**The 12th IEEE International Conference on Computational Science and Engineering (CSE-09)**

## Keynote: *Computational Science and Engineering in Emerging Cyber-Ecosystems*

*Prof. Manish Parashar, Rutgers University, USA*

# About the keynote speaker

Manish Parashar is Professor of Electrical and Computer Engineering at Rutgers University, where he also is director of the NSF Center for Autonomic Computing (CAC), associate director of the Rutgers Center for Information Assurance and director of the Applied Software Systems Laboratory. He received a BE degree in Electronics and Telecommunications from Bombay University, India and MS and Ph.D. degrees in Computer Engineering from Syracuse University. He has received the IBM Faculty Award (2008) Rutgers Board of Trustees Award for Excellence in Research (2004-2005), NSF CAREER Award (1999) and the Enrico Fermi Scholarship from Argonne National Laboratory (1996). His research is in the broad area of applied parallel & distributed computing and computational science, and specifically on solving science and engineering problems on very large systems. For more information please visit http://nsfcac.rutgers.edu/people/parashar/.

## Summary:

Significant strategic investments are quickly realizing a pervasive computational cyber-infrastructure that integrates computers, networks, data archives, instruments, observatories, and embedded sensors and actuators. This in turn has the potential for enabling new paradigms and practices in computational science and engineering – those that symbiotically and opportunistically combine computations, experiments, observations, and real-time information. However the ability of scientists to realize this potential is being severely hampered primarily due to the increased complexity and dynamism of the applications and computing environments. Autonomic computing has the potential to fundamentally address these challenges. In this talk, I will motivate autonomics for computational science and engineering. I will then describe research efforts at TASSL, Rutgers University as part of the NSF Center for Autonomic Computing aimed at enabling autonomic scientific and engineering applications that can address the challenges of (and benefit from) pervasive computational ecosystems.

**The 7th IEEE/IFIP International Conferences on Embedded and Ubiquitous Computing (EUC-09)**

## Keynote: *Cache-Aware Scheduling and Analysis for Multicores*

*Prof. Wang Yi, Uppsala University, Sweden*

# About the keynote speaker

Wang Yi received his Ph.D. in computer science from Chalmers University of Technology, Sweden in 1991. He is a chair professor (Embedded Systems) at Uppsala University, and a professor in computer science at North Eastern University, China. He has been a program chair of TACAS, FORMATS, EMSOFT and HSCC, and a track chair of RTSS. He is or has been an editorial board member of Elsevier Journal of computer architectures, the journal of Computer Science and Technology, and IEEE transactions on computers.

His research interests include modeling and verification of real-time and embedded systems. He initiated (1993) and co-founded the UPPAAL tool (1995) and also the company UP4ALL (2007). He also co-founded the TIMES tool for scheduling and analysis of timed systems. His current interests are in the development of embedded and real-time applications on multi-core processors. He is directing the Swedish strategic research program CoDeR-MP: Computationally Demanding Real-Time Applications on Multi-core Platforms, in collaboration with ABB and SAAB. He is also a principle investigator of UPMARC: Uppsala Programming for Multi-core Architectures Research Center.

## Summary:

The major obstacle to use multicores for real-time applications is that we may not predict and provide any guarantee on real-time properties of embedded software on such platforms; the way of handling the on-chip shared resources such as L2 cache may have a significant impact on the timing predictability. In this talk, we propose to use cache space isolation techniques to avoid cache contention for hard real-time tasks running on multicores with shared caches. We present a scheduling strategy for real-time tasks with both timing and cache space constraints, which allows each task to use a fixed number of cache partitions, and makes sure that at any time a cache partition is occupied by at most one running task. In this way, the cache spaces of tasks are isolated at run-time. As technical contributions, we present solutions for the scheduling analysis problem. For simplicity, the presentation will focus on non-preemptive fixed-priority scheduling. However, our techniques can be easily adapted to deal with other scheduling strategies like EDF. We have developed a sufficient schedulability test for non-preemptive fixed-priority scheduling for multicores with shared L2 cache, encoded as a linear programming problem. To improve the scalability of the test, we then develop our second schedulability test of quadratic complexity, which is an over approximation of the first test. To evaluate the performance and scalability of our techniques, we use randomly generated task sets. Our experiments show that the first test which employs an LP solver can easily handle task sets with thousands of tasks in minutes using a desktop computer. It is also shown that the second test is comparable with the first one in terms of precision, but scales much better due to its low complexity, and is therefore a good candidate for efficient schedulability tests in the design loop for embedded systems or as an on-line test for admission control.

**The 7th IEEE/IFIP International Conferences on Embedded and Ubiquitous Computing (EUC-09)**

## Keynote: *White Space Networking - Is it Wi-Fi on Steroids?*

*Dr. Victor Bahl, Microsoft Research Redmond, USA*

# About the keynote speaker

Victor Bahl is a Principal Researcher and founding Manager of the Networking Research Group in Microsoft Research Redmond. He is responsible for directing research activities that push the state-of-art in the networking of devices and systems. He and his group build proof-of-concept systems, engage with academia, publish papers in prestigious conferences and journals, publish software for the research community, and work with product groups to influence Microsoft's products. His personal research interests span a variety of topics in wireless systems design, mobile networking, and network management. He has built and deployed several seminal and highly cited networked systems with a total of over 7600 citations. His research has been incorporated into Microsoft's core products, industry standards, and numerous non-Microsoft commercial products. He has authored over 85 papers in highly-selective conferences and 114 patent applications, 60 of which have issued; he has delivered close to two dozen keynote & plenary talks; he is the founder and past Chairperson of ACM SIGMOBILE; the founder and past Editor-in-Chief of ACM Mobile Computing and Communications Review, and the founder and steering committee chair of the Mobile Systems Conference; He has served as the General Chair of several IEEE and ACM conferences including SIGCOMM and MobiCom, and is serving on the steering committees of seven IEEE & ACM conferences & workshop; he has served on the board of over half-a-dozen journals; on several NSF and NRC panels, and on over six dozen program committees. Dr. Bahl received Digital's Doctoral Engineering Fellowship Award in 1995 and SIGMOBILE's Distinguished Service Award; in 2001. In 2004, Microsoft nominated him for the innovator of the year award. He became an ACM Fellow; in 2003 and an IEEE Fellow; in 2008. When not working, he loves to read, travel, eat in fine restaurants and spend time drinking with friends and family. More on him at http://research.microsoft.com/~bahl/

## Summary:

We began our journey with the goal of commoditizing pervasive connectivity for the remaining billions. We gravitated towards providing neighborhood connectivity in developing and rural regions. Businesses saw an opportunity and local government began to value blanket city-wide coverage. But success was not inevitable. Deployments failed and critics questioned the promises. Perhaps the technology was not ready for prime time. So we began "fixing" the technology, part of which included revisiting governmental policies around spectrum allocation. The US government listened and in a landmark ruling on Nov. 4, the FCC voted to open the unused low frequency bands for unlicensed use.

In this talk, I will discuss the evolution of our thinking on how to achieve open pervasive internet connectivity. I will highlight promising new directions that are full of interesting challenges. I will discuss solutions that researchers are developing and show their trajectory. My objective is to present what I believe is the new frontier of wireless networking and ubiquitous Internet, at the intersection of cognitive systems, mesh networking, and white spaces. I will challenge the audience into taking on new technical problems and thinking about new business models, which will lead us to success in our original goal of commoditizing pervasive connectivity for the masses, bridging the digital divide, and enabling exciting new applications and services in the process.

**The 2009 IEEE International Conference on Social Computing (SocialCom-09)**

## Keynote: *Network Analysis and Visualization for Understanding Social Computing*

*Prof. Ben Shneiderman, University of Maryland, USA*

# About the keynote speaker

BEN SHNEIDERMAN (http://www.cs.umd.edu/~ben) is a Professor in the Department of Computer Science Founding Director (1983-2000) of the Human-Computer Interaction Laboratory (http://www.cs.umd.edu/hcil/), and Member of the Institute for Advanced Computer Studies at the University of Maryland at College Park. He was elected as a Fellow of the Association for Computing (ACM) in 1997 and a Fellow of the American Association for the Advancement of Science (AAAS) in 2001. He received the ACM SIGCHI Lifetime Achievement Award in 2001. Ben is the author of Software Psychology: Human Factors in Computer and Information Systems (1980) and Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th ed., March 2009) (http://www.awl.com/DTUI/). He pioneered the highlighted textual link in 1983, and it became part of Hyperties, a precursor to the web. His move into information visualization helped spawn the successful company Spotfire (http://www.spotfire.com/) whose success was in pharmaceutical drug discovery and genomic data analysis. He is a technical advisor for the HiveGroup (http://www.hivegroup.com). His early work on medical histories influenced many contemporary systems and his current work extends the search capabilities for modern Electronic History Records. With S Card and J. Mackinlay, he co-authored Readings in Information Visualization: Using Vision to Think (1999). His recent books include Leonardo's Laptop: Human Needs and the New Computing Technologies (MIT Press) which won the IEEE book award in 2004.

## Summary:

Social computing applications include fabulous success stories and widespread failures. Researchers, user interface designers, and community managers are all struggling to understand the dynamics and determinants of success. Network analysis methods and information visualization tools are rapidly improving to enable data gathering, sophisticated analysis, and comprehensible presentations that support predictive theories, business planning, and community decision making. Social computing is shifting from playful discretionary usage to mission critical applications such as community safety, healthcare delivery, and disaster response. A vast international research effort would help ensure success for these and other applications in business, education, and beyond.

**The 2009 IEEE International Conference on Information Privacy, Security, Risk and Trust (PASSAT-09)**

## Keynote: Elections with Practical Privacy and Transparent Integrity

*Dr. David Chaum, Board of Directors of DigiCash Inc., USA*

# About the keynote speaker

Widely recognized as the inventor of electronic cash, he is also known for first proposing cryptographic techniques -- including untraceable communication and credential mechanisms -- that more generally allow individuals to protect their identity and related information. David is also credited with a fundamental role in so-called multi-party computation and has over 50 publications and dozens of patents. With Ph.D in Computer Science from Berkeley, he taught at several universities, established a leading cryptography research group, and founded DigiCash and the International Association for Cryptologic Research.

## Summary:

Scantegrity II, an enhancement for optical scan voting systems, achieves a level of integrity unprecedented in scalable elections. It uses unique confirmation codes that are printed on ballots in invisible ink. Voters mark their ballots just as with conventional fill-in-the-oval, but a special pen makes the ink visible so that voters can note the confirmation codes if they wish.

Verifiability of election integrity is complete: voters can check that their confirmation codes are correctly posted by looking them up online by ballot serial number; voters can check that codes correspond correctly to candidates by keeping a voided ballot; and anyone online can check that the tally is computed correctly from all posted codes by performing a simple computation. Even those running the election, and even if they had unlimited code breaking computational resources, would be detected if they tried to alter the outcome. Resistance to vote buying or coercion and the privacy provided are similar to that of the underlying optical scan system.

Scantegrity II works with scanners located in polling places, as in some countries, or at central locations, as would be practical in most other countries. Vote-by-mail, provisional ballots, and voters with disabilities can be accommodated. It is implemented in Java, is open-source, and includes sample programs to verify the proof that the outcome is correct. The system has been tested in small elections using off-the-shelf printers and scanners. A municipal election is planned for November 2009.

The novel techniques for in-person verification and unconditional transparent integrity will hopefully be applicable even beyond elections.

**The 2009 IEEE International Conference on Information Privacy, Security, Risk and Trust (PASSAT-09)**

## Keynote: *Privacy, Security, Risk and Trust in Service-Oriented Environments*

*Prof. Stephen S. Yau, Arizona State University, USA*

# About the keynote speaker

Stephen S. Yau is the director of Information Assurance Center and a professor of computer science and engineering at Arizona State University (ASU), Tempe, Arizona, USA. He served as the chair of the Department of Computer Science and Engineering at ASU in 1994-2001. Previously, he was on the faculties of Northwestern University, Evanston, Illinois, and University of Florida, Gainesville.

He served as the president of the Computer Society of the Institute of Electrical and Electronics Engineers (IEEE) and American Federation of Information-Processing Societies (AFIPS). He was on the IEEE Board of Directors, and the Board of Directors of Computing Research Association. He served as the editor-in-chief of IEEE COMPUTER magazine, and organized many national and international major conferences, including the 1974 National Computer Conference sponsored by AFIPS, Association of Computing Machinery, IEEE Computer Society, and Society for Computer Simulation, and the 1989 World Computer Congress sponsored by International Federation for Information Processing (IFIP). He founded the Annual International Computer Software and Applications Conference (COMPSAC) sponsored by the IEEE Computer Society, in 1977.

His current research includes service-based systems, trustworthy computing, software engineering, mobile ad hoc networks and ubiquitous computing. He has received many awards and recognition for his accomplishments, including the Tsutomu Kanai Award and Richard E. Merwin Award of the IEEE Computer Society, the IEEE Centennial Awards and Third Millennium Medal, the Outstanding Contributions Award of the Chinese Computer Federation, and the Louis E. Levy Medal of the Franklin Institute. He is a Life Fellow of the IEEE and a Fellow of the American Association for the Advancement of Science.

He received the M.S. and Ph.D. degrees from the University of Illinois, Urbana, and the B.S. degree from National Taiwan University, Taipei, all in electrical engineering.

## Summary:

Service-Oriented Architecture (SOA) has been adopted in many critical information systems in many application domains, such as health care, scientific research, e-business, and homeland security. While SOA has many advantages, such as rapid composition, deployment, and dynamic adaptation of service-based systems, many issues on security, privacy, risk, and trust in service-oriented environments need to be resolved in order to achieve trustworthy information systems.

In this address, the privacy, security, risk, and trust and their relationship in service-oriented environments will be discussed. The challenging issues and the current state of the art of addressing these issues will be presented. Future directions of research in this area will also be discussed.

**The 2009 International Symposium on Trusted Computing and Communications (TrustCom09)**

## Keynote: *Trust Mechanisms and Their Applications in Dynamic and Mobile Computer Systems*

*Prof. Jie Wu, Temple University, USA*

# About the keynote speaker

Jie Wu is chairman and professor in the Department of Computer and Information Sciences, Temple University. He was a program director at US National Science Foundation. His research interests include the areas of wireless networks and mobile computing, routing protocols, fault-tolerant computing, and interconnection networks. He has published more than 450 papers in various journals and conference proceedings. He serves in the editorial board of the IEEE Transactions on Mobile Computing. Dr. Wu was also general co-chair for IEEE MASS'06, IEEE IPDPS '08, and DCOSS'09. He has served as an IEEE Computer Society distinguished visitor and is the chairman of the IEEE Technical Committee on Distributed Processing (TCDP). Dr. Wu is a fellow of the IEEE.

## Summary:

Reputation is the opinion of one entity about another. In an absolute context, it is the trustworthiness of an entity. The talk will start with different ways of building trust between entities based on reputation, which include direct contacts or third-party recommendations. Then different trust mechanisms used in computer systems are discussed and compared. The talk ends with various applications of trust mechanisms in dynamic and mobile computer systems.

**International Workshop on Reconfigurable and Multicore Embedded Systems (WoRMES09)**

## Keynote: *From reconfigurable architectures to self-adaptive autonomic systems*

*Dr. Marco D. Santambrogio, Massachusetts Institute of Technology, USA*

# About the keynote speaker

Marco D. Santambrogio received a Master degree in Computer Science from University of Illinois at Chicago and a Laurea in Computer Engineering from Politecnico di Milano, Italy in 2005. He received his PhD degree in Computer engineering from the Politecnico di Milano, Italy in 2008 and he is now Postdoc Fellow at MIT in 2009. He has been with the Micro Architectures Laboratory at the Politecnico di Milano, where he founded the Dynamic Reconfigurability in Embedded System Design (DRESD) project in 2004. His main research interests are methodologies for dynamic reconfiguration and hardware/software co-design in embedded system.

## Summary:

Systems on a Chip (SoC) can draw various benefits such as adaptability and efficient acceleration of compute-intensive tasks from the inclusion of reconfigurable hardware as a system component. Dynamic reconfiguration capabilities of current reconfigurable devices create an additional dimension in the temporal domain. During the design space exploration phase, overheads associated with reconfiguration and hardware/software interfacing need to be evaluated carefully in order to harvest the full potential of dynamic reconfiguration. In order to overcome the limits deriving by the increasing complexity and the associated workload to maintain such complex infrastructure, one possibility is to adopt self-adaptive and autonomic computing systems. A self-adaptive and autonomic computing system is a system able to configure, heal, optimize and protect itself without the need for human intervention.