Foreword


Since this is the 1st ECBS-EERC conference, a word about its inception seems appropriate at this place. ECBS-EERC was established at the ECBS 2008 conference in Belfast, Northern Ireland, to allow ECBS academics and practitioners in Eastern Europe to assemble, present papers, and produce a conference publication. The main ECBS-EERC goal is to provide professional conference opportunity for Eastern Europeans and still keep the meeting costs attractive.

The theme of the 1st ECBS-EERC, Setting New ECBS Frontiers... was selected to reflect both of its associations. The first association originates from the desire to enable further advanced research in the area of ECBS methods, tools, and applications. The second one comes from the mission to attract more new researchers from the region to join the ECBS community. Our overall aim is to contribute to the IEEE TC on ECBS, and its international annual conference by materializing domains of both of these associations.

We would like to thank all the authors for their interest and contributions to the success of this conference. Our sincere gratitude goes to the team of referees who fitted in with the tight schedule that was required, and who secured high quality of the papers included in the conference proceedings. IEEE Computer Society Publishing Service (CPS) deserves much credit for its professionalism in handling the conference proceedings production process.

Last, but certainly not least, we are delighted to welcome you to the City of Novi Sad. After last two decades of troubled history it is now ready to welcome guests and we hope you enjoy the wider experience of your visit, in addition to fully engaging in the conference itself. We look forward to an exciting, creative, and productive conference.

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Abstract

“System” is one of the most overused words in the English language. No doubt in other languages too. I once worked on a project that included this word twice in its title, with a different meaning in each case. One of the most challenging tasks we humans can undertake is to build systems that do what we intend without messing up anything else. This means that system engineers must have a profound understanding of the problem to be solved, the available technologies, applicable constraints, and implications for the environment into which the new system will be placed. This is a daunting task for which there is no magic process which when followed will assure success. Even modest changes to existing working systems must be undertaken with care. We can at least learn something about how to engineer systems from successes and failures of the past. The system engineer must be expert in a range of technical disciplines, but this is not enough. Engineering systems requires a high degree of artistry, creativity and innovation. These are not qualities to be acquired in a conventional engineering curriculum, but for those with the inherent ability, they can be acquired through experience, anecdote and metaphor.

Biography

Byron Purves is a native of England where he received a Bachelor of Science degree in Physics and Mathematics. In 1969 he went to the US and received a Doctor of Philosophy degree in Physics from Brigham Young University. His degree research was in automatic speech recognition. He joined The Boeing Company in 1973 as an acoustics engineer. Since that time he has worked in commercial aircraft (e.g., 757 preliminary design team), electric utility control systems (e.g. software manager), space (e.g., Robotics and Automation Manager for the Space Station program), and military systems (e.g., Battle Command architect for Future Combat Systems). In recent years he has worked in homeland security disciplines, including nuclear and radiological detection, commercial aviation security, border security and biological threats. Dr. Purves is a Boeing Technical Fellow and past chairman of the IEEE Computer Society Technical Committee on Engineering of Computer Based Systems. He has produced around forty publications. His particular interests include understanding the information needed to represent systems, and the art of developing large complex systems. As a side venture he and his brother have developed a software product (Blues Begone) to help people recover from depression and anxiety. He has been married to Susan for forty years. They have six children and four grandchildren.
Keynote: Autonomous and Autonomic Systems: Paradigm for Engineering Effective Computer-Based Systems

Roy Sterritt
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Abstract

The Autonomous and Autonomic Systems initiative has as its vision the creation of self-directed and self-managing systems to address today’s concerns of complexity and total cost of ownership while meeting tomorrow’s needs for pervasive and ubiquitous computation and communication.

The future of computing and communications is being researched under many areas; including grid computing, utility computing, pervasive computing, ubiquitous computing, invisible computing, world computing, ambient intelligence, ambient networks and so on...

The driving force behind these future paradigms of computer-based systems is the increasing convergence between proliferation of devices, wireless networking, and mobile software.

Weiser first described what has become known as ubiquitous computing as the move away from the “dramatic” machine, where hardware and software’s focus was on being so exciting that we as users would not want to be without it, towards making the machine “invisible”, so embedded in our lives it is used without thinking or recognising it as computing.

Behind these different terms and research areas, lie three key properties: nomadic, embedded and invisible. In effect, leading to, the creation of a single system with (potentially) billions of networked information devices and resulting in a Complexity Quagmire?

As such, the case can be made that all of the next generation paradigms, in one form or another, will require an autonomic–self-managing–infrastructure to be able to provide the successful reality of this envisaged level of pervasiveness, invisibility and mobility.

This talk reports on research and development, with examples from Biometric Identification and Tracking Systems, Autonomic Communications, and Space Exploration Systems, utilizing the biological metaphor of the autonomic nervous system to computing and communications, in which computer-based systems self-regulate by using automatic reactions to defend, optimize and heal.

Biography

Roy Sterritt is a member of Faculty at Computing and Engineering in the University of Ulster. He spent several years in industry with IBM, first at their UK headquarters in Portsmouth, and then at the IBM Hursley Labs in Winchester. Initially he was a Software Developer but then became a Product Development Manager with responsibility for tools to support risk assessment and project management in personal and mobile environments which were used widely in the UK and US. Roy’s academic research career began in 1996 when he was appointed to the first of a series of joint University of Ulster and Nortel research projects investigating parallel, automated and intelligent approaches to the development and testing of fault management telecommunications systems.

Roy’s main focus of research is Systems and Software Engineering of Autonomic (Self-Managing Computer-Based) Systems, essentially a research area developed from a call from industry to deal with the complexity and total cost of ownership of our systems of systems (IBM 2001). To date he has 150+ publications in the field including research collaborations with NASA, IBM TJ Watson Center, BT, SAP, HP and Core Systems as well as many academic partners. He is the founding chair of the IEEE Technical Committee on Autonomous & Autonomic Systems (TCAAS) which spun out of EBCS, through its EASe (Engineering of Autonomic Systems) workshops. In his role as chair of TCAAS he is overseeing the creation of IEEE Letters in AAS, and has been appointed to the many editorial boards including the NASA Journal on Innovations in Systems and Software Engineering, AIAA Journal of Aerospace Computing, Information, and Communication, Journal of Autonomic and Trusted Computing, and Multiagent and Grid Systems - An International Journal.

In 2009, Roy is serving on the IEEE CS Publications board and chairing the Conference Publications Operations Committee (CPOC); and serving on the IEEE CS Technical & Conferences Activities Board (T&C excom) and chairing the Conference Advisory Committee (CAC).
Keynote: Programming the “Cloud-in-a-Can”:
From Paintable Computing to Scale-free Architectures

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Abstract

Could wafer-scale massive parallelism be the next breakthrough in enterprise architectures? On the HW side we posit a mesh of one million RISC cores covering a single 12” wafer, delivering 300 TeraOps of peak performance in a 4 kW power envelope. On the programming side we envision self-configuring distributed code that is topology-agnostic, resilient to variability, and supports scaling far beyond the ecology of a single wafer.

This perennial vision has always been hobbled by equally perennial scaling obstacles: memory architecture, bandwidth to mass storage, long design cycles, test, fault management, SW portability, and growth of a programming community. In search of fresh solutions, this talk visits three chronologically related research efforts: “paintable computing”, “scale-free architectures” and programming with “masterless map-reduce”. Results from “paint” and “scale-free architectures” motivate the concept of computing on dense 3D meshes of millions of unreliable cores. Research on “masterless map-reduce” extends a popular functional programming language (map-reduce) to incorporate fine-grain distributed control as a means of scaling on a regular mesh.

Biography

William Butera is a research scientist at Mitsubishi Electric Research Labs (MERL) where he works at the juncture of silicon scaling, distributed algorithms, and novel usage models. His experience spans component design, macro-architecture, programming models, software tools, and distributed applications. As a research scientist at Intel’s Enterprise Server Group, he focused on hardware models and software methods for robust performance scaling on wafer-scale meshes. Prior to Intel, Bill held positions at MIT as a graduate researcher and staff scientist (at the Media Laboratory and the National Science Foundation Center for Bits and Atoms, respectively). There, he helped launch the Paintable Computing project with work on theory and methods for self-assembling code. He developed algorithms, coded applications, and designed prototype hardware — much of it for DARPA’s “paintable displays” project.