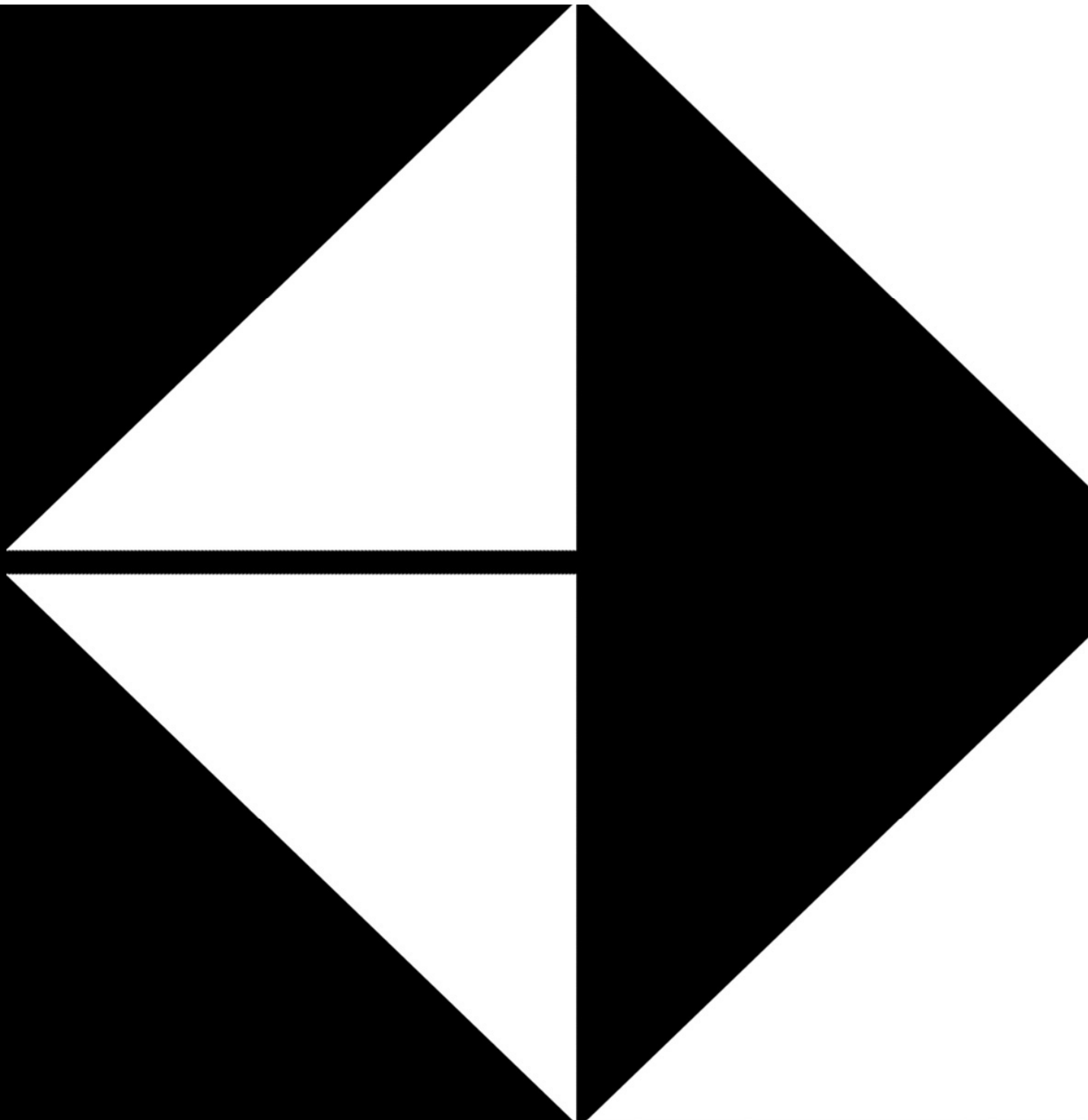




CONSEG 09

Proceedings of the
International Conference on Software Engineering
17-19 December 2009 | Hotel Savera, Chennai, India



Organized by
Computer Society of India, Div II (Software) and Chennai Chapter

Supported by
IEEE Computer Society, Madras Chapter
Software Process Improvement Network (SPIN), Chennai Chapter
Bangalore Software Process Improvement Network (BSPIN)



Foreword

Software Engineering, which formally had its origin in a NATO report of 1968, has become an increasingly important discipline. As software becomes more ubiquitous, and mass production and usage of IT and IT enabled services become the order of the day, it is becoming increasingly critical that we turn software development from an art form (or even witchcraft), which it has been, to a true engineering discipline, capable of producing repeatable, consistent performance in products and services. It is fair to say that effective software engineering will be to the 21st century what basic engineering was to the 20th century.

CONSEG 09 is an endeavor of the Computer Society of India (CSI), (Div II on Software & the Chennai Chapter), with the support of the IEEE Computer Society-Madras Chapter, Software Process Improvement Network (SPIN)-Chennai Chapter, and Bangalore Software Process Improvement Network (BSPIN), to bring to focus the various facets of Software Engineering. The Call for Papers attracted as many as 140 papers from more than a dozen countries. The Program Committee, with members drawn from academia and industry across the globe, had the challenging task of choosing eight papers out of those received. In order to encourage student talent, one Student Paper was also chosen.

We are also privileged to have seven eminent speakers accepting our invitation to deliver talks on topics that are of vital interest and importance to the software engineering scenario. The conference is preceded by two half-day tutorials on Eliciting Architecturally Significant Requirements and Agile Methodologies. In keeping with the economic scenario and the pivotal importance of software, we have a panel discussion on Developing Affordable Software Profitably, bringing the perspectives of the software producer, customer, end user and the academia.

CONSEG 09 is also an occasion for us to felicitate and honor Prof. H.N. Mahabala, who has been one of the architects of Computer Science education and the IT industry in India, for close to four decades. Prof. Mahabala, a Fellow of CSI, past president of CSI and a winner of several awards has been a guiding light in steering a number of Indian IT luminaries to success. We take this opportunity to felicitate, salute and honor him, the Guru for many of us in India.

An integral part of the conference is the discussion on the reforms (“overhaul” as Prof. Mahabala has called it!) that are needed for Computer Science education. Prof. Mahabala himself has written a concept note specifically for discussion in this conference and we have dedicated one session to the aspects covering Computer Science education that may be relevant to budding young software engineers as well as act as inputs for policy makers.

(contd...)



(...contd.) Foreword

We would like to thank the Advisory Committee, which provided valuable guidance for this conference. We would like to thank the members of the Organizing Committee for working through all the logistics and sponsorships, without which we could not have taken this conference to successful completion. Our thanks are also due to the members of the Program Committee and the reviewers of the papers for the painstaking effort they have put in to formulate the program, to review the papers and to provide overall support whenever needed. We would like to thank Priya Bangara, Divya Vyas, Nimesh Varma, G. Srinu and K. Jayaram of the editorial team from Tata Consultancy Services, Hyderabad, for putting together the Conference Proceedings. We would like to thank all the authors for contributing the papers and for keeping to the deadlines for submission. We would also like to thank the invited speakers who have graciously offered to share their valuable experience with the conference attendees.

We acknowledge and sincerely thank the sponsors – Tata Consultancy Services, Infosys Technologies Ltd, Cognizant Technology Solutions, Competency Center Software Quality, SSN School of Advanced Software Engineering, Sri Sai Ram Engineering College, Velammal Engineering College, SRM University, RMK Group Engineering Colleges, Meenakshi Sundararajan Engineering College, NIT Warangal, Rajalakshmi Engineering College, M. Kumarasamy College of Engineering and K. Ramakrishnan College of Engineering.

CONSEG 09 is being hosted in Chennai, the cultural hub of South India. The month of December is especially important here, not only for the pleasant climate, but also for the celebration of music and art. We do hope you enjoy your stay here!

Ramesh Gopaldaswamy

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T.V. Gopal

Co-Chairman

Program Committee

K. Ananth Krishnan

Chairman

V. Rajanna

Co-Chairman

Organizing Committee



About CSI and CONSEG

The Computer Society of India (CSI) was formed on 6 March 1965, during the formative years of Information Technology, and is the first and largest body of computer professionals in India. It was started by a few computer professionals and has now grown to be the sole national body representing computer professionals. Its membership today stands at over 50,000, with 60 chapters across India.

CSI is a non-profit professional meeting ground to exchange views and information, and to learn and share ideas related to the advancement of the theory and practice of Computer Engineering and Technology Systems, Science and Engineering, Information Processing and related Arts and Sciences.

The International Conference on Software Engineering (CONSEG) is one of the many international conferences organized by CSI. The goal of CONSEG is to conceptualize and articulate new and emerging ideas and solutions from the business, managerial, technological, empirical, and theoretical perspectives, and also to provide a forum for researchers, practitioners and educators to present and discuss recent innovations, trends, experiences and concerns in the field of software engineering.



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C.R. Muthukrishnan	TCS
S. Mahalingam	TCS; President, CSI
P. Thrimurthy	CSI
Christer Norstrom	Mälardalen University, Sweden



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San Murugesan	Member	University of Western Sydney, Australia



(...contd.) **Program Committee (PC)**

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Shashikant V. Albal	SSN School of Advanced Software Engineering, Chennai, India
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B. Palaniappan	Annamalai University, India
Raj Kamal	Devi Ahilya University, Indore, India
Chandrakumar	Hewlett-Packard, Chennai, India



Agenda



Thursday, 17 December 2009

Time	Pre-Convention Tutorials
0900	Registration
1000	Tutorial 1: Eliciting Architecturally Significant Requirements Matthew Bass, Carnegie Mellon University, USA
1300	Lunch
1400	Tutorial 2: End-to-End SDLC with Agile Methodologies Baiju Joseph, Senior Manager, Yahoo! and Srinivasan Desikan, Master System Technologist, HP, Bangalore, India



Friday, 18 December 2009

Time	Session Name	Speaker(s)
0800	Registration	
0900 – 1015	Inauguration	
1015 – 1100	Keynote Lecture #1: Software Architecture as a Strategic Asset	Matthew Bass, Carnegie Mellon University, USA
1100 – 1115	Tea Break	
1115 – 1200	Keynote Lecture #2: What is Commonly Not Known about SaaS	Venguswamy Ramaswamy, TCS
1200 – 1230	Paper Presentation 1 (PP1): Non-Technical Components of Software Development and their Influence on the Success and Failure of Software Development	S.N. Geethalakshmi, Avinashilingam University for Women, Coimbatore, India
1230 – 1300	Manufacturer Presentation #1	
1300 – 1400	Lunch	
1400 – 1430	PP2: WordNet-Based Approach towards Better Comprehension between Providers and Clients	<ul style="list-style-type: none"> • Kaouthar Fakhfak, Khalil Drira, <u>Said Tazi</u> Laboratoire d'Analyse et d'Architecture des Systemes (LAAS-CNRS), Toulouse, France • Tarak Chaari Mohamed Jmaiel National Engineering School of Sfax, ENIS, Tunisia
1430 – 1515	Keynote Lecture #3: Cloud Computing and Hadoop	Chidambaran Kollengode, Yahoo! Inc, Bangalore, India
1515 – 1530	Tea Break	

(In the Speaker column, an underlined name indicates the presenter of the paper.)



(...contd.) **Friday, 18 December 2009**

Time	Session Name	Speaker(s)
1530 – 1615	Keynote Lecture #4: Cyber Infrastructure and its Implications for Software Engineering	Jorge Herrera, Rochester Institute of Technology, New York, USA
1615 – 1645	PP3: Making Code Structural Quality Metrics More Relevant and Useful in a Project Context	<u>Annapurna Hosahalli</u> Jagadish. S, Wipro Technologies, Bangalore, India
1645 – 1745	Panel Discussion: Developing Affordable Software Profitably (moderated by C.R. Muthukrishnan)	
1800 – 1930	Felicitations of Prof. H.N. Mahabala	
1930 onwards	Dinner	



Saturday, 19 December 2009

Time	Session Name	Speaker(s)
0900 – 0930	Manufacturer Presentation #2	
0930 – 1000	PP4: A New Fuzzing Technique for Software Vulnerability Mining	<ul style="list-style-type: none"> • <u>Bill Atwood</u> Concordia University, Montreal, Canada • Zhiyong Wu, Xueyong Zhu University of Science and Technology, Anhui, China
1000 – 1045	Keynote Lecture #5: Instructional Design for Scaling and Quality	N. J. Rao IIIT, Bangalore
1045 – 1100	Tea Break	
1100 – 1215	H.N. Mahabala's initial thoughts	H.N. Mahabala, IIIT, Bangalore
	Lead paper: On the Evolution of the Industrial Software Engineering Graduate Program	<ul style="list-style-type: none"> • <u>Sasikumar Punnekkat</u> Christer Norström Mälardalen University, Västerås, Sweden • Lars-Olof Gustafsson, Ericsson AB, Sweden • V. Rajanna, Tata Consultancy Services, Hyderabad, India
	Discussion on CS Course Curriculum for Producing Better Software Engineers	H.N. Mahabala from IIIT, Bangalore, and others

(In the Speaker column, an underlined name indicates the presenter of the paper.)



(...contd.) **Saturday, 19 December 2009**

Time	Session Name	Speaker(s)
1215 – 1245	Manufacturer Presentation #3	
1245 – 1345	Lunch	
1345 – 1430	Keynote Lecture #6: Water, Water, Everywhere..: Data-Driven Computational Linguistics Research	A. Kumaran Microsoft Research, India
1430 – 1500	PP5: Critical Success Factors in Distributed Agile for Outsourced Product Development	Raja Bavani Program Director, MindTree Ltd. Pune, India
1500 – 1530	PP6: Module Based Regression Test Selection Strategy	Annamariale Chandran, Honeywell Technology Solutions, Madurai, India
1530 – 1545	Tea Break	
1545 – 1615	Keynote Lecture #7: Managing Sustainable Software Systems	Anders Wall ABB Corporate Research, Sweden
1615 – 1645	PP7: A Method and Framework for Domain Knowledge-Assisted Requirements Evolution (K-RE)	Preethu Rose, Manish Kumar, <u>Nirav Ajmeri</u> , Manas Agarwal, V. Sivakumar and Smita Ghaisas Tata Research Design and Development Center, Tata Consultancy Services, Pune, India

(In the Speaker column, an underlined name indicates the presenter of the paper.)



(...contd.) Saturday, 19 December 2009

Time	Session Name	Speaker(s)
1645 – 1715	Student Paper: Web Component Based Information System for Linking Innovations	<ul style="list-style-type: none">• <u>Srinivasan R.</u> Valliammai Engineering College, Chennai• <u>Raman V.R.</u> Crescent Engineering College, Chennai
1715 – 1730	Valediction	

(In the Speaker column, an underlined name indicates the presenter of the paper.)



Guest Lectures: Speaker Profiles & Abstracts



Guest Lectures – Speaker Profiles and Abstracts

Session Name	Speaker(s)
Tutorial 1: Eliciting Architecturally Significant Requirements	Matthew Bass, Carnegie Mellon University, USA
Tutorial 2: End-to-End SDLC with Agile Methodologies	Baiju Joseph, Senior Manager, Yahoo! and Mr. Srinivasan Desikan, Master System Technologist, HP, Bangalore, India
Keynote Lecture #1: Software Architecture as a Strategic Asset	Matthew Bass, Carnegie Mellon University, USA
Keynote Lecture #2: What is Commonly Not Known about SaaS	Venguswamy Ramaswamy, TCS
Keynote Lecture #3: Cloud Computing and Hadoop	Chidambaran Kollengode, Yahoo! Inc, Bangalore, India
Keynote Lecture #4: Cyber Infrastructure and its Implications for Software Engineering	Jorge Herrera, Rochester Institute of Technology, New York, USA
Keynote Lecture #5: Instructional Design for Scaling and Quality	N. J. Rao IIIT, Bangalore, India
Keynote Lecture #6: Water, Water, Everywhere...: Data-Driven Computational Linguistics Research	A. Kumaran Microsoft Research, India
Keynote Lecture #7: Managing Sustainable Software Systems	Anders Wall ABB Corporate Research, Sweden



Matthew Bass

Faculty, Master of Software Engineering Program
Carnegie Mellon University, USA

Matthew Bass is a former member of the technical staff of the Software Architecture Group of Siemens Corporate Research. In this role, he taught software architecture, mentored Siemens operating companies in software architecture practices, conducted software architecture reviews for critical projects, and was a software architect for multiple domains including automotive, medical, building automation, and power distribution.

Bass has been a practicing software engineer for many years and has worked with Fortune 500 companies in multiple domains. Additionally, Bass spent more than three years as a resident affiliate with the Product Line Systems program

at Carnegie Mellon's Software Engineering Institute.

He lectures internationally, and has given talks and conducted tutorials at numerous international conferences. He has degrees in Computer Science and Software Engineering from the University of Pittsburgh and Carnegie Mellon University, respectively.

Session Abstract: *Eliciting Architecturally Significant Requirements*

Having a system that exhibits the properties needed to support an organisation's business context, relies on having an architecture that is 'fit for purpose'. To do this, we must be able to extract the requirements that are architecturally significant from the business context.

Traditional requirements elicitation approaches typically do not explicitly identify requirements that drive the architecture. This tutorial is focused on identifying the requirements that drive the architecture, and providing some practical approaches for eliciting and prioritizing these requirements.



Baiju Joseph

Senior Manager, Yahoo!

Baiju Joseph leads the Quality Engineering team of the Yahoo Emerging Markets Business Group. He has more than 16 years of IT experience.

Baiju has delivered lectures on Agile testing in test conferences and industry fora. He has also published articles on Agile Testing in leading IT magazines. Prior to Yahoo, Baiju worked with Ariba QA, Novell Inc System Test Team and the Ministry of Information & Broadcasting.

Baiju has experience in the areas of Agile methodologies (XP, Scrum), test automation, test management, and in setting up distributed Agile testing teams.

He holds a B.Tech. in Electronics and Communication Engineering and an M.S. in Software Systems from BITS, Pilani.

Baiju Joseph and Mr. Srinivasan Desikan will jointly conduct the tutorial on *End-to-End SDLC with Agile Methodologies*.

Session Abstract: *End-to-End SDLC with Agile Methodologies*

In today's fast-changing world, business requirements often also change rapidly. If we use predictive, heavyweight methodologies to develop software it would be difficult to incorporate the changing business needs of customers. On the other hand, lightweight software development methodologies that appeared in the late nineties are more attuned to incorporating changes. The disciplined, adaptive nature of these methodologies helps us to easily accommodate changing needs of customers, even in later parts of the development cycle.

Many software development organisations in India have started moving towards Agile development methodologies, as it helps them to respond to changing business environments very quickly and provide better customer satisfaction. In today's business environment it is not really the *big* that win the battles; it is the *fast* that win the battles over the *slow*. Time to market is very important. Agile development helps us to deliver value to the customer rapidly, through a divide and conquer approach, and through prioritisation. The core focus area in Agile methodologies is investing 20% effort in the right place to can yield 80% of the value.

The tutorial covers:

- Introduction to Agile Methodologies
- Extreme Programming (XP) basics
- Scrum basics
- Scrum roles and terminologies
- Test driven development, user stories, automation
- Planning and tracking, Unit testing, Coding, Early feedback, Release
- HP Quality Center – Implementing Agile methodologies with Quality Center



Srinivasan Desikan

Master System Technologist, Hewlett-Packard, Bangalore, India.

Srinivasan Desikan is currently working as a System Software Master Level Technologist at HP (STSD), Bangalore. Earlier, he worked as Director of Quality Assurance (QA) and Testing at Talisma & Siebel, and as Worldwide Director of QA at Agile Software. Srinivasan has held different technical and management positions at Novell Inc, Wipro, and C-DOT and was part of large testing and product development teams.

Srinivasan has been in the domain of product testing since 1989, and some of these products have been used by millions of customers worldwide. He is well known in the testing community around the world and has considerable experience in the areas of test automation, test management, test processes and in setting up test teams from scratch.

He has delivered lectures on testing in international Testing conferences such as QAI-India, ASIASTAR-2002 (Melbourne-Australia), PSQT/PSTT-2003 (Washington, USA), SPIN (Chennai, India) and STeP-IN (Bangalore, India).

Passionate about testing and product development, Srinivasan regularly delivers lectures and tutorials at several universities and companies in India. He is part of the non-profit software testing certification board

initiated to support the cause of Software Testing Community globally. So far, he has certified more than 1000 professionals and students, as a service. He has also participated in international exhibitions like COMDEX & NetWorld Interop, and exhibited several products and technologies.

Srinivasan has authored a best-selling book, 'Software Testing - Principles & Practices', published by Pearson Education, India. Some of his interesting articles and publications can be accessed at: stickyminds.com and QAGuild.com. He has also submitted a couple of patent disclosures on Testing.

Srinivasan and his book have received numerous awards, the most recent being Test2008.in Award for his contribution to Academia & Industry. He has also received 'The Bestselling Book' award from the Karnataka Technical Book Forum.

Baiju Joseph and Srinivasan Desikan will jointly deliver the tutorial on *End-to-End SDLC with Agile Methodologies*.



Venguswamy Ramaswamy

Global Head, TCS Small and Medium Business (SMB)

Venguswamy Ramaswamy, or 'Swamy' as he is better known, globally heads the Small and Medium Business (SMB) Unit in TCS. SMB is a strategic business unit of TCS and provides end-to-end business solutions to the SMB segment.

In his previous role, he was the Director of TCS' Global Consulting Practice and was instrumental in the structural formation, development and positioning of TCS' consulting offerings. Consulting Magazine had placed him amongst the top 25 consultants of the year 2007.

During his 15 year tenure in TCS, Swamy has held several strategic positions including managing key customer relationships, building and heading the Process Consulting Group, managing the Corporate Resource Management function, leading numerous Centers of Excellence, as well as launching TCS's first steps in geographies such as Hungary and China.

Swamy is a firm believer in the power of IT to create business value, and is known for his interest in Innovation & Quality and expertise in Six Sigma. He is also recognized as a champion of many digitisation drives within TCS, including deploying digital platforms for Six Sigma, creativity and talent acquisition.

Swamy is credited with pioneering TCS' global consulting operating model, thereby helping customers to optimise business processes, ensure faster business results and reduce operational risks. Swamy's leadership role in developing this model has made a significant contribution in redefining the manner in which business and IT consulting services are delivered in the industry today.

Session Abstract: *What is Commonly Not Known About SaaS*

Today, the level of adoption of SaaS in the market is promising. India is not far behind. The usage of SaaS is going beyond traditional business applications. We do see several research reports on the market size of SaaS. We in TCS believe these numbers are not relevant. The market we know is defined by applications we see in SaaS today. SaaS concepts are evolving; new concepts will create new market places. The size of latent market places will make these projections irrelevant. The present does not tell the future. India has to play the future game. We will discuss three possible technologies, which, when integrated with SaaS, will create new markets.

Our obsession with what we know stops us from what is possible. We should not let the existing success stories dominate our ideas, but open our minds to all the possibilities.



Chidambaran Kollengode

Director Cloud Computing, Yahoo! India R&D, Bangalore, India

Chidambaran Kollengode (Chid) is a Systems professional with over twenty years of experience, of which the last eight years has been in senior leadership roles. He is currently working as Director, Cloud Computing at Yahoo! India R&D, exploring the boundaries of distributed computing for very large volume data processing.

Prior to joining Yahoo!, he worked with Amazon to build a highly-scalable, distributed architecture and cost effective implementation for processing huge amounts of search and advertisement (Internet) data.

Chid has a wealth of experience in technology development and organisation building. He also has a successful track record in building models and sustainable infrastructure for evidence-based

management, and quantitative fact-based analysis. He is a frequent presenter in enterprise architecture fora (India and abroad). He is the Founder-President of Data Management Association, Bangalore (since 2006). This is the first chapter in the South-East Asia region. He is also a Member of the Data Management Association, Philadelphia (since 1996).

Chid has a Masters Degree in Business Administration (MBA) from Pennsylvania State University (major in Information Systems) and a Bachelors in Engineering from NIT, Trichy (formerly REC, Trichy). He has been a visiting professor at the University of Phoenix and continues to be a faculty member and mentor, teaching masters and undergraduate courses. Chid also teaches in a couple of Indian universities.

Session Abstract: *Cloud Computing and Hadoop*

The information age is producing a huge amount of data. This requires a paradigm shift in thinking about how to store and process this data. Traditional architectures fade into cost overruns, scalability and ROI issues. Distributed computing is the answer to these challenges. In traditional, high-performance settings, one often assumes a 'well-behaved' system: no faults or failures, minimal security requirements, consistency of state among application components, availability of global information and simple resource sharing policies. While those assumptions are arguably valid in tightly coupled systems, they break down as systems become more distributed.

This presentation will talk about Cloud Computing in Yahoo! with emphasis on the Hadoop Grid. The Grid Computing Group at Yahoo! Bangalore focuses on Grid frameworks that scale to thousands of machines and handle peta-bytes of data. The Group is especially involved in the development of the Open Source Hadoop platform and its deployment within Yahoo!



Jorge L. Díaz-Herrera

Professor of Computing and Founding Dean of the B. Thomas Golisano College of Computing and Information Sciences, Rochester Institute of Technology, New York, USA

Jorge L. Díaz-Herrera became Professor of Computing and Founding Dean of the B. Thomas Golisano College of Computing and Information Sciences at Rochester Institute of Technology in Rochester, New York, in July 2002.

Prior to this appointment, he was Professor of Computer Science and Department Head at Southern Polytechnic State University in Atlanta and Yamacraw Project coordinator with Georgia Tech.

He was a senior member of the technical staff of the Software Engineering Institute at the Carnegie Mellon University, USA, where he also conducted research in Product Line Engineering. He was department chair of the Software Engineering Department at Monmouth University in New Jersey, USA, and on the faculty of the departments of Computer Science at George Mason University in Fairfax, Virginia and at SUNY Binghamton, New York.

Díaz-Herrera completed his undergraduate education in Venezuela, and holds both a Master's and doctorate degrees in Computing Studies from the Lancaster University, UK.

He recently completed the Graduate Certificate in Management Leadership in Education from

Harvard University's Graduate School of Education.

Díaz-Herrera has conducted extensive consulting services with a number of firms and government agencies including the New York Stock Exchange (SIAC), MITRE Corp., The Institute for Defense Analysis, General Electric, Singer-Link, TRW, EG&G and IBM, among others. He has also provided professional expertise to international organisations including the European Software Institute, Australian Defense Science and Technology Office, Kyoto Computing Gaikum, Kuwait University, Cairo University and Malaysia University of Technology.

He has chaired several national and international conferences, and has been a technical reviewer for the National Science Foundation, the American Society for Engineering Education and several conferences and journals. He has more than 80 publications to his credit.

(session abstract on the next page)



Jorge L. Díaz-Herrera

Session Abstract: *Cyber Infrastructure and its Implications for Software Engineering*

Despite tremendous progress in Computing, Communication and Information Sciences and Technology (CCIST), the fact remains that general purpose computing environments are not ideal for advancing discovery and product development at a quick pace, and their deficiencies and shortcomings may significantly limit the rate of progress. A more advanced environment is required.

The session explores questions like: What if we could effortlessly put together a computing environment that is exactly tailored to suit specific needs? How can we do this? What are the implications of this new environment for software development?

We begin with an analogy in the car industry. If the car industry had developed the same way the computer industry has, what do you think you would be driving today? We would all be driving pretty much the same car, right? What computer do you use? What operating system? I bet it is an MS Windows-based machine, or perhaps a Mac. Well, this would be the equivalent to all of us, or the great majority of us, driving an eighteen wheeler! And it would probably be black!

Does this make sense? Don't we need different types of cars for different types of jobs? Why are we all using the same computer regardless of our job or level of sophistication in CCIST? Either the tool is very flexible, or we know it is not, or insufficient to support the specialists needs, or simply inadequate, but that's what's available! We were frustrated with computers a decade ago; we are frustrated with computers now. Will we continue to be frustrated with computers tomorrow?

Computing improvements have transformed early large machines into compact devices that enable, mediate, support, and organize our lives! Computers can be embedded anywhere and everywhere (inside writing tools, clothes, appliances and so on). The computer is so embedded, so fitting, so natural, that we use it without even thinking about its social impact - similar to writing or electricity. If computers are going to be everywhere, they better stay out of the way so that we compute while doing something else! This is becoming a reality with 'the Web as the ubiquitous computer' [Pendyala & Shim 2009].

The key lies in virtualization. The idea is to provide the user with a virtual environment that creates the 'illusion' of a specific hardware/software platform, but one that is tailored to the user's specific needs. The technology to do this is here in terms of Virtual Machines, Software as a Service, Cloud Computing, the Web as an anywhere/anytime 'computer', and so on. But, what is missing is an analysis and modularization of specific user needs. We propose a product line approach to address this need.



N.J. Rao

Visiting Professor, International Institute of Information Technology, Bangalore, India

N.J. Rao obtained his B.E. degree in Telecommunication Engineering from the Andhra University in 1964, M.Tech. in Industrial Electronics from IIT, Bombay in 1966, and Ph.D. in Controls Systems from IIT, Kanpur in 1972. He joined the School of Automation of Indian Institute of Science (IISc), Bangalore as Assistant Professor in 1972.

He served as the Chairman of Centre for Electronics Design and Technology (CEDT) for 15 years and as the Chairman of Department of Management Studies for eight years at IISc. His major areas of research were control systems, system dynamics and engineering education. He facilitated the creation of a unique product oriented graduate program in Electronics Design

and Technology, and an MBA program. He coordinated the activities of the World Bank project - IMPACT, and the Ministry of HRD project - NPTEL - at IISc. After superannuation in 2006 from IISc, he has been a visiting professor at the International Institute of Information Technology, Bangalore and works as a consultant on issues related to education.

His present research interests include instruction design, intelligent tutoring systems, computer assisted evaluation of student performance, and designing integrated courses to meet the learning outcomes of higher education.

Session Abstract: *Instructional Design for Scaling and Quality*

All undergraduate programs in engineering in India need redesigning to meet the program outcomes as defined by National Board of Accreditation (NBA). This is necessary to fulfill the requirements of Washington Accord, to which India wishes to become a signatory. The curriculum design of undergraduate programs in computing can be done in the framework of Computing Curricula 2005 as defined jointly by ACM, AIS, AITP and IEEE-CS. Every course in a program is required to meet a subset, selected by instructors, of NBA program outcomes.

At this stage of redesigning curricula and courses to meet the requirements of NBA, it is desirable to rediscover the conventional ideals of higher education, namely, critical and creative reflection and discourse. These can be achieved by following a systematic process for designing a course and large scale adoption of educational technology tools. It is the quality of assessment that determines the quality of learning. It is appropriate adoption of open source tools of educational technology that ensures scaling up with actually improving the quality of learning. The lecture presents a systematic process for designing courses and the experiences in implementing it at the Thiagarajar College of Engineering, Madurai, India.



A. Kumaran

Head, Multilingual Systems Research Group at Microsoft Research India, India

A. Kumaran is currently the head of the Multilingual Systems Research Group at Microsoft Research India. He has a Bachelors degree from Anna University, Chennai, and a Masters degree from Rutgers University, New Jersey, USA. After his Masters, he worked for Bell Communications Research, US and Oracle Corporation, US/India for 15 years, before moving back to a research-oriented career. He joined the Indian Institute of Science, Bangalore, to pursue doctoral research in the area of Multilingual Information Retrieval Architectures.

After doing his Ph.D. in 2005, he joined Microsoft Research India, where he now heads a research group engaged in research on multilingual and cross-language systems. His current interests are resource creation for research, Machine Translation/Transliteration and cross-lingual IR systems; he is also interested in methodologies for collecting linguistic data to enable research in resource-poor languages.

Session Abstract: *'Water, water, Everywhere...': Data-driven Computational Linguistics Research*

This phrase by the ancient mariners aptly captures the essence of data requirement for Computational Linguistics research. Thanks to the Internet, natural language data is readily available through the media and internet, but in a highly unstructured form, with widely varying quality. In this talk, we outline the current statistical and machine learning based approaches in Computational Linguistics research, and underscore the critical need for data to support such research.

We will discuss some simple problems to show the effectiveness of such approaches. However, these approaches critically depend on large amounts of appropriate linguistics data, making such research possible only in a handful of languages of the world. While the natural language data are available in large quantities, they need to be "structured" to glean useful information from them.

We present two broad approaches in structuring the data, namely, mining the web and involving internet users to provide data. Mining the web data addresses mining multilingual news stories produced by news organisations on the same timeline for useful information. Engaging the Internet population in providing data may be useful in specific tasks and domains, paralleling the successes of community-contributed efforts like Wikipedia. We discuss our experiences in implementing such approaches for creating linguistic data.



Anders Wall

Principal Scientist, ABB Corporate Research, Sweden

Anders Wall is a Principal Scientist at ABB Corporate Research. He received his M.Sc. in Computer Science from Uppsala University in 1994, his Ph.Lic from Uppsala University in September 2000, and his Ph.D. from Mälardalen University in September 2003. Anders has many years of industrial experience in software development of industrial control systems. At ABB, Anders has been leading several software architecture improvement initiatives for different large and long-lived software-intensive control systems. These systems are typically developed and maintained in complex, distributed organisational settings.

He is also involved in ABB's process improvement initiative which is based on CMMI. Anders is an associated researcher at Mälardalen University where he carries out research on

software development in complex organisations and is supervising several Ph.D. students.

His main research interest is development of sustainable software intensive products, including software architecture in general and software architecture for real-time systems in particular, product development processes, organisation, and business aspects.

Other areas where Anders has been academically active include component-based software engineering for real-time systems and formal methods for real-time systems.

Session Abstract: *Managing Sustainable Software Systems*

Software intensive systems in the industrial control domain are typically large, complex and long-living. They are developed in geographically distributed organisations. These systems have evolved and are being maintained for more than 15 years. These may be in operation in customer sites for as long as 30 years. It is a challenge to sustain an efficient and profitable business, capitalizing on the investments made in the software, since the software architecture changes and erodes during this time. Business contexts, organisations, software technologies, and processes change much more frequently than the software architecture does, and we believe that all these dimensions must harmonize for efficient software product development. Consequently, we need to continuously manage and nurse the architecture.

This talk defines the meaning of sustainable software systems, what their characteristics are, factors that are important for achieving software system sustainability, and the challenges we are facing in this industry today.



Conference Papers



Conference Papers

Session Name	Speaker(s)
Paper Presentation 1 (PP1): Non-Technical Components of Software Development and their Influence on the Success and Failure of Software Development	S. N. Geethalakshmi, Avinashilingam University for Women, Coimbatore, India
PP2: WordNet-Based Approach towards Better Comprehension between Providers and Clients	<ul style="list-style-type: none"> • Kaouthar Fakhfak, Khalil Drira, <u>Said Tazi</u> Laboratoire d'Analyse et d'Architecture des Systemes (LAAS-CNRS), Toulouse, France • Tarak Chaari Mohamed Jmaiel National Engineering School of Sfax, ENIS, Tunisia
PP3: Making Code Structural Quality Metrics More Relevant and Useful in a Project Context	<u>Annapurna Hosahalli</u> Jagadish S., Wipro Technologies, Bangalore, India
PP4: A New Fuzzing Technique for Software Vulnerability Mining	<ul style="list-style-type: none"> • <u>Bill Atwood</u> Concordia University, Montreal, Canada • Zhiyong Wu, Xueyong Zhu University of Science and Technology, Anhui, China
H. N. Mahabala's initial thoughts	H.N. Mahabala, IIIT, Bangalore, India
Lead Paper: On the Evolution of the Industrial Software Engineering Graduate Program	<ul style="list-style-type: none"> • <u>Sasikumar Punnekkat</u> Christer Norström Mälardalen University, Sweden • Lars-Olof Gustafsson, Ericsson AB, Sweden • V. Rajanna, Tata Consultancy Services, Hyderabad, India

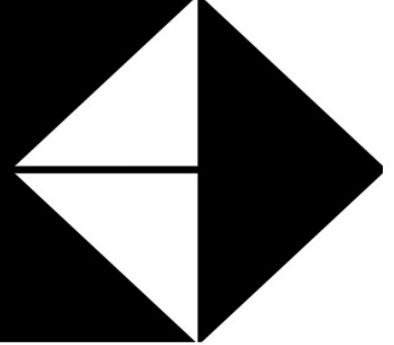


(...contd.) **Conference Papers**

Session Name	Speaker(s)
Discussion on CS Course Curriculum for producing Better Software Engineers	H.N. Mahabala from IIIT, Bangalore, India and others
PP5: Critical Success Factors in Distributed Agile for Outsourced Product Development	Raja Bavani Mindtree Ltd, Bangalore, India
PP6: Module Based Regression Test Selection Strategy	Annamariale Chandran, Honeywell Technology Solutions, Madurai, India
PP7: A Method and Framework for Domain Knowledge-Assisted Requirements Evolution (K-RE)	Preethu Rose, Manish Kumar, <u>Nirav Ajmeri</u> , Manas Agarwal, V. Sivakumar and Smita Ghaisas Tata Research Design and Development Center, Tata Consultancy Services, Pune, India
Student Paper: Web Component Based Information System for Linking Innovations	<ul style="list-style-type: none"> • <u>Srinivasan R.</u> Valliammai Engineering College, Chennai, India • <u>Raman V. R.</u> Crescent Engineering College, Chennai, India

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