algorithms Rachid El-Azouzi (University of Avignon), Sabir Essaïd (Université Mohammed V, Rabat-Agdal), Tania Jimenez (Université d'Avignon, LIA), Bouyakhf El Houssine (Université Mohammed V, Rabat), Souad Benarfa (Université Mohammed V, Rabat),			
	Chair: Krzysztof Pawlikowski (University of Canterbury, New-Zea Traffic Models and Measurements	aland) -		
	Enhanced Skype Traffic Identification  Marcell Perényi (Budapest University of Technology and Economics, dept. of telecommunications and media informatics), Sándor Molnár (Budapest Unive Technology and Economics, dept. of telecommunications and media informat	rsity of		

Quantifying ILP by means of Graph Theory [ PDF ] [ Abst Rafael Rico (Universidad de Alcala), Virginia Escuder (Universidad de Alcala), Raul [ PDF ] [ Abstract ] Duran (Universidad de Alcala). Estimating Markov-Modulated Compound Poisson Processes [ PDF ] [ Abstract ] Hiroyuki Okamura (Graduate School of Engineering, Hiroshima University), Yuya Kamahara (Graduate School of Engineering, Hiroshima University), Tadashi Dohi (Graduate School of Engineering, Hiroshima University), [ PDF ] [ Abstract ] An Overview of Long-range Dependent Network Traffic Engineering and Analysis: Characteristics, Simulation, Modelling and Control Karim Rezaul (NEWI, University of wales), Vic Grout (NEWI, University of Wales), 12:30-14:00 Lunch at restaurant "Le Lieu Unique" 14:00-16:30 Session 3 Petri and Automata networks Chair: Simonetta Balsamo (University Foscari di Venezia, Italy) Location: Lecture room BC, Lower foyer Chair: Simonetta Balsamo (University Foscari di Venezia, Italy) - Petri and Automata networks A Toolkit for Performability Evaluation Based on Stochastic [PDF] [Abstract] **UML State Machines** Jan Trowitzsch (Technische Universität Berlin), Armin Zimmermann (Technische Universität Berlin), Dan Jerzynek (Technische Universität Berlin), [ PDF ] [ Abstract ] Modeling and Evaluation of Supply Chains with GSPN Components Gabriel Alves (Universidade Federal de Pernambuco (UFPE)), Ricardo Lima (Universidade de Pernambuco (UPE)), Paulo Maciel (Universidade Federal de Pernambuco (UFPE)), [ PDF ] [ Abstract ] Product form for Stochastic Automata Networks Jean-Michel Fourneau (Laboratoire Informatique de Grenoble and PRISM, University of Versailles), Brigitte Plateau (INRIA Project MESCAL, LIG, CNRS UMR 5217), William Stewart (North Carolina State University), Representing LCFSPR BCMP service center with Coxian [ PDF 1 [ Abstract 1 service time by GSPN Simonetta Balsamo (Università Ca' Foscari di Venezia), Andrea Marin (Universita Ca' Foscari di Venezia), [ PDF ] [ Abstract ] A Binomial Measure Method for Traffic Modeling Lingbo Pei (PLA University OF Science and Technology), Ming Chen (PLA University OF Science and Technology), Jun Zhou (PLA University OF Science and Technology), 16:30-17:00 Coffee Break 17:00-18:30 Session 4 = Optimization and Games II Chair: Christos Cassandras (Boston University, USA) Location: Lecture room BC, Lower foyer Chair: Christos Cassandras (Boston University, USA) - Optimization and [PDF][Abstract] Utility Maximization for Resolving Throughput/Reliability Trade-offs in an Unreliable Network with Multipath Routing Vladimir Marbukh (NIST), [PDF][Abstract] **Asymmetric Delay in Evolutionary Games** Tembine Hamidou (LIA-CERI, University of Avignon), Altman Eitan (INRIA), Rachid El-Azouzi (University of Avignon), SEPCOM: Customizable Zero Copy Model [ PDF ] [ Abstract ] Kai Chen (State Key Laboratory of Information Security, Graduate University of the Chinese Academy of Sciences), Purui Su (State Key Laboratory of Information Security, Institute of Software, Chinese Academy of Sciences), Yingjun Zhang (State Key Laboratory of Information Security, Graduate University of the Chinese Academy of Sciences), Dengguo Feng (State Key Laboratory of Information Security, Institute of Software, Chinese Academy of Sciences), 19:30-22:00 Welcome Reception: Wine and Cheese Party at the "Machines de l'Ile de Nantes"

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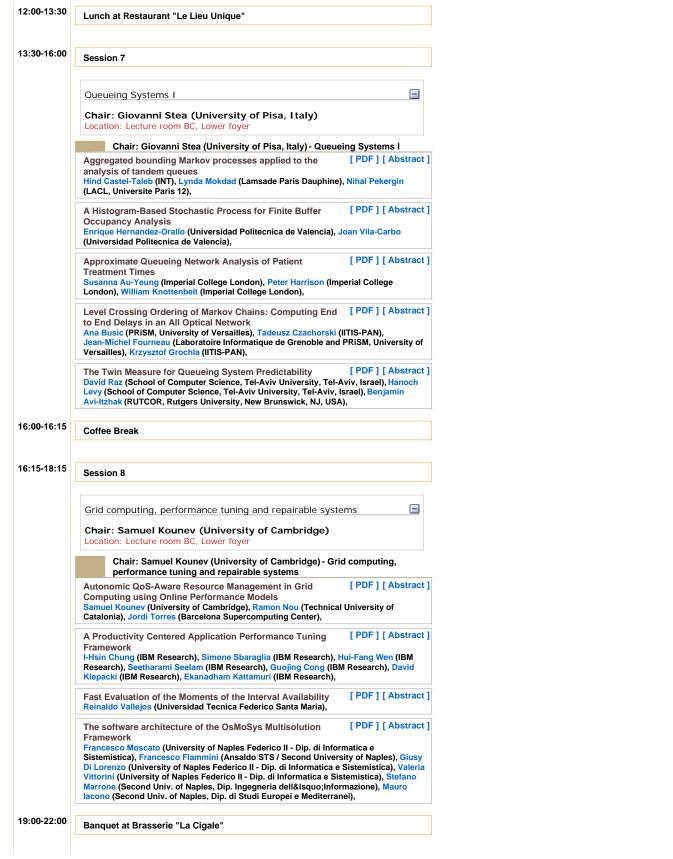
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## Wednesday, 24th

### Time Event 09:00-10:00 **Invited Speaker 1** A Generic Mean Field Convergence Result for Systems of Interacting Objects by Jean-Yves Le Boudec (EPFL, Switzerland) Chair: Alexandre Proutiere (Microsoft Research, UK) Location: Lecture room BC, Lower foyer 10:00-10:30 **Coffee Break** 10:30-12:00 Parallel Sessions 5 and 6 = Statistical physics models for Simulation I communication systems Chair: Armin Zimmermann Chair: Alexandre Proutiere (Technische Universitat Berlin, (Microsoft Research, UK) Germany) Location: Lecture room BC, Lower Location: Lecture room E, Lower foyer foyer Chair: Alexandre Proutiere (Microsoft Research, UK) - Statistical physics models for communication systems [PDF][Abstract] Vector Precoding in Wireless Communications: A Replica Symmetric Analysis Ralf Müller (NTNÚ), Dongning Guo (Northwestern University), Aris Moustakas (National and Kapodistrian University of Athens), [PDF][Abstract] Cross-system resource allocation based on random matrix Samson Lasaulce (CNRS), Alberto Suarez (Eurecom), Raul De Lacerda (Eurecom), Merouane Debbah (Supelec), Chair: Armin Zimmermann (Technische Universitat Berlin, Germany) -[ PDF ] [ Abstract ] Hybrid Simulation of a FIFO Queuing System with Trace-Driven Background Traffic Ben Lauwens (RMA), Bart Scheers (RMA), Antoine Van de Capelle (KULeuven), Jan Potemans (KULeuven), Using Parallel Replications for Sequential Estimation of Multiple Steady State Quantiles Mirko Eickhoff (University of Canterbury, COSC Department), Don McNickle (University of Canterbury, Management Department), Krzysztof Pawlikowski (University of Canterbury, COSC Department), [ PDF ] [ Abstract ] **Detecting the Duration of Initial Transient in Steady State** Simulation of Arbitrary Performance Measures Mirko Eickhoff (University of Canterbury, COSC Department), Don McNickle (University of Canterbury, Management Department), Krzysztof Pawlikowski (University of Canterbury, COSC Department),



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## Thursday, 25th

Time

09:00-10:00

**Invited Speaker 2** 

Epidemic Dissemination and Efficient Broadcasting in Peer-to-Peer Systems

by Laurent Massoulié (Thomson Research Paris, France) Chair: Bruno Tuffin (INRIA, France)

Location: Lecture room BC, Lower foyer

10:00-10:30

**Coffee Break** 

10:30-12:30

Parallel Sessions 9 and 10

Queueing Systems II

Chair: Jean-Michel Fourneau (Laboratoire Informatique de Grenoble and PRISM, University of Versailles, France)

Location: Lecture room BC, Lower foyer

of Performance and Desian Wireless Networks

Chair: Ralf Muller (NTNU, Norway)

Location: Lecture room E, Lower foyer

Chair: Jean-Michel Fourneau (Laboratoire Informatique de Grenoble and PRISM, University of Versailles, France) - Queueing Systems II Stationary Delays for a Two-Class Priority Queue with

Impatient Customers Oualid Jouini (Ecole Centrale Paris), Yves Dallery (Ecole Centrale Paris),

[PDF][Abstract] Kernel density in the use of the strong stability method to evaluate the proximity of G/M/1 and M/M/1 systems

Aïcha Bareche (Laboratory of Modelization and optimization of Systems), Djamil Aïssani (Laboratory of Modelization and optimization of Systems),

Continuous PEPA Queues: Individual behaviour in continuous queueing networks

Finite-buffer bulk service queue under Markovian service

[ PDF ] [ Abstract ]

[ PDF ] [ Abstract ]

Jeremy Bradley (Imperial College London), Ashok Argent-Katwala (Imperial College

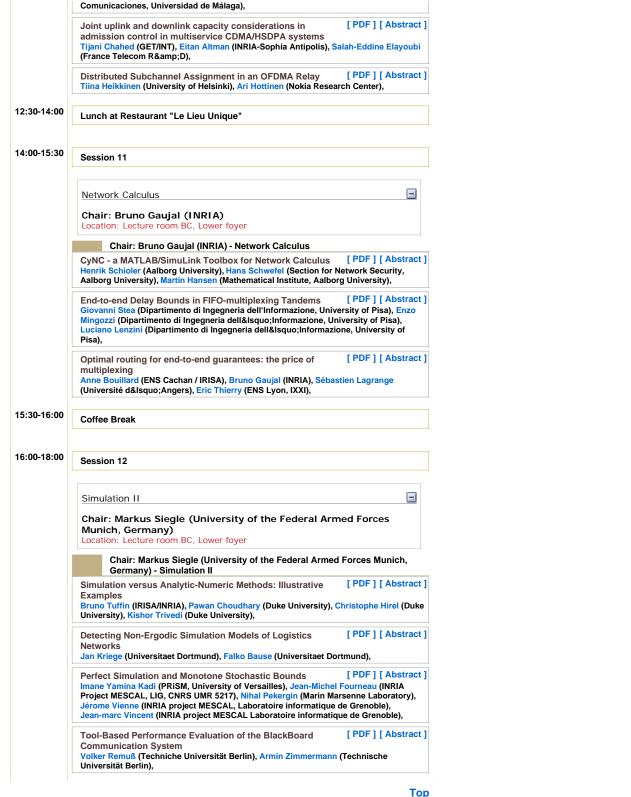
process Abhijit Banik (IRISA, Rennes), Umesh Gupta (Indian Institute of Technology), Mohan Chaudhry (Royal Military College of Canada),

Chair: Ralf Muller (NTNU, Norway) - Performance and Design of Wireless Networks

[ PDF ] [ Abstract ] Cellular network with continuum priority set Jean-Marc Kelif (France Telecom Research and Development), Eitan ALTMAN (INRIA),

[PDF][Abstract] Maximum Delay-Constrained Source Rate over a Wireless Channel

Beatriz Soret (Departamento de Ingeniería de Comunicaciones, Universidad de Málaga), J. Tomás Entrambasaguas (Departamento de Ingeniería de Comunicaciones, Universidad de Málaga), M. Carmen Aguayo-Torres (Departamento de Ingeniería de



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**SMCTools Workshop** Friday, 26th

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Conference Day 3

Conference Day 1 Tuesday, 23rd

Inter-Perf Workshop Friday, 26th

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# Friday, 26th

Time	Event	
09:15-09:30	Welcome Speech and Introduction	
09:30-10:30	Keynote Talk 1	
	Network Gossip Algorithms by Devavrat Shah (Massachusetts Institute of Tech Location: Room B, Lower foyer	nology)
10:30-11:00	Coffee Break	
11:00-12:30	Plenary Session 1	
	Inter-Perf 2007 Workshop	≡
	Plenary Session 1 Location: Room B, Lower foyer	
	Plenary Session 1 - Inter-Perf 2007 Workshop	
	Random multi-access protocols in networks with partial interaction and non-saturated nodes: A mean field approach Alexandre Proutière (Microsoft Research, Cambridge),	[ PDF ] [ Abstract ]
	Dynamic Retransmission Limit Scheme for Routing in Multi-hop Ad hoc Networks Ralph El-Khoury (University of Avignon), Rachid El-Azouzi (University of Avignon)	[ PDF ] [ Abstract ] sity of Avignon),
	Preliminary Results on Social Learning with Partial Observations Ilan Lobel (MIT), Daron Acemoglu (MIT), Munther Dahleh (MIT), Asu	[ PDF ] [ Abstract ]
12:30-14:00	Lunch Hotel-Restaurant Novotel	
14:00-15:00	Plenary Session 2	
	Inter-Perf 2007 Workshop	
	Plenary Session 2 Location: Room B, Lower foyer	
	Plenary Session 2 - Inter-Perf 2007 Workshop	
	Experiences from the SSR Development Thomas Fuhrmann (Universität Karlsruhe),	[ PDF ] [ Abstract ]

Random Walk Based Routing Protocol for Wireless Sensor [PDF] [Abstract]
Networks
Issam Mabrouki (Mitsubishi Electric), Xavier Lagrange (GET/ENST Bretagne), Gwillerm
Froc (Mitsubishi Electric),

Break

15:30-16:30 Keynote Speech 2

Fair Division and Collective Welfare in Self-Organized Networks
by Sonja Buchegger (Deutsche Telekom Laboratories, Berlin)
Location: Room B, Lower foyer

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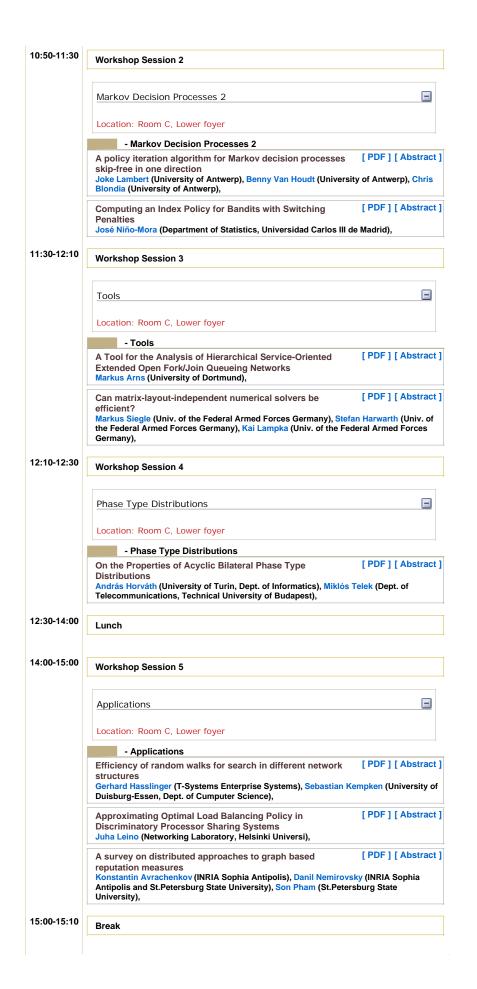
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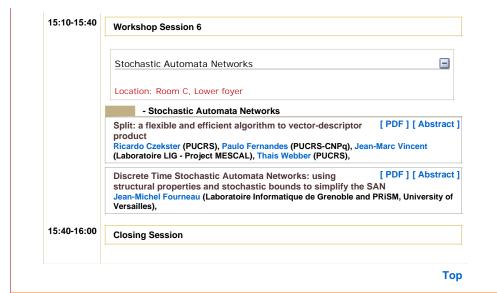




## Friday, 26th

Time	Event
09:00-09:10	Opening
09:10-09:50	Invited Talk
	,
	Invited Talk
	Location: Room C, Lower foyer
	- Invited Talk
	Quantitative analysis of biochemical signalling pathways [PDF] [Abstract]  Jane Hillston (University of Edinburgh),
09:50-10:30	Workshop Session 1
	Markov Decision Processes 1
	Location: Room C, Lower foyer
	- Markov Decision Processes 1
	Constrained Markov games with transition probabilities [PDF] [Abstract] controlled by a single player Eitan Altman (INRIA), Saswati Sarkar (Univ of Pennsylvania), Eilon Solan (Tel-Aviv
	University),
	Characterization and Computation of Restless Bandit [PDF] [Abstract] Marginal Productivity Indices José Niño-Mora (Department of Statistics, Universidad Carlos III de Madrid),
10:30-10:50	Coffee Break





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