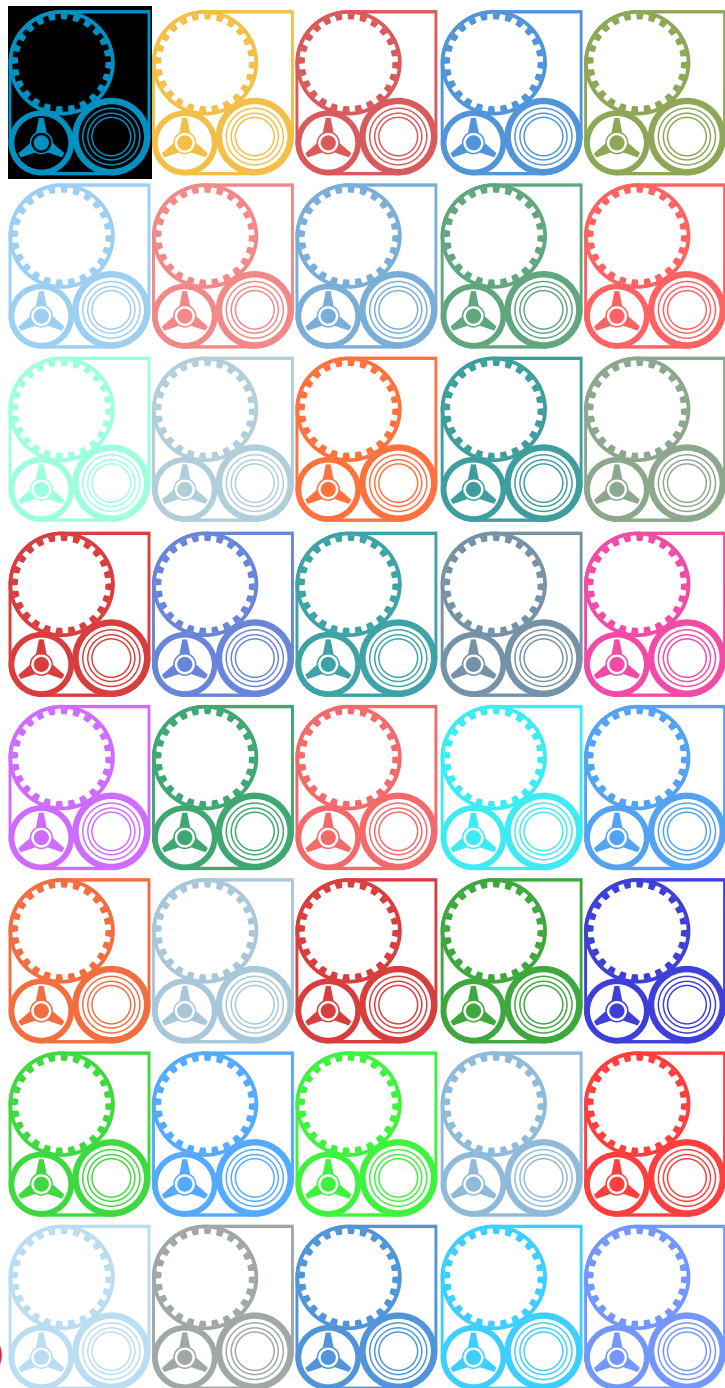


40 EDITIONS OF ICSE



the ruby
anniversary
celebration



Domenico Bianculli
Nenad Medvidović
David S. Rosenblum (eds.)

40th ACM/IEEE International Conference on Software Engineering (ICSE 2018)
Gothenburg, Sweden, May 27–June 3, 2018

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Nenad Medvidović
David S. Rosenblum (eds.)

40 EDITIONS OF ICSE:
the ruby anniversary celebration

Book Editors

Domenico Bianculli
SnT Centre
University of Luxembourg
Luxembourg, Luxembourg
domenico.bianculli@uni.lu

Nenad Medvidović
Computer Science Department
Viterbi School of Engineering
University of Southern California
Los Angeles, CA, USA
nenom@usc.edu

David S. Rosenblum
School of Computing
National University of Singapore
Singapore, Republic of Singapore
david@comp.nus.edu.sg

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The production of this book has been made possible by the generous support of Chalmers University of Technology, ACM SIGSOFT, and IEEE TCSE.

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SPECIAL INTEREST GROUP IN SOFTWARE ENGINEERING

tcse 

We dedicate this volume to the organizers and attendees of the 1968 NATO Conference on Software Engineering held in Garmisch, and to the ICSE General Chairs and Program Chairs who played a fundamental role in making ICSE the venue of choice for presenting the best research in software engineering.

We also offer a special note of fond remembrance for the attendees and Chairs who have passed away.



Contents

Editors' Introduction	xi
0 "ICSE-0" <i>Barry Boehm</i>	1
1 The 1st ICSE, 1975 <i>Tony Wassermann</i>	5
2 The 2nd ICSE, 1976 <i>Leon J. Osterweil</i>	7
3 The 3rd ICSE, 1978	11
4 The 4th ICSE, 1979 <i>Barry Boehm</i> <i>Walter F. Tichy</i>	12
5 The 5th ICSE, 1981	22
6 The 6th ICSE, 1982 <i>Victor Basili</i>	23

7	The 7th ICSE, 1984	26
	<i>William E. Howden and Jean-Claude Rault</i>	
8	The 8th ICSE, 1985	30
	<i>Barry Boehm</i>	
9	The 9th ICSE, 1987	33
	<i>Kouichi Kishida</i>	
10	The 10th ICSE, 1988	36
	<i>Tan Chin Nam</i>	
	<i>Bertrand Meyer</i>	
	<i>Larry Druffel</i>	
11	The 11th ICSE, 1989	46
	<i>Dines Bjørner</i>	
12	The 12th ICSE, 1990	48
	<i>Marie-Claude Gaudel and Peter A. Freeman</i>	
13	The 13th ICSE, 1991	51
	<i>David Barstow</i>	
14	The 14th ICSE, 1992	54
	<i>Lori A. Clarke and Carlo Ghezzi</i>	
	<i>Karl Reed</i>	
15	The 15th ICSE, 1993	65
	<i>Victor Basili, Richard DeMillo, and Takuya Katayama</i>	
16	The 16th ICSE, 1994	70
	<i>Leon J. Osterweil and Axel van Lamsweerde</i>	
17	The 17th ICSE, 1995	74
	<i>Ross Jeffery</i>	

18	The 18th ICSE, 1996	77
	<i>Dieter Rombach</i>	
	<i>Tom Maibum</i>	
	<i>Marv Zelkowitz</i>	
19	The 19th ICSE, 1997	83
	<i>Rick Adrion, Alfonso Fuggetta, Richard Taylor,</i>	
	<i>and Tony Wasserman</i>	
20	The 20th ICSE, 1998	90
	<i>Koji Torii</i>	
	<i>Kokichi Futatsugi</i>	
	<i>Richard A. Kemmerer</i>	
21	The 21st ICSE, 1999	99
	<i>Barry Boehm</i>	
	<i>David Garlan and Jeff Kramer</i>	
22	The 22nd ICSE, 2000	105
	<i>Carlo Ghezzi, Mehdi Jazayeri, Alexander Wolf, and Kevin Ryan</i>	
23	The 23rd ICSE, 2001	111
	<i>Hausi A. Müller</i>	
24	The 24th ICSE, 2002	116
	<i>Will Tracz</i>	
25	The 25th ICSE, 2003	119
	<i>Lori A. Clarke, Laura K. Dillon, and Walter Tichy</i>	
26	The 26th ICSE, 2004	123
	<i>David Rosenblum</i>	
27	The 27th ICSE, 2005	126
	<i>William G. Griswold</i>	
	<i>Bashar Nuseibeh</i>	
	<i>Gruia-Catalin Roman</i>	

28	The 28th ICSE, 2006	133
	<i>Kouichi Kishida</i>	
	<i>Leon J. Osterweil</i>	
29	The 29th ICSE, 2007	139
	<i>Wolfgang Emmerich and Gregg Rothermel</i>	
30	The 30th ICSE, 2008	143
	<i>Matt Dwyer and Volker Gruhn</i>	
31	The 31st ICSE, 2009	145
	<i>Jo Atlee and Paola Inverardi</i>	
32	The 32nd ICSE, 2010	148
	<i>Jeff Kramer, Judith Bishop, Premkumar Devanbu,</i>	
	<i>and Sebastián Uchitel</i>	
33	The 33rd ICSE, 2011	152
	<i>Richard Taylor and Nenad Medvidović</i>	
34	The 34th ICSE, 2012	156
	<i>Martin Glinz, Gail Murphy, and Mauro Pezzè</i>	
35	The 35th ICSE, 2013	163
	<i>Betty H.C. Cheng and Klaus Pohl</i>	
36	The 36th ICSE, 2014	168
	<i>Lionel C. Briand and André van der Hoek</i>	
37	The 37th ICSE, 2015	173
	<i>Antonella Bertolino</i>	
	<i>Gerardo Canfora and Sebastian Elbaum</i>	
38	The 38th ICSE, 2016	180
	<i>Laura K. Dillon, Will Tracz, Willem Visser, and Laurie Williams</i>	
39	The 39th ICSE, 2017	184
	<i>Sebastián Uchitel, Alessandro Orso, and Martin Robillard</i>	

40 The 40th ICSE, 2018	188
<i>Ivica Crnkovic, Marsha Chechik, and Mark Harman</i>	
A ICSE-MIP	192
<i>Leon J. Osterweil, Barry W. Boehm, and Dewayne E. Perry</i>	



Editors' Introduction

*Domenico Bianculli, Nenad Medvidović,
and David S. Rosenblum*

2018 marks the occasion of the 40th International Software Engineering Conference (ICSE), which has served the software engineering community as its leading research conference series since 1975. ICSE has a long and noble history, and we celebrate that history of 40 conferences with this souvenir booklet, which also covers the 1975 International Conference on Reliable Software (which many people consider to be the “ICSE-0” conference) and the ICSE Most Influential Paper Award.

Our celebration is centered around the key figures in our community who volunteered countless hours and years of their time as ICSE General Chairs and Program Chairs, ensuring the continued and lasting success of ICSE as the most important gathering place to learn about the latest and greatest research the software engineering community has to offer.

We contacted all of the former General Chairs, Program Chairs, and other lead Organizational Chairs that we were able to locate, and we asked them to provide a written reminiscence of a few pages about the ICSEs they organized. We were extremely gratified by the response we received. 72 former chairs contributed something, which has allowed us to cover 39 of the 41 ICSE conferences that have taken place.

Some former chairs decided to offer their reminiscences as a group effort, while others chose to write individually. Some opted for a summary of the key happenings at their ICSE, while others provided anecdotes about their conference and its organization. Long-time attendees of ICSE will enjoy being reminded of talks, sessions and events long forgotten, and they will marvel at how much ICSE has changed over the years. Younger members of the community will enjoy learning about what their advisors and teachers and more senior colleagues (or advisors' advisors, teachers' teachers and colleagues' colleagues) were doing 10 or 20 or 40 years ago, what the discipline was like at those times, and how even the mechanics of organizing a conference has changed dramatically in less than two decades (such as the welcome disappearance of disseminating submissions and reviews in hardcopy form by post!).

Young or old, we hope you enjoy reading through this collection as much as we enjoyed putting it together. And in closing, we fondly remember the significant efforts of the former ICSE chairs who have passed away. (Their names are marked with the symbol † in the summary information for each conference.) Even though their words are not contained in these pages, their contributions to our community will never be forgotten.

“ICSE-0” or the 1975 International Conference on Reliable Software

Barry Boehm

The 1968 NATO report identifies a number of software engineering challenges. One of the main ones was about engineering software for higher reliability. Here are some examples:

“Particularly alarming is the seemingly unavoidable fallibility of large software.”

Ed David and A.G. Fraser

“The massive dissemination of error-loaded software is frightening.”

Edsger Dijkstra

“We build systems like the Wright brothers built airplanes—build the whole thing, push it off the cliff, let it crash, and start over again.”

R.M. Graham

One result of the concern about software reliability was the holding of a number of workshops and conferences on software reliability, including a large 1973 IEEE Symposium on Software Reliability in New

The 0th ICSE - Fact Sheet

Dates:	April 21–23, 1975
City:	Los Angeles, CA, USA
Venue:	International Hotel
General Chairs:	Martin L. Shooman and Raymond T. Yeh
Program Chairs:	Barry W. Boehm and C.A.R. Hoare

York City. With Martin Shooman at New York Poly, I was involved in organizing a large 1975 sequel to the 1973 conference. We found that Raymond Yeh was planning a similar ACM conference on the topic, and we agreed to combine the two into a large ACM-IEEE International Conference on Reliable Software (ICRS) to be held in Los Angeles. Ray and Marty were the Co-General Chairs, and Tony Hoare and I were the co-Program Chairs.

We had a busy two-day Program Committee at TRW in Redondo Beach, with over 150 paper submissions. We accepted 53 papers, and agreed to have 9 invited papers and a keynote by Ruth Davis, Director of the Institute for CS and Technology at the US National Bureau of Standards. The resulting Proceedings took 591 pages; 31 papers were from academia, 22 from industry, and 4 from government. Most were from the US, but most of the main European countries were represented, along with Canada and Japan. The primary topics of the accepted papers were 14 for software reliability, 12 on testing, 11 on structured programming, 9 on Verification, and 6 on Correctness. One remembers curious things from remote events. Our TRW meeting place was limited on restroom facilities. During one break after a long session, the restroom was full. Someone came in and said, “Looks like we have a full house.” Someone else said, “Well, Jim King is here and occupied. Maybe the full house can be beaten by a royal flush.”

The conference took 3 days and drew over 600 participants. Highlights were Edsger Dijkstra’s opening talk in Guarded Commands and Non-Determinacy and his final talk with the vintage-Dijkstra title of “Correctness Concerns and Among Other Things, Why they are Resented.” The talk was mostly about avoiding the trap of “Better, Cheaper,

Faster,” which some NASA people would have appreciated a few decades later. Bob Williams’ talk was about his experiences in managing the 7-year, \$100 million Site Defense ballistic missile defense software project, and how to reinterpret the extended Winston Royce waterfall model on a project with 318% requirements volatility over 5 builds, due to changes in arms control treaties, and types of radar, missiles, communications, etc. One quote from his test manager was, “Testing a requirement is like walking on water. It helps if it is frozen.” Vic Vyssotsky’s talk reminded people that reliable software may not be dependable. His main example was one of the AT&T electronic switching systems, which had 15 minutes/year requirement for downtime. The AT&T reliability experts analyzed and created a system with over a year of Mean Time Between Failures (MTBF), but were surprised toward the end of the project that a load of bad data crashed the database, which took 4 days to recover, or mean time to repair (MTTR). The downtime requirement was not for Reliability but for Availability, which is calculated as $MTBF/(MTBF + MTTR) = 365/369 = 0.989$, or roughly 4 days vs 15 minutes downtime per year.

One of the main take-aways from the conference was that reliability is only one of the desired qualities that good software should provide, and that it would be better to have future main conferences address the overall topic of software engineering. This was picked up by IEEE, which held the 1st National Conference on Software Engineering in September 1975 in Washington DC. Due to the short lead time and US focus, NCSE-1 was much smaller (100-page Proceedings with 11 papers, 10 from the US). With longer lead times, sponsorship by both ACM and IEEE, and an international outreach, ICSE 2 in San Francisco in October 1976 was much larger and the ICSE series was on its way.

*
* * *

The selection committee meeting of ICRS was the first encounter between Harlan Mills and Tony Hoare. Mills' first remark was a comment on how young (and handsome) Hoare looked. From the confidence of Hoare's style of writing, he expected a venerable greybeard. Hoare was a lifelong admirer of Mills' work on the Clean room at IBM. It was based on the mathematical cleanliness of functional programming. Hoare's own work attempted to extend his work, but extending it to the more expressive medium of the typed predicate calculus.

*
* * *

During his talk at the end of the conference, Tony Hoare gently parodied some of the earlier speakers.

The 1st ICSE, 1975

Tony Wassermann

The 1st National Conference on Software Engineering (NCSE), chaired by Harlan Mills and sponsored by IEEE and the National Bureau of Standards (now NIST), could be considered as ICSE 1. It was held in Washington, DC, on September 11–12, 1975, and followed the successful International Conference on Reliable Software, held near Los Angeles International Airport in Spring 1975 and preceded the 2nd International Conference on Software Engineering, held in San Francisco in 1976.

The IEEE Computer Society took a leading role in establishing software engineering as a professional discipline. 1975 was not only the start of the ICSE series, but also the first year of IEEE Transactions on Software Engineering.

The keynote talk was given by Fred Brooks, whose now-classic book, “The Mythical Man-Month” had been published earlier that year. The Keynote talk was the first time that most attendees heard the statement, “Adding people to a late software project makes it later.”

The papers in the NCSE Proceedings reflect an era of mainframe computing, predating personal computers and the Internet. Structured programming and programming methodology were two main themes. One of the most interesting talks was Kernighan and Plauger’s “Software Tools”, which described some philosophical principles of the Unix™

The 1st ICSE - Fact Sheet

Dates:	September 11–12, 1975
City:	Washington, DC, USA
Venue:	Mayflower Hotel
General Chairs:	Harlan D. Mills† and Dennis Fife†
Program Chair:	Thomas B. Steel, Jr.

operating system, which had recently been released by AT&T Bell Laboratories.

Personal Note: I may have been the only person to attend all three of these events. My paper, “A Top-Down View of Software Engineering”, is the first paper in the NCSE Proceedings. I served as a co-founder (with the late R. Stockton Gaines) of ACM’s Special Interest Committee on Software Engineering, but ACM’s subsequent approval of SIGSOFT was more than a year behind the IEEE Computer Society. As SIGSOFT’s first elected Chair, I worked on making the ICSE conferences a joint activity of the two societies, as it remains today.

The 2nd ICSE, 1976: “A Remembrance”

Leon J. Osterweil

Opening the Proceedings of ICSE 2 last week, for the first time in decades, was like opening a 40-year-old time capsule. The Proceedings opens a window onto the Software Engineering community as it was when it was very new—a world that will seem very unfamiliar to the younger members of today’s community. Leafing quickly through the pages, one is immediately struck by the jarring differences in the appearance of the papers, varying considerably in typeface and formatting. This was an era before the rise of standardized word processes such as T_EX, and authors were allowed to submit papers in whatever layout and typeface they wanted. Diagrams were often shaky-looking hand-drawn efforts. The papers also varied in size with long papers intermixed with short abstracts.

A young member of today’s Software Engineering community will probably also be surprised to see the breadth of Computer Science research areas that is represented in these Proceedings, covering Programming Languages, Databases, Hardware, and Numerical Computation, as well as topics that are more familiar today, such as requirements, programming style and design. It may seem hard to imagine now, but in 1976, the year when ICSE 2 was held, there were still technical meetings that attempted to span all of Computer Science. There was still an ACM Annual Meeting featuring research papers. And there

The 2nd ICSE - Fact Sheet

Dates:	October 13–15, 1976
City:	San Francisco, CA, USA
Venue:	Jack Tar Hotel
General Chair:	Raymond T. Yeh
Program Chair:	C.V. Ramamoorthy†

had been a series of annual Spring Joint Computer Conferences (SJCCs) and Fall Joint Computer Conferences (FJCCs) that were merged into an annual National Computer Conference (NCC) in 1973. All of their proceedings contained papers spanning all of Computer Science, although they also featured large exhibitions of products (mostly hardware) and much of the focus was on practice. So, from this point of view, it is less surprising that the ICSE 2 contributors and attendees came from a broad spectrum of Computer Science subdisciplines.

But, although 1976 was a time when the Computer Science community was still used to meeting as one whole, it was also a time when the subdisciplines, such as Software Engineering, were starting to split off to form their own conference and publication series. The two words, Software and Engineering, had first been put together at the famous NATO conference in 1968, only 8 years prior to ICSE 2. Accordingly, it was not at all clear what the nature of this newly-minted discipline was going to be, and so people from many diverse parts of Computer Science came to ICSE 2 to try to find out, and to try to stake their claims in this new, exciting area.

The meeting was organized by the energetic duo of Raymond Yeh, the General Chair, and C. V. Ramamoorthy (now deceased), the Program Chair. Both were veteran organizers of meetings, and both were enthusiastic organizers and builders of academic communities. The breadth of the meeting and the bulk of the proceedings are testaments to their ecumenical and welcoming attitudes towards community formation. In a nice tie to the past, ICSE 2 was held at the Jack Tar Hotel (now also deceased), the site of numerous previous IEEE meetings (including at least one previous FJCC). Locating the meeting there also

put it in the heart of downtown San Francisco, hopefully making it appealing to academics from Stanford and Berkeley, and practitioners from the already-booming Bay Area high tech industry. This appeal apparently worked, as the hefty size of the proceedings and the list of authors attests. By my count, the proceedings contains 103 papers and abstracts. The Program Chair's statement tells us that "Roughly only one out of every five contributed papers was accepted for presentations, ensuring high technical quality" [sic]. That suggests that about 500 submissions were handled by the program committee, which consisted of only 15 (!) members, including Prof. Ramamoorthy, the Chair.

In the proceedings one sees papers by many of the early Software Engineering pioneers, some of whom have continued to be active contributors to this day, but many of whom have long since left our community. Thus there were papers by David L. Parnas, Barry Boehm, Friedrich Bauer, Anita Jones, James C. Browne, Meir M. Lehman, Susan Gerhart, Peter Denning, Harlan Mills, William Wulf, Mary Shaw, and Peter Neumann, among many other early Software Engineering community luminaries (My own modest contribution was third from the end of the proceedings, and was delivered to a very small audience who had thankfully decided to stay until the bitter end). But there are also papers by people from disciplines that are no longer considered to be part of Software Engineering. Thus, for example, there was an entire section about databases, including a paper from Michael Stonebraker about his work with relational databases. There was a paper by Peter Wegner about "Research Paradigms in Computer Science", and Hardware pioneer Maurice Wilkes also submitted a paper, albeit about Structured Programming. I distinctly recall Wilkes's presentation during which he stated that Software Engineering was probably not a real scientific discipline, but rather, "a form of low cunning".

Other luminaries, some of whom have long-since left our community attended without presenting. I recall seeing Niklaus Wirth, who had recently released his Algol-W compiler, sitting in a large sofa surrounded by a coterie of admirers. I was intrigued to see him jump up, suddenly abandoning his acolytes, to greet someone else. Who was it that would cause the renowned Prof. Wirth to so suddenly jump up like that? It was Donald Knuth, currently in the midst of writing his then-encyclopedia series of Computer Science text books. It is remarkable

to realize, today, that in 1976 it was still conceivable that one person, Knuth, would endeavor to write a 7-volume set of books purporting to cover all of Computer Science. As we all know now, the discipline of Computer Science exploded so rapidly that even the indefatigable Prof Knuth could not keep up. Neither Wirth nor Knuth has a paper in the proceedings, but they were there to participate in conversations about the future of the young discipline of Software Engineering.

So ICSE 2 was a gathering of a wide spectrum of Computer Science luminaries, all gathered to help work out what the substance of Software Engineering would become. Wilkes's comment, not atypical in the day, suggests why many of these luminaries did not stay with us for very long. And indeed, over the ensuing decades many very estimable people left our community as we have continually focused in, narrowing and deepening the scope of our work. Perhaps we are better off for our focus. But one has to wonder how our community and its work might have developed had more of these outstanding minds stayed with us.

CHAPTER

3

The 3rd ICSE, 1978

The 3rd ICSE - Fact Sheet

Dates:	May 10–12, 1978
City:	Atlanta, GA, USA
Venue:	Hyatt Regency Atlanta
General Chair:	Maurice V. Wilkes†
Program Chair:	Laszlo A. Belady

See page 97 to read about a memory of ICSE-3 by Richard A. Kemmerer.

The 4th ICSE, 1979

The 4th ICSE - Fact Sheet

Dates:	September 17–19, 1979
City:	Munich, Germany
Venue:	Technische Universität München: Neues Hauptgebäude (oder Stammgelände) and Südbau (Robert-Sauer-Bauten)
General Chair:	Friedrich L. Bauer†
Program Chairs:	Meir M. Lehman† and Leon G. Stucki†

“Celebration of the NATO Conference After 10 Years” by Barry Boehm

ICSE-4, in Munich in September, 1979, chaired by Prof. Friedrich Bauer, celebrated the 1968 NATO Conference, also in Germany (Garmisch) and chaired by Prof. Bauer, by having four invited presentations: “Software Engineering As It Was in 1968” (Brian Randell); “Software Engineering As It Is” (Barry Boehm); “Software Engineering As It Should

Be” (Edsger Dijkstra); and “Software Engineering As It Will Be” (Wlad Turski).

Software Engineering As It Was in 1968 (Brian Randell)

Brian Randell’s 1968 survey reflected his thorough approach to computing history. In terms of the marketplace, software was becoming a commodity, and some Chief Information Officers were finding that they were spending about as much on software as they were on hardware, and they were getting concerned that the hardware vendors would start charging separately for their systems software (unbundling). Some related 1968 developments were the issuance of the first patent for software, and the results of the SDC Sackman-Grant study of the impact of interactive programming on software productivity. Interactive programming was helpful, with about a 31% to 67.5% decrease in debugging time, but the differences were small compared to the wide efficiencies in programmer productivity (25:1 in coding time; 26:1 in debugging time; 13:1 in execution speed).

In the area of programming languages, IBM’s PL/1 was not making Fortran and COBOL obsolete, as had been expected. Europeans were more familiar with ALGOL, but ALGOL was also not displacing Fortran and COBOL either. Multiprogramming and time-sharing were also hot topics in 1968, both commercially and in research. Their performance difficulties also spawned a growth in system performance measurement and analysis. Its importance was reflected in the invitation to the NATO conference to Ken Kolence, president of the Boole and Babbage measurement and analysis company.

1968 also witnessed Edsger Dijkstra’s famous “GOTO Considered Harmful” letter, and Larry Constantine’s definition of modularity, coupling, and cohesion. These were followed by Dijkstra’s THE multiprogramming system and in 1969 by his Notes on Structured Programming, which was to spawn offshoots such as Structured Analysis, Structured Design, Structured Testing, etc. Another modular approach was Zurcher and Randell’s Iterative Multilevel Modeling. A further 1968 observation about how many software systems were really organized was Conway’s law: “The structure of a software system reflects the structure of the organization that developed it.”

Finally in October 1968, there was the NATO conference to address what was needed to make the creation and evolution of software into an engineering discipline. It brought together some of the world's software analysts, developers, managers, and researchers to characterize the challenges and responses necessary to make software into an engineering discipline. Its report created a legacy of software engineering challenges and responses that served to inform decades of contributions to software engineering research and practice, but still leaves challenges that persist to this day. One view of the challenges addressed by the conference, but still persisting to this day, is about how to develop software not just to produce the desired functionality, but also to address the slippery challenge of satisfying its non-functional requirements, such as reliability, availability, maintainability, scalability, usability, and affordability.

“Software Engineering As It Is” in 1969 (Barry Boehm)

My challenge was to summarize how well the software engineering field was coming along as an engineering discipline. Fortunately, I had been teaching an MS-level Software Engineering course at USC with about 50 students, and had come across a paper that summarized 10 key principles learned on developing several large projects: William Hosier's "Pitfalls and Safeguards in Real-Time Digital Systems with Emphasis on Programming." These were Testable Requirements, Precise Interface Specifications, Early Planning and Specification, Lean Staffing in Early Phases, Core and Time Budgeting, Careful Choice of Language, Objective Progress Monitoring, Defensive Programming, Integration Planning and Budgeting, and Early Test Planning. Here is a short summary of some of the lessons and some of the student project experience responses.

- Testable Requirements. "It is easy to write specifications in such terms that conformance is impossible to demonstrate."
Experience response: "A requirements spec was generated. It has a number of untestable requirements, with phrases like "appropriate response" all too common".

-
- **Precise Interface Specifications.** “This is apt to be a monumental and tedious chore, but every sheet of accurate interface specifications is, quite literally, worth its weight in gold.”
Experience response: “The interface schematics were changed over the years and not updated, so when we interfaced with the lines, fuses were burned, lights went out, . . .”
 - **Lean Staffing in Early Phases.** “The designers should not be saddled with the distracting burden of keeping subordinated profitably occupied. . . Quantity is no substitute for quality; it will only make matters worse.”
Experience response: “At an early stage in the design, I was made the project manager and given three trainees to help out on the project. My biggest mistake was to burn up half my time and the other senior designer’s time trying to keep the trainees busy. As a result, we left big holes in the design that killed us in the end.”
 - **Defensive programming.** “Programmers should be imbued with the doctrine of anticipating possible troubles and detecting or correcting them in their program.”
Experience response: “The programmer was a victim of the sad illusion that if the users were given a set of rules for entering the data, they would enter the data correctly. She had not even dreamed of the things users could do to destroy the database.”

Hosier’s paper was published in 1961, but its lessons learned were frequently not being practiced 18 years later. One reason was that it was published in the IRE Transactions on Engineering Management, a journal not likely to be familiar to software engineers (It was reprinted in the Proceedings of ICSE-9, where I organized a panel session on “Software Process Management: Lessons Learned from History”). Some other reasons included in the ICSE-4 paper were:

1. The field is growing rapidly. Different approaches are appropriate for open-source software, agile methods, and multi-organization systems of systems such as supply chain management and crisis management, although many of the older principles still apply. The field is also growing in the number of people assimilated per year, leading to point 2.

-
2. We aren't teaching many of the lessons learned to students. A 1979 survey by Prof. Richard Thayer found that 18 of the 20 major software engineering issues were only lightly covered in the instructors' courses. The main reasons given for the light coverage were lack of expertise, lack of texts and other teaching materials, and inappropriateness for computer science departments.
 3. Technology transfer is slow.
 4. We resist the required discipline.
 5. We have our role models mixed up. In one of TRW's non-aerospace companies, the heroes were the indispensable programmers that carried the designs around in their heads, but were there to pull three all-nighters to get the system delivered on time. Jerry Weinberg, a highly humanitarian person, said in his 1971 *Psychology of Computer Programming* book, "If a programmer is indispensable, get rid of him as soon as possible."
 6. We often take a restricted view of software engineering. The restricted view focuses on how soon the project can get through with requirements, architecting, and planning, so that it can get on to the more familiar job of programming (we'd better hurry up and start coding, because we'll have a lot of debugging to do).

The paper continues with a review of recent developments in Requirements and Specifications; Program Design; Programming; Verification and Validation; Maintenance; Software Psychology and Human Factors; and Software Phenomenology and Economics. It concludes by observing that the software field was getting more complex at a faster rate than we could put it in order, and quotes Bill Wulf in a 1979 paper,

"The research described [here] will undoubtedly improve the situation, but history suggests that our aspirations will grow faster than the technology to satisfy them. I, for one, would not want it any other way."

Software Engineering As It Should Be (Edsger Dijkstra)

Edsger Dijkstra's changing the title of his contribution to "My Hopes for Computing Science" reflects his emphasis on separation of concerns. His belief was that computer science was best focused on making computer programming into a precise mathematical science, and that the software aspects of other engineering disciplines such as engineering management, engineering ergonomics, and engineering economics were best left to others. Toward the end of his paper, he identifies two approaches for addressing the need to cover both correctness concerns and efficiency concerns: abstract data types and program transformation, and concludes that they are useful but not complete solutions. A particular shortfall in their coverage is that there can be several forms of efficiency besides computing speed, such as storage efficiency, speed in completing the job, speed and ease of program understanding and modification, and combinations of these.

Earlier in the paper, Dijkstra identifies other difficulties: those of mathematically describing such objectives as "understandability", and those of finding enough mathematically-trained programmers to evolve the world's highly mathematical software. These would be challenges, but such education would be part of his hopes for computing science. A further difficulty is that different users want different combinations of efficiency, and that it may be impossible to develop a program that satisfies them all. Recall the [Weinberg-Schulman, 1974] experiment in which each of five programmers were given a program to develop (solve a set of linear equations using Gaussian elimination), and one of five efficiency criteria to optimize: minimize program size, required memory, or effort to complete, or maximize program clarity or output clarity. Each programmer finished first (or in one case, tied for first) in what they were asked to optimize, but finished last or next-to-last in one or more of the other criteria.

Another part of the Dijkstra paper provides his recommendations on how to proceed in addressing such challenges: (1) separation of concerns and effective use of abstraction; (2) the design and use of notations, tailored to one's manipulative needs; and (3) avoiding case analysis, in particular combinatorially exploding ones. A difficulty with step 3 is that there may be many users with different priorities, and as above,

satisfying them all may be impossible. Elsewhere in his writings, Dijkstra expresses his antipathy to the term “user” (see EWD 618 and 791), and concludes that it has no place in a mathematical discipline of computing science. Other definitions of the terms “computer science” and “engineering” suggest a broader concern of software engineering than just programming. The 1967 Newell-Perlis-Simon definition concludes that “computer science” should be “the study of the phenomenology surrounding computers.” For “software engineering,” a good definition can be made by specializing the Webster or Wikipedia definitions of “engineering” to software: “The creative application of scientific principles to design or develop software.” A related observation from Simon Ramo at TRW was that for the engineering of complex systems, TRW’s most valuable engineers were T-shaped. They had deep understanding of their specialty discipline, but also had enough understanding of other disciplines to be effective in helping to create complex multidiscipline systems.

This does not mean that every software engineer needs to be T-shaped. Other difference-makers in developing excellent complex systems are deep domain specialists. An excellent example was Edsger Dijkstra, with his deep contributions to software engineering, such as structured programming and the THE system; identifying harmful programming features such as the GO TO, guarded commands, and in appropriate contexts, separation of concerns.

Software Engineering As It Will Be (Wlad Turcki)

If Wlad Turcki were to come back today, I think he would be much surprised at how different software engineering is from his predictions in *Software Engineering As It Will Be*. He was right-on in predicting that nearly everyone would be relying on computers and software. His vision featured that nearly everyone would be learning how to program, starting in primary schools, and graduating to increasingly powerful programming methods, languages, and tools. A good part of his paper discusses the challenges of such powerful languages: they should be extensible, modular, adaptable, and scalable, but also having versions embodying a person’s natural language: a formidable problem. I had the feeling that he had spent some nontrivial time exploring how such

languages might look, feel, and act across multiple natural languages. He also discussed and highlighted the challenge of making products of such languages reliable, safe, and secure, especially if they needed to execute on a variety of platforms.

As we know now, the evolution of human-computer interfaces diverged incredibly from Wlad's projection of human-computer interaction. It was also in 1968 (December) that Doug Engelbart at SRI gave "the mother of all demos" at the ACM/IEEE Fall Joint Computer Conference in San Francisco. It demonstrated almost all of the fundamental elements of modern personal computing: windows, hypertext, graphics, efficient navigation and command input, video conferencing, the computer mouse, word processing, dynamic file linking, revision control, and a collaborative real-time editor (collaborative work).

I was at the Rand Corporation in 1968, using DARPA interactive computing technology to develop a system for aerospace engineers to interactively specify a rocket vehicle's characteristics and to visualize its resulting performance. I wasn't at the FJCC, but saw a movie of the demo soon after, and was blown away at its prospects. A further paradigm shift emerged in October 1969 with the first message sent over the Arpanet from UCLA to SRI, and a working 4-node version of the Arpanet by December 1969. Further productization of these capabilities came with Xerox-PARC and their engineering of the technology into the Alto workstation, Steve Jobs in making a reasonably-priced version of the Alto with the Macintosh, and Bill Gates converting his Microsoft infrastructure into Windows. Further Apple exploitation of microelectronics technology led to the emergence of smartphones, and calling up your desired services by poking at something you hold in your hand, and more recently by speaking to it: a far cry from Wlad Turski's everyone-a-programmer vision in 1969.

This is tremendously powerful technology, that can be used to empower people, or also to empower governments to control people. For a couple of looks at the possible future evolution of such technology, I'd recommend for the former that you look at the article, "Estonia, The Digital Republic," by Nathan Heller in the December 18, 2017 issue of the New Yorker. For the latter, I'd recommend that you look at the article, "Inside China's Vast New Experiment in Social Ranking," by Mara Hvistendahl in the December 14, 2017 issue of Wired.

Recollections by Walter F. Tichy

The 4th ICSE, which took place at the Technical University Munich in Sept. 1979, was the first conference I ever attended. At the time, I was finishing my PhD at Carnegie-Mellon University and had already started teaching as assistant professor at Purdue University. Even though the conference brought me back to the place of my undergraduate education, I remember being overwhelmed with coming face to face with so many famous people, a feeling that is probably shared by all students at their first scientific meeting. The luminaries I distinctly remember were F.L. Bauer, L. Belady, B. Randall, and E.W. Dijkstra. Looking over the proceedings now, I'm amazed how many software researchers were on the program who already were, or would later become, well-known researchers, although I did not get acquainted with them until later in my career.

There are two observations I would like to share, one about how the publication process worked at the time, the other about the style of papers then and now.

When a paper was accepted back then, the publisher would send the main author a set of over-sized model pages. A model page outlines the title area, two text columns, the spot for the page number, etc., in light blue boxes. You were then expected to type (with a typewriter!) the text into this outline. Given my typing skills, I was not thrilled about the prospect of using lots and lots of correction fluid! Fortunately, CMU already had one of the early xerographic printers, and Brian Reid had just developed Scribe, a document formatting system (a precursor of Latex). To put the text on the model pages, I printed the paper in single column format and then cut out and glued the columns onto the model pages. I also glued in the diagrams. Then I sent the pages to the publisher who would photo-reduce the pages to the proper size. The internet did not exist yet, so reviewers would receive packages full of paper copies. I remember participating in conference committees later on, where the program chairs lugged several suitcases full of articles to the meeting. Today, the call for papers, article preparation, submission, and reviewing are all done digitally. Program committee meetings often take place in cyberspace. Conference proceedings don't even get printed anymore. Instead, attendees get a URL to download

the papers. The entire process has been digitized and internetized. Still, I miss printed proceedings!

Regarding paper styles, the empirical side was under-developed in 1979. The proceedings include 44 articles. The volume begins with a historical perspective, a state-of-the-art survey, and ends with two opinion pieces. The majority of the papers present new techniques and tools. However, empirical research is not completely absent: There are a few case studies, experience reports, and four papers on software metrics, all of which I would definitely classify as empirical. The metrics papers are the only ones whose primary aim is to present and analyze data, though there is no hypothesis testing. The articles on techniques and tools (mine included) are written in “advocacy style”: The authors describe what they developed, but do not provide experience reports or careful evaluations. These deficits were noted by several attendees, in particular Les Belady. Perhaps at the time authors thought that they had developed entirely new capabilities, whose advantages were so obvious or so new that a comparison was unnecessary or impossible.

The situation today is completely different: It is hardly possible for a paper to be accepted at ICSE and other conferences without quantitative evaluation or experimental results. The rise of software repositories in the 1990s simplified empirical analyses a great deal, as one can evaluate automated tools on the data post facto without human subjects. Experiments about software processes, however, still require human participants, as it is difficult to vary or control the process used post facto. The need for empirical studies in software engineering was hotly discussed in the 1990s. This discourse has led to much more rigorous scientific standards in software research today. Software Engineering is of great societal importance, and today, the research undergirding it is on a firm, scientific footing.

CHAPTER

5

The 5th ICSE, 1981

The 5th ICSE - Fact Sheet

Dates:	March 9–12, 1981
City:	San Diego, CA, USA
Venue:	Town & Country Resort & Convention Center
General Chair:	Seymour Jeffrey
Program Chair:	Leon G. Stucki†

The 6th ICSE, 1982

Victor Basili

ICSE 6, September 1982 was the first ICSE held in Asia. Prior to this, the only ICSE held out of the US was the 4th ICSE held in Munich, Germany. At the time, ICSEs were run every year and a half, alternating between the spring and the fall. The IEEE Computer Society was the original sponsoring organization for ICSE. Co-sponsors for ICSE 6 included ACM SIGSOFT, the US National Bureau of Standards, and the Information Processing Society of Japan. ACM became a co-sponsor later when the conference was run every year, rather than every 18 months. For many years ICSEs were identified by their number rather than by their date.

ICSE 6 was the first conference of its size and focus run in Japan and was organized in Tokyo. The venue was Gakushuin University. This university and its attached schools were originally founded for the education of the Imperial family and provided a beautiful campus. The Japanese contingent provided tremendous organizational support.

There were two honorary chairmen, Koji Kobayashi, the president of the Nippon Electric Company (NEC) and Professor Raymond Yeh from the University of Maryland.

The General Chair was Professor Yutaka Ohno from Kyoto University. In Professor Ohno's forward to the conference he pointed out that

The 6th ICSE - Fact Sheet

Dates:	September 13–16, 1982
City:	Tokyo, Japan
Venue:	Gakushuin University: 100th Anniversary Memorial Hall
General Chair:	Yutaka Ohno†
Program Chairs:	Victor R. Basili and Hajime Enomoto†
Honorary Chairs:	Koji Kobayashi† and Raymond T. Yeh

“the increased quality and productivity of software has become of vital importance in Japan ... the significance of this conference taking place, in as it does in the Asian region, can therefore not be underestimated”.

The Program Chairs were Professor Victor Basili from the University of Maryland and Professor Hajime Enomoto from Tokyo Institute of Technology.

The call for papers included both regular and short papers. The regular papers were reviewed on the basis of quality and relevance to the conference. The short papers were reviewed on the basis of interesting ideas and valuable experiences. There were 245 full papers submitted (39 accepted) and 46 short papers submitted (16 accepted). There were six reviews for each paper. There were two program committee meetings, one in Tokyo and one at the University of Maryland, each over a period of 2 days. You must remember that although we had email, there was not much computer support of any of the activities. Program Committee Members were from 16 countries: Australia, Austria, Brazil, Canada, China, England, France, Italy, Japan, Korea, Poland, Sweden, Switzerland, West Germany, the USSR, and the USA. There were 644 reviewers.

This was a larger number of papers accepted than prior ICSE conferences. The goal was to expand the set of published papers to provide maximum a larger audience.

The Keynote speakers covered three continents: Professor Fritz Bauer from the Munich Technical University, Germany, Dr. Gerald Weinberg, Gerald M. Weinberg and Associates, USA, and Professor H.

Yamada from the University of Tokyo, Japan.

As there was a large local audience, so the talks were translated into Japanese.

There was a Tool Fare organized by Kouichi Kashida which displayed the state-of-the art software engineering tools on micro computers and personal computers. There were Poster Sessions organized by Dr. I Toda to allow for the presentation of ideas not ready for publication.

The organization was exceptional, done mostly by Japanese volunteers, from the panels to the meals, to the ambiance.

As I was the only American on the organizing team, I was the liaison to the IEEE Computer Society. We began our meetings in the fall of 1980. It was my first interaction with the Japanese, so I was not well versed in their customs nor them in ours. One humorous thing I learned after our initial negotiations was that “hai”, which I assumed to mean, yes, I agree, really meant, yes, I understand. So I returned from my first organizing meeting thinking several issues were settled, only to discover that the Japanese negotiation concept of consensus required several meetings on the Japanese side before agreement was provided.

The 7th ICSE: “1984, then and now”

William E. Howden and Jean-Claude Rault

1984 was a year for major new programs of research and training in software engineering. Carnegie-Mellon University was selected as the location for the new DOD-funded Software Engineering Institute. The European Strategic Program on Research in Information Technology (ESPRIT) was starting.

Progress in software engineering has been consistent with Fred Brooks’ predictions in his 1987 paper “No Silver Bullet”: significant improvements will be made through steady progress in a variety of disciplines, but there will be no silver bullet that will eliminate the essential complexity of computer programs. The following paragraphs describe some of the differences between software engineering in 1984 and today.

Some of the important *programming languages* ideas today can be traced back to 1984. Fortran was the most popular language in 1984 but object-oriented programming had begun, with C++ and Objective C. The most popular language today is Java. Functional programming can be traced back to Lisp and today its progeny, such as Clojure, are mainstream. Concurrent programming became more accessible with the introduction of Ada 83. The languages we have today also include those motivated by the internet, such as Javascript, Ruby, Python and PHP. The programming languages state-of-the art at ICSE 1984 was

The 7th ICSE - Fact Sheet

Dates:	March 26–29, 1984
City:	Orlando, FL, USA
Venue:	Hyatt Orlando
General Chair:	Terry A. Straeter†
Program Chairs:	William E. Howden and Jean-Claude Rault

represented by programming tools and techniques for the languages at that time.

The subject being 1984, the writings of George Orwell were searched to find something that might be relevant. In *Politics and the English Language* (1946), he wrote:

“Probably it is better to put off using words as long as possible and get one’s meaning as clear as one can through pictures and sensations. Afterward one can choose—not simply *accept*—the phrases that will best cover the meaning, and then switch round and decide what impressions one’s words are likely to make on another person.”

In 1984, *programming environments* were relatively simple. Development processes were built around the structured methods: structured programming, structured design and structured testing (white box coverage). The world is very different today, with dozens of IDE’s (Integrated Development Environments). Many tool sets are oriented to UML models and to design patterns like MVP. Use of the so-called cloud has facilitated cooperative development. ICSE 1984 included early work on some of the components of today’s more complex environments. Tichy described a revision control system for the Unix environment; Osterweil described the principles for a development environment that contained an integrated set of tools; and Taylor and Stanish considered what would be needed in a programming environment for Ada. In related work that was typical for this period, Mohri et al. developed support technology for the use of PDL (Programming Design Language); Scheffer, Rzepka and Stone described research on the

evaluation of older methods like SREM; and Teitleman described a programming environment for experimental program construction using the language Cedar.

By 1984, many of the foundational ideas for *software testing* had been developed: coverage measures, assertions, symbolic evaluation, and black and white box testing. This work has continued at a steady pace over the years, with the development of new testing ideas such as operational profiles. In addition, older ideas have been applied to new programming languages. For example, symbolic evaluation has been used in industrial tools for automated test generation for Java class methods. We also saw the development of test frameworks and JUnit. One of the most important developments was test-driven program development, in which tests form a kind of incremental specification. The research described at ICSE 1984 represented the state-of-the art at the time. Ntafos described a new coverage measure called “required element testing” and Zeil used perturbation testing for computational errors. Hennell, Hedley, and Riddell described their experience with the LDRA industrial tool set, whose testing component was based on code segment coverage.

Early work on *program design* included structured and top-down program design. It also saw the development of key ideas like information hiding. The design world today is very different. Incremental development has been emphasized, in which executable functional threads are implemented and then augmented, serving as progressively more complete versions of a system. There has also been the development of design patterns, from MVP at the system level, to patterns like Singleton and Visitor at the programming level. UML has replaced the structured design diagrams, broadening the application of design representations to additional programming paradigms such as object-oriented and concurrent programming. The ubiquity of personal computers and the internet has emphasized the importance of *user interface design*. The post-1984 world saw the development of Java Swing classes, which allowed programmers to plug in graphical user interface components.

The state-of-the art for program design was represented at ICSE 1984 in work by Duncan *et al* where they compared the use of top-down design to information hiding in the development of an Ada com-

munications program. Parnas, Clements, and Weiss described an extension to information hiding called a “module guide”, which assisted in the understanding of complex systems. Pre-1984 design methods included the techniques described in Jackson’s *Principles of Program Design*. Lucena, Martins, Veloso, and Cowan compared the Jackson method to their new data transformations methodology for file processing programs. Draper and Norman described several simple principles for software engineering for user interfaces. A comparison of this paper with the contents of Norman’s 1988 classic work, *The Design of Everyday Things*, indicates how much richer the knowledge of design became after 1984. And of course, in 1984 we had the first Macintosh computer, and the world was never the same.

Static analysis is another area that began in the 1970’s that is significantly more developed today than in 1984. Initially, we had tools such as Lint. Other static analysis tools used data flow analysis. One of the first of these was DAVE, (Osterweil and Fosdick), for detecting references to undefined variables in Fortran programs. The post-1984 era saw the widespread integration of static analysis tools into new development environments. The work presented at ICSE 1984 represented static analysis at that time. For example, the LDRA tool set, referenced above in the testing section, included typical static analysis capabilities. Static type-checking is another form of static analysis. Static type-checking since 1984 is both more refined and more widely used. It includes, for example, techniques like defined types, and new forms of type inference.

In addition to programming languages, environments, testing, design, and static analysis, other important areas were covered at ICSE 1984. State-of-the art work was presented in *formal specifications, static analysis, reliability measurement, cost estimation, error processing, complexity measurement, metrics, artificial intelligence in software engineering, and software verification*.

The 8th ICSE, 1985: “Highlights”

Barry Boehm

ICSE-8 was held at Imperial College in London. Manny Lehman was the General Chair; Horst Hunke and I were the co-Program Chairs. It was 10 years after ICSE-1; for a while, the ICSE conferences were held ever 18 months. Starting with ICSE-9 in March 1987, ICSE would go to annual conferences in the March-May timeframe. In the 10 years since ICSE-1, the software engineering field was showing significant signs of becoming more of an engineering discipline. Large companies were creating software policies, standards, and support environments in the US, Europe, and Japan. The US Department of Defense had established the Software Engineering Institute at Carnegie Mellon U., with John Manley, an ICSE-8 author, as its Director, and Prof. Mary Shaw at CMU as its Chief Scientist. NASA-Goddard, U. Maryland, and Computer Science Corp. had formed the NASA Software Engineering Laboratory, which contributed 3 ICSE-8 papers. Japan was three years into its ambitious 10-year Fifth Generation Computer Systems program, combining massively parallel computing, software engineering and artificial intelligence. This was stimulating similar initiatives in Europe (ESPRIT), the UK (Alvey), and the US (Strategic Computing Initiative, Microelectronics and Computer Technology Corporation (MCC), and the Software Productivity Consortium). Some of these were covered

The 8th ICSE - Fact Sheet

Dates:	August 28–30, 1985
City:	London, UK
Venue:	Imperial College London: Sherfield Building
General Chair:	Meir M. Lehman†
Program Chairs:	Horst Hünke and Barry Boehm

in an ICSE-8 panel led by Les Belady, the leader of the MCC software initiative.

ICSE-8 selected 49 papers out of over 260 submissions. There were three main streams: Software Process and Environments; Software Engineering Methods, and Software Engineering Management Issues, plus a number of panels. Some of the highlights were:

- Sam Redwine and Bill Riddle’s study of Software Technology Maturation. They investigated 17 software technologies, such as formal verification, compiler construction, abstract data types, structured programming, software acquisition standards, cost models, Smalltalk-80, and Unix. For each technology, they tried to identify when they went through the stages from concept formulation to popularization. They were not able to get precise data on the technologies, but got enough to conclude that it takes about 15 to 20 years to go from appearance of a key idea to being popularized in the community.
- A panel brought together by Barbara Kitchenham and Howard Rubin of the proprietors of four cost estimation models to compare their estimates, using a description of a project coming from an IBM education workbook. The resulting estimates were not very uniform: the Jensen JS-2 model estimated 940 person-months; the Putnam SLIM model 200, Estimacs 112, and GECOMO (Paul Rook’s UK extension of COCOMO) 363 person-months. The panel concluded that a main source of diversity was the differences in each model’s cost driver parameters, and that further comparisons should be made on several projects whose efforts were

known, and to try to create a Rosetta Stone relating the models' cost driver parameters to each other.

- A closing panel led by Bob Balzer explored the role of logic and artificial intelligence in the software enterprise, as this was going to be a major theme for ICSE-9. The panel discussion indicated that this would be a challenge due to the complexity of human intelligence, but one worth pursuing.

The 9th ICSE, 1987: “A Retrospective Note”

Kouichi Kishida

March 1984, after the closing session of 7th ICSE, I received a surprise message from the steering committee of the conference telling that “you are nominated as a program chair for the 9th ICSE scheduled in the Spring of 1987”. It was the start of my 3 years conference planning activity as a member of the 4 persons team: General Chair - William Riddle, Program Cochair - Robert Balzer and myself, and Tools Chair - Larry Druffel.

My first contact with ICSE community was 1976. I have attended 2nd ICSE held in San Francisco. Since then I have kept participating in series of conferences and served as a PC member from 1983. In the case of 6th ICSE held in Tokyo, I volunteered some back-ground jobs for the planning and operation of the conference with my colleagues in Japanese software industry.

I’ve entered into the world of computer software in early 1960s. It was the midst of machine language programming age. I was fascinated by the mysterious appearance of machine language program code, and also by the shape of various diagrams used to describe program structure.

In 1966, so-called Structured Program Theorem Paper was published in the May issue of the CACM magazine. This small mathematical paper provoked an intellectual stimulation among the people

The 9th ICSE - Fact Sheet

Dates:	March 30–April 2, 1987
City:	Monterey, CA, USA
Venue:	Monterey Conference Center
General Chair:	William E. Riddle†
Program Chairs:	Robert M. Balzer and Kouichi Kishida

who are interested in the issue of program structure design. Around the year 1970, a surge of the wave called “Structured Programming” swept all over the world. This phenomenon was the last effect brought by 20th century’s philosophical trend “Structuralism”.

I got caught in this wave, and tried to develop a unique program design method using hierarchical set of flowcharts. Those flowcharts looked like a kind of abstract art to my eyes. Beside working as a computer programmer, I was somehow deeply involved in artistic activities as a member of an avant-garde artists group. So, my behavioral principle in software design was just to make complicate program execution process visible for eyes of end users by a set of hierarchical flowcharts. For me, drawing action of program flowchart was similar to abstract art painting.

About a half century ago, German artist Paul Klee gave a short speech in the opening session of his seminar at Bauhaus. He pointed out the conceptual difference between analysis in science and analysis in art. Analysis method in science is product-oriented. Artist-style of analysis is completely different. Product-oriented analysis to a given masterpiece in a museum is only useful to make a fake art. The main purpose of analysis in art is to study the PROCESS, how that masterpieces was created.

I followed this artistic process-oriented paradigm in my software design practice. The major concern was how to make proper balance between the static concept of STRUCTURE and the dynamic concept of program execution PROCESS.

February 1984, the 1st International Software Workshop (ISPW) was held in England (Egham, near London). The organizer of this work-

shop Prof. M.M.Lehman kindly invited me as an observer, then I became a regular participant of ISPWs. This series of workshops were the stage of planning discussion of 9th ICSE.

Discussions at 1st ISPW were fairly interesting but rather chaotic. Young planning staffs of 2nd ISPW (held in California in 1985) tried to organize various conceptual items around process issues. This effort was half successful. I myself have recognized the important role of software tools that can introduce radical change in development process.

3rd ISPW was held at a ski resort up in Rocky Mountain Colorado (home ground of our general chair Bill Riddle) in 1986. There were many suggestive topics presented at this workshop. The most stimulating presentation was “Software Processes Are Software Too,” by Lee Osterweil. After the workshop, as the program co-chairs, Bob Balzer and I discussed about the keynote of next ICSE and selected this talk. Next year, the opening keynote speech of Lee Osterweil with counter talk of M.M.Lehman at the 9th ICSE in Monterey gave a big impact to the software engineering community, and the concept of “Process Programming” proposed in that keynote became a major discussion topic in 1990s.

The 10th ICSE, 1988

The 10th ICSE - Fact Sheet

Dates:	April 11–15, 1988
City:	Singapore
Venue:	Raffles City, Pan Pacific Hotel
General Chair:	Tan Chin Nam
Program Chairs:	Larry Druffel and Bertrand Meyer

Memories by Tan Chin Nam

The 10th ICSE was held in Singapore at the newly built Raffles City Convention Center, which also housed the world's tallest hotel at that time; the 73-storey Westin Stamford. I was invited to be the General Chair of the conference, a role I found meaningful and compelling as I was then the Managing Director of Economic Development Board (EDB), the investment marketing agency of Singapore as well as Chairman of National Computer Board (NCB), which was set up to drive Singapore into the information age. I was assisted by Yeo Chun Cheng,

an NCB Research Software Engineer, to help organise the conference as the local host.

The Conference started with two tutorials that each went for two full-days, covering the latest trends in Software Engineering. Tom De-Marco hosted one of these sessions, to a fully-packed audience.

The Conference proper was divided into two tracks over three days—a conference track and a Tools Fair. Software practitioners and academics convened over these few days to share and discuss new developments in software for the conference track, and software product vendors and researchers exhibited their latest creations at the Tools Fair. Larry Druffel from the Software Engineering Institute, Carnegie Mellon University (CMU), chaired the Programme Committee, while Grady Booch from Rational Software and Wong Seng Hon from Singapore's National Computer Board chaired the Tools Fair. Lim Swee Say, CEO of the National Computer Board and Founding Director of the Information Technology Institute (ITI) organised the entertainment and publicity programmes. Swee Say has since moved on to politics and is currently Singapore's Minister of Manpower.

On the evening of the first day of the conference proper, attendees were treated to a night of sumptuous feasts of fusion food and cultural performances showcasing the rich cultural heritage of Singapore.

It was really the beginning of the graphical user interface; many companies showcased graphical software engineering tools on the recently popular IBM PCs and the Apple Macintoshes. High-end Silicon Graphics Computers were also making their initial foray. Singapore's own Computer Systems Advisers (CSA) showcased its award-winning Picture-Oriented Software Engineering (POSE) tool, developed with technology from the ITI.

Another area of great interest was object-oriented languages. Rational Software demonstrated their latest Object-Oriented Development Environment.

It is interesting to note how the technologies from those days have evolved, and are still used today in smartphones. For example, the programming language used in the iPhone is Objective C, one of the more popular Object-Oriented languages at the time.. The current Apple's Xcode Development environment shares many similarities to the early Rational Development Environment.

The titans of the software engineering world were all present - Barry Boehm, David Barstow, Grady Booch, Tom DeMarco, Larry Druffel, Les Belady, etc.

It was also the beginning of the government's IT push in Singapore. Les Belady whom I first met at the IBM Watson Research Lab at Yorktown was a key adviser in this development. Les introduced the discipline of software engineering to the study team of six led by the Founding Chairman of NCB, Mr Philip Yeo, when we visited him. This laid the foundation for the NCB to develop expertise in structured analysis and programming to tackle the mammoth task of national computerisation.

In the early eighties, Singapore recognised the importance of Information Technology for the development of the Singapore economy and nation building. The National Computer Board was set up to coordinate the government's overall push into Information Technology for our economic competitiveness and enhanced quality of life. The NCB and the Ministry of Defence's Systems and Computer Organisation formed the Joint Software Engineering Programme led by Lim Swee Say to develop the software engineers required to drive the IT transformation. A concerted effort was put into the development of the talents needed to nurture this industry, and the government orchestrated a wide reaching drive to computerise the various government ministries and government services under the National Computerisation Plan with seven versions of the National IT Plan to date and a more recent overlay of Singapore's Smart Nation initiative, as a natural follow through of the Intelligent Island vision.

We have come a long way since the 10th ICSE was convened in Singapore. It was an important milestone in our IT journey and history, as we evolve into the digital age stronger and better as a nation, and as valued partners to other countries.

“ICSE 1988 in Singapore: an education in software engineering research management” by Bertrand Meyer

Forty ICSEs: what a unique journey! Through all these years, ICSE has been the vector of the software engineering community. Every one of its members has ICSE stories to tell, stories of encountering new ideas, of meeting brilliant colleagues, of coming across new ways of building software (and inevitably, for those of us who submit papers, of being rejected, unfairly of course, but we survived and our papers improved). It was a great honor to serve as program chair for ICSE 1988 in Singapore.

ICSE 1988 was a great vintage. As attested by the Most Influential Paper award ten years later, one of its highlights was the Statemate paper by Harel, Pnueli and their colleagues. It was not the only notable contribution; the proceedings have papers by many of the field's luminaries such as Wing, Boehm, Kaiser, Basili, Notkin, Roman... I remember many lively presentations and discussions at the conference; authors were all excited to be in Singapore and gave their best. One amusing moment happened during the post-mortem PC meeting after all sessions had closed. In the discussion of lessons learned and suggestions for the next conference, I said that we should include a keynote by a notable representative of the personal computer industry; they must, I argued, have things to teach us about software development. I believe I cited Philippe Kahn, then of Borland and Turbo Pascal, as an example. The reaction, to my surprise, was negative: these people are not into real large-scale development, they do not belong in our conference. The attitude quickly changed in subsequent years, and PC software has been richly represented at ICSE. At that time, however, there was still a dose of condescension towards personal computer software, an impression that true software engineering was about large projects in industry and government. Today, of course, such a dividing line no longer exists.

Having ICSE in Singapore was for me the story of a team failure that unexpectedly led to personal opportunity. Even though I lived in the US, in Santa Barbara where I had started Eiffel Software af-

ter a short stint as an academic at UCSB, I had kept close ties with the French software engineering community and we prepared a strong proposal to hold ICSE 1988 in Nice. That would have been the first ICSE in France. It happened in 1990 (through a new proposal in which I was not involved), but for 1988 our proposal lost to Singapore. We were disappointed because we felt France, with its vibrant software industry, and the Nice area, with its thriving mini-Silicon-Valley (the Sophia-Antipolis area), were the obvious choice. An influential member of the committee was pushing hard for Singapore, however, and I assume the idea was to help the enterprising Singaporean community to put itself on the research map, although in the end the accepted papers included little local participation. Today, as everyone knows, the Singapore research community is a major world player, with NUS and other Singaporean institutions vying for the top spots in rankings for many fields including software engineering. I like to think that the ICSE committee's far-sighted decision back then to bet on a new player (disappointing as it was for the competing proposal's backers) played some role in this breathtaking development.

The consequence for me was to trade the position of conference chair (which I would have taken on in Nice) for program chair. I am immensely grateful that the committee put its trust in me. For someone in his mid-thirties, it is an irreplaceable experience to gain an early snapshot of the year's crop of best and latest research, and to manage a program committee made of the absolute top names in one's field—most of whom at ICSE 1988 (including my co-chair Larry Druffel) were senior to me. I am proud of the program we produced.

I organized one of the PC meetings close to home in Santa Barbara, an opportunity to convene a small symposium on software engineering. I was mostly an entrepreneur rather than an academic (somewhat of a rarity in such positions, since many industry people just do not have the time and resources for such endeavors) and learned a lot about the culture of research management and refereeing.

I remember a discussion about a paper by a prestigious professor, who was also in the PC and at the meeting. The referees' comments were negative. One of the members fought for the paper, saying it described a project into which a government agency was pouring lots of money, and it would be wrong not to have it represented at ICSE.

Others countered that the same criteria should apply to this paper as to all others. They won; the committee rejected the paper. While the decision was correct on principle, I am not sure what stance I would take today. One should look at the substance. “Bad reviews, reject!” is an easy decision, so easy in fact that it does not even require a PC meeting; an algorithm would suffice. One should not dismiss outright an argument of the form “*the current paper may not be very good, but this ongoing project is important and the community should know about it, that’s what conferences are for*”. I can envision the same debate at a PC meeting today; the community has still not decided between the two views of professional conferences: publication of record (“journal in a hotel” in Lance Fortnow’s phrase), or opportunity for presentation of current progress?

At the discussion of another paper, a Famous Computer Scientist on the committee expounded that it was UNETHICAL (pronouncing this work in a thundering voice) for a paper on topic T not to cite project P. That paper too was rejected. Famous Computer Scientist also happened to be the leader of project P. He may have been right on substance, but this short discussion convinced me further that anonymous refereeing is wrong, at the least the asymmetric kind of anonymous refereeing where the referee knows who the author is but not the other way around. With open refereeing, you can write: “*Why do you not cite my work?*” Immodest perhaps, but honest. Anonymity opens the way for abuses.

Discovering Singapore was an extraordinary experience. The dynamism of this rapidly expanding economy and its people bedazzled all visitors. Some ICSE participants stayed at the legendary Raffles hotel, where we convened for many discussions. The Raffles had not yet undergone major remodeling (nowadays, it looks more like your average 5-star) and still reeked of its colonial past, as if Somerset Maugham might any minute join the conversation at the bar. A fascinating if harrowing sight was the ongoing reconstruction of the old town. I went every morning to watch the bulldozers at work; in the few days that the conference lasted, they removed an entire city block under our eyes, making way for today’s gentrified residences, no doubt sporting all amenities but lacking the old charm.

At the conference itself, our company, Eiffel Software, rented a

booth. Setting up a technical exhibit in a remote land where we knew no one was a gambit, but it all worked out. That presence gave us the opportunity to display the nascent Eiffel IDE and explain the concepts of object-oriented software engineering including Eiffel's Design by Contract mechanism. The first edition of my book *Object-Oriented Software Construction* had just appeared, without the notoriety that it gained later, but we managed to get a few copies into Singapore. As usual at ICSE, but perhaps even more than usual because of the novelty and attraction of the conference location, everyone who was anyone in software engineering attended, the source of countless discussions and insights.

In addition to these international colleagues, many of the visitors to our booth were local, leading to many long-term relationships, particularly invitations to come back and give seminars. As a result, I visited Singapore again many times in the following years, teaching OO and systematic software development to enthusiastic audiences. These visits provided me with many fond memories of software engineering in Singapore; none fonder, however, than the magic of the 1988 ICSE.

Recollections of ICSE 10 & 11 by Larry Druffel

I had the privilege of being the Program Chair for ICSE 10 in Singapore in 1988, and General Chair of ICSE 11 in Pittsburgh in 1989. Reviewing the topics of the two reveals much about the important research and industrial focus at that time.

The venue of these two conferences, although different in many dimensions, contributed to the excitement that surrounds each ICSE. Singapore was a delightful location that offered opportunities for vacation travel (e.g., Grady Booch and I were able to visit Hong Kong and mainland China with our wives on the return trip), Singapore was also growing a software industry supported by research presence at the National University of Singapore. Pittsburgh was emerging from the loss of its coal and steel industrial base with a growing software community lead by Carnegie Mellon University, both with startup software companies and the Software Engineering Institute.

Software was emerging as an important enterprise. Corporations were beginning to realize that software engineering must be a core

competency. The number of universities with degrees in software engineering was growing. The European Software Engineering Institute was created in Spain. Research funding for software engineering was growing. Aircraft designers were talking about the conversion from fly by wire, to fly by software.

The major topics of papers and ensuing discussion included:

Software Development Environments. Much of the discussion in the early 1980's focused on individual software tools, such as configuration management. By the middle of the decade, the conversation evolved to software development environments. At ICSE 10 and 11, not only the research, but also product development discussion was focused on "Integrated" Software Development Environments. Papers described not only research environments but also commercially available products with different philosophies supporting integration. One paper that described the emerging plans for a software development environment to support Space Station was notable as a signal of the importance of supporting a system that would be in operation into the next century.

Software Process Modeling and Management. Although Barry Boehm had much earlier shown that a spiral model of software development is both more effective and realistic than the waterfall model, in practice, companies continued to use the waterfall model, often driven by government practices. Several papers at ICSE 10 & 11 were directed toward discussion of alternative process models. Often the discussion was aimed at methods of improving productivity and there were several proposing alternative measures of productivity. Watts Humphrey, then a retired IBM Executive working at the Software Engineering Institute offered a process model consistent with the teachings of Peter Deming. This model would eventually receive widespread acceptance internationally.

Software Productivity Measurement. Discussion of software productivity centered largely on lines of code, but even the line of code definition was debated. Much of the impetus for this research came from corporations and government organizations that wanted to apply cost models. Although some of the papers argued for measures of productivity based on number of bugs per unit (usually one thousand lines of code), there was a strong sense among the research community that lines of code was an artificial measure.

Distributed Systems and concurrency. Many examples of distributed systems were working their way into fielded systems, but there was little support for analyzing such systems or even models of how they were to be managed. An avionics system developer described the challenges of moving from a federated system of processors, each tied to a sensor or group of sensors, to a truly distributed system of processors. There was recognition that protocols would be needed for autonomous operation of nodes in a distributed system as well as the need for failure recovery. Mathematical models of concurrency were offered.

The Past and Future of Software Engineering. In my opening comments for ICSE 11, I highlighted two Panels that were to: (1) discuss the maturity of software engineering; and (2) predict the future of software engineering. I compared software engineering to my personal experience as an electrical engineer and noted that few, if any, analytical methods based on solid mathematics were available to software engineers. In those opening remarks, I outlined the SEI vision for the future of the profession and suggested that in addition to analytic methods, we needed focus on software architectures. I used an analogy that as a young electrical engineer I saw how the super heterodyne receiver served as an architecture that evolved into a standard, allowing the introduction of new technologies, such as transistors and mechanical filters to improve performance.

The retrospective panel was “A Twenty Year Retrospective of the NATO Software Engineering Conference”. Panelists (Jim Tomayko, David Gries, Bernard Galler, Mary Shaw and Doug Ross) discussed progress toward software engineering becoming an accepted profession. Arguments for it were that some governments were considering licensing of software engineers and the evolution of software engineering degrees at universities. There was also the sentiment that software engineering still had a significant amount of maturing to do.

ICSE 11 also featured a panel discussion of the “Future of software engineering in the year 2001” (that year being the first year of a new century). Panelists (Michael Jackson, Alan Kay, Michael Sintzoff and Bob Balzer) offered their predictions not only based on expansions of the expected maturity of the research topics of the day, but also proposed automated programming based on artificial intelligence, and a mathematical rigor in testing.

Other Topics. Typical of other ICSE conferences, there were harbingers of future topics. Words and phrases that were included in topics of papers included: object oriented, real-time, real-time automation, software reuse, abstract data types, automated debugging, open systems, software visualization, specifications, requirements, prototyping, formal methods, and software architecture.

The 11th ICSE, 1989*

Dines Bjørner

During the 1980s, besides a chair in Computing Science at the Technical University of Denmark, I was scientific director of the Danish variant of a software engineering institute: the Dansk Datamatik Center. Among our activities were those of developing two sets of mathematical semantics and full-language, commercial compilers for the International Telecommunications Union's CHILL and the US DoD Ada programming languages. As a result I often traveled the US, visited the DoD Software Engineering Institute whose leader, Dr Larry E. Druffel, I am rather fond of. Perhaps as a result of that I was an invited speaker at ICSE 1987 in Monterey, California. And, perhaps as a result of that I was then nominated co-chair of *ICSE 1989*.

My co-chair, Richard E. (Dick) Fairley, being based in the US, graciously took the leadership in preparing the conference. I met Dick, for the first time, at the program committee meeting, held in early 1989 at a hotel near Washington DC's John Foster Dulles International Airport. The meeting was a nice eye-opener. A good atmosphere, rather different from the very many Pan-European PC meetings I had taken part in, in Europe at that time. The PC members, most of them from

*See also Larry Druffel's contribution on page 42.

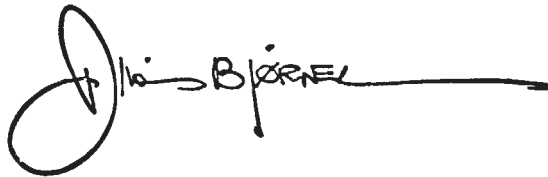
The 11th ICSE - Fact Sheet

Dates:	May 15–18, 1989
City:	Pittsburgh, PA, USA
Venue:	David L. Lawrence Convention Center, Vista International Hotel
General Chair:	Larry Druffel
Program Chairs:	Dines Bjørner and Richard Fairley

the US, exuded a friendly camaraderie. To me there is no doubt, it was Dick's gentle work that secured a successful ICSE.

From the conference itself I recall, with pleasure, the talks of Robert (Bob) Balzer, Barry W. Boehm, Bill Curtis, Anthony Finkelstein, Kōkichi Futatsugi, the late Bernard E. Galler, David Gries, Michael A. Jackson, Dewayne E. Perry, Colin Potts, the late Doug Ross, Motoshi Saeki, the late Michel Sintzoff and Ian Thomas. Truly an impressive list of top computing scientists and software engineers.

The ICSE events have contributed, and continues to contribute, significantly to the profession of software engineering, a discipline viewed slightly differently here, in Europe, than in North America.

A handwritten signature in black ink, reading "Dines Bjørner". The signature is stylized, with a large, looped initial "D" and a long horizontal line extending to the right.

PS:

I flew home, with Scandinavian, out of Newark, NJ. Our taxiing out was briefly interrupted and the craft, a brand new Boeing, returned to the gate. Four men joined us, sat on the row just behind me. At all times during the ensuing flight different two of them, at all times, seem to have been in the cockpit – for periods of typically 30 minutes. Beautiful take-off, smooth flight, and an ever so smooth landing. When at the gate we were informed that this flight had been “fully automatic”, i.e., completely monitored and controlled by the Boeing equipment !

The 12th ICSE, 1990: “PC Co-Chairs’ Recollections”

Marie-Claude Gaudel and Peter A. Freeman

What follows here may suffer from the natural tendency to remember primarily the positive aspect of events many years ago, not the less positive ones. With that caveat, it is a pleasure to review our small efforts to advance the field in which we were both active at that time.

Little needs to be said here about the wonderful site for ICSE-12 on the French Riviera, other than that if you have not visited this ancient yet modern city, you must! The conference venue was the brand-new Acropolis Conference Center in the heart of the city.

François-Régis Valette, head of ONERA-CERT¹ and now fully retired, was General Chair and Marie-France Kalogera, of AFCET² in Paris, was Local Arrangements chair. François-Régis provided us excellent strategic advice and Marie-France not only made the excellent local arrangements in Nice but supported the PC logistics and meeting.

Because this was to be the first ICSE in the last decade of the century, we chose a title and emphasis of looking forward, while addressing the increasing need for interaction between SE researchers and practitioners. The introduction to the final program captures this:

¹ONERA (Office National d’Etudes et Recherches Aérospatiales) is the French national aerospace research center.

²AFCET (*Association Française pour la Cybernétique Économique et Technique*) was at that time the French computing research society.

The 12th ICSE - Fact Sheet

Dates:	March 26–30, 1990
City:	Nice, France
Venue:	Nice Acropolis Convention Center
General Chair:	François-Regis Valette
Program Chairs:	Peter A. Freeman and Marie-Claude Gaudel

Building a Foundation for the Future

The 12th International Conference on Software Engineering program presents a balanced selection of presentations that will appeal to researchers, practitioners, and those concerned with the transfer between them. At the core of the program are 30 carefully selected papers presenting significant contributions and (in shorter form) real-world experiences. Four panels and a special session addressing emerging issues of wide spread interest have been formed to bring a variety of opinions to the conference.

Another new feature of ICSE-12 are two invited lectures presenting an overview of recent advances in two important sub-areas. The program will be enriched by three invited addresses intended to expand the knowledge of attendees in areas outside their usual concern, and a set of technical presentations on tools.

Of special interest to many will be the expanded 2-day program of eight tutorials presenting in-depth introduction in a variety of important topics.

David Talbot of the European Commission provided the first plenary address on *Software Engineering in the European Community*, Barbara Liskov of MIT gave the second one on *Structure of Distributed Programs*, and Stephen Squires of the U.S. DARPA spoke on *High Performance Computing and Software Engineering*. The invited lectures were given by Vic Basili of the University of Maryland on *Recent Advances in*

Software Measurement and François Bancelhon of GIP Altair on *Recent Advances in Object-Management Systems*.

Anyone active in software engineering at that time can easily see how all of these presentations pointed to emerging concerns and issues, some of which are still very relevant today. A number of the 22 refereed papers also can be seen with hindsight as being foundational, and similarly the 6 short papers on actual experience in realistic settings and the tool presentation session clearly point at some of the practical advances of the recent decades.

The 14 paper sessions and 4 panels, while naturally having some amount of overlap, could be factored into four broad categories representing the primary topics of that day: Environments, Process, Experience, and Technology Transfer. Perhaps life was not as fast-paced then, but by having only two papers per most 90-minute sessions, this permitted longer presentations of results and discussions.

The Program Committee consisted of sixty (!) leading researchers and practitioners from around the world. Coordination was difficult at a time of only rudimentary and spotty email, to say nothing of paper-only submissions and the sheer size of the Committee. The PC met at the cavernous Palais des Congrès, Porte Maillot, Paris on September 16-18 and had to treat more than 200 submissions; as with the meeting in Nice, we did not have much trouble getting members to attend!

When trying to assess the overall impact of this particular ICSE, one can refer, of course, to its published results (the Proceedings and a special issue of the *Communications of the ACM*, Vol. 34, No. 5, May 1991). However, it gives a partial picture only, not taking into account the meeting itself, which was designed to bring together researchers and practitioners and the impact it had on the attendees.

We can definitely assert, that this week among many of our colleagues from all around the world in a magnificent location was a unique scientific and human experience and a great pleasure. Years later (it was 28 years ago!), we still meet colleagues that recall it. . . . For both of us as we pursued other goals, it formed an enduring friendship that is warm and respectful. We have the feeling that the same is true for many others who participated in one or more aspects of ICSE-12.

The 13th ICSE, 1991: “Recollections”

David Barstow

ICSE '91, held in Austin, Texas, occurred in the early days of an area in the United States that is sometimes called “Silicon Gulch”. Austin is the capital city of one of the largest states in the United States. The University of Texas at Austin is a major university with a strong computer science department. Several industrial and government research and development centers had been established in Austin in the 1980s, including IBM, HP, Schlumberger, MCC, and Silicon Laboratories. South-by-Southwest, which is now a major media and technology conference, was still in its early days, focused more on media than technology.

The world of software engineering was also in the early stages of a transition. In the 1980s, software development was usually described in terms of large projects, developed with a waterfall methodology, from requirements through design, implementation, testing, and release, followed by a long period of maintenance. Models of quality and cost had been developed to fit the waterfall approach. The Capability Maturity Model had also just been developed, providing a framework for analyzing and improving a group’s capability to produce large software projects successfully.

But changes were coming. There was growing recognition of the shortcomings of the waterfall approach, and practitioners were developing a variety of ways to overcome those shortcomings, such as iter-

The 13th ICSE - Fact Sheet

Dates:	May 13–17, 1991
City:	Austin, TX, USA
Venue:	Stouffer Austin Hotel, MCC
General Chair:	Les Belady
Program Chairs:	David Barstow and Koji Torii

ative development and reuse. CASE tools (Computer AIDED Software Engineering), which had been developed in the 1980s, were becoming increasingly important and also increasingly special purpose, able to do remarkably quick development within limited boundaries. But other approaches, such as agile development, were still several years in the future. And it would be decades before machine learning techniques would be used to build task-specific software.

There were also looming changes in hardware environments. Personal computers were beginning to become popular, and the Internet would grow dramatically during the 1990s. We had inklings of distributed systems, but we were a very long way from what today is described as the “cloud”. These hardware changes would help push toward evolving conceptions of exactly what software is and what it means to engineer it.

ICSE '91 reflected these transitions. There were a total of 45 papers, including panel sessions. I reviewed the titles to try to classify them, and found eleven focused on “old” software engineering, two focused on “new” software engineering, and nine focused on the transition. (I no longer have a copy of the proceedings, so I couldn't look at the bodies of the papers. It would not surprise me if some of my classifications might be slightly off!)

A list of the ICSE '91 papers can be found in the ACM's database¹ of computer-oriented literature. Among other things, the database includes indicators of a paper's influence: the number of times that a paper is cited by other papers, and the number of times that a full copy of

¹<https://dl.acm.org/citation.cfm?id=256664&preflayout=flat>

a paper is downloaded. The most often cited paper of ICSE '91 was "Tolerating Inconsistency" by Robert Balzer. The most often downloaded paper was "Cost estimation of software intensive projects: a survey of current practices" by Jairus Hihn and Hamid Habib-agahi.

One other topic in the proceedings that I found particularly interesting was a panel session on "Non-technological issues in software engineering". Unfortunately, twenty-seven years later, I don't have any memories of actually attending the panel, which I'm sure I would have enjoyed. The only memories I still have from the conference itself were running around trying to make sure everything happened when it was supposed to happen. My best memories of the full ICSE '91 experience are feelings of gratitude for the opportunity to work with two exceptional people, Dr. Les Belady, the conference chairman, and Dr. Koji Torii, the program co-chair, as well as a strong and active program committee.

The 14th ICSE, 1992

The 14th ICSE - Fact Sheet

Dates:	May 11–15, 1992
City:	Melbourne, Australia
Venue:	Melbourne World Congress Centre
General Chair:	Tony Montgomery†
Program Chairs:	Lori Clarke and Carlo Ghezzi
Program	
Coordinator:	Karl Reed

“Positioning ICSE as the Premier Software Engineering Research Conference” by Lori A. Clarke and Carlo Ghezzi

Situation at the time

When we were asked in 1990 to co-chair ICSE 14, Computer Science research was converging in most computing sub-disciplines towards

recognizing the leading role of conferences as premier venues for communicating research results. This move made CS different from traditional scientific fields, where scientific communication was mainly achieved via journal publication. The different CS communities started identifying the flagship role of certain conferences, whose prestige derived from their high quality submissions and by rigorous selection processes by program committees that included internationally recognized research leaders. Publishing in these conferences was increasingly accepted as recognition of top research. Although ICSE from its inception had been considered the major research venue for Software Engineering, its position as such was felt by us and many colleagues as declining, so much so that many people were considering abandoning it and had started or were considering starting other conferences. When we were selected to be the program chairs, many colleagues told us it was a sinking ship and that we should not even bother to jump aboard. With the support of the ICSE Steering Committee, we took this on knowing that we had to significantly change the culture of the conference for 1992 and for the future.

One of the reasons for this sense of decline was the unstated expectation that accepted ICSE papers needed to show short-term relevance, especially industrial applicability. Although such a goal is still difficult to accomplish, this was even more so at this time, since it was before the wide-scale use of integrated development environments and before readily available component libraries provided building blocks on which to build prototype tools. Moreover, software systems that could serve as realistic subjects for experimental evaluation were not easily available since there were few open source repositories of software, let alone versioning histories for researchers to exploit. This emphasis on industrial application discouraged researchers from submitting their more theoretical or preliminary results and seemed to be encouraging the growth or birth of other conferences to fill this need.

Another concern was that the program committee was starting to be viewed as a small, closed club since members tended to serve year after year, even though the community had been growing substantially over the years.

Major Changes incorporated

Thus when we agreed to take on the task of being program committee co-chairs, we tried to tackle these shortcomings.

In the Call for Papers and in all our advertising for ICSE 14, we reaffirmed that, although ICSE welcomed experience reports and case studies from industry, it was a research conference and would publish innovative, but well founded and well reasoned, ideas.

In addition, we adopted and expanded the newly approved SIGSOFT conference guidelines. Specifically, we laid out rules for program committee selection, including that program committee members must:

- not have served on the three previous, consecutive ICSE program committees;
- have an established publication record in ICSE or in other highly regarded, related conferences;
- must have experience as a responsible reviewer in highly regarded conferences;
- must commit to attending the program committee meeting; and
- must personally read and review all of their assigned papers (although additional expert reviews could be sought).

We announced that deadlines would be hard deadlines. We made it clear that submission dates would not slip and that authors should not expect exceptions (which was a common practice at the time). Keep in mind that authors needed to send eight paper copies of their submission to the program chairs and the postmark on the package determined the submission date.

In addition, we required all program committee members, including the chairs, to adhere to strict conflict of interest guidelines, and excluded the General Chair and Program Committee co-chairs from submitting papers for review.

Although all of these requirements are well-accepted practices now, this was not the case when we were running the program committee meeting in the early 1990s.

Resulting Conference

The research paper track, which was the main focus of our efforts, consisted of 25 papers, selected out of 211 papers submitted. This rigorous selection process led to a high-quality program. This was positively viewed by the community and, we believe, helped secure ICSE's position as the premier SE research conference.

Many of the guidelines that we adopted for ICSE 14 were subsequently presented to and incorporated by the ICSE steering committee into the ICSE guidelines.

One issue that also arose was how ICSE locations and organizing team members (General Chair, Program Committee co-chairs) were selected. The tradition in place up to ICSE 14 was that locations of future conferences were selected by the ICSE steering committee based on bids. The Steering Committee separately then selected the General Chair and Program Committee co-chairs. Thus, the ICSE 14 location of Melbourne was selected before the team. Late Professor Tony Montgomery, then at RMIT, Melbourne, was a very well known and senior CS faculty member in Melbourne, and was nominated General Chair of ICSE 14. Tony devoted considerable energy into the organization of the conference, with substantial and enthusiastic help from Professor Karl Reed from La Trobe University who was (and is) an active member of the software engineering community and served as the liaison. The whole team ended up working together well, leading to a very successful conference. It took some time and effort, however, to align objectives and set up a coherent shared vision of the conference. The ICSE guidelines were subsequently modified to require the organizing team to be very familiar with the conference and to give the ICSE steering committee influence on the people involved in the major conference roles. This has been subsequently reflected in the organizing teams selected after these changes to the guidelines were adopted by the ICSE steering committee (post ICSE 1994).

In retrospective, we are proud that our efforts went in a direction that has been further consolidated by the following ICSEs, and which led to the prestigious role that ICSE now has among CS conferences. Researchers know that publishing a paper at ICSE is commonly accepted as an indication of high-quality work. This was not quite so

when we accepted to serve as ICSE PC co-chairs. We are also proud that our experience led the ICSE Steering Committee to approve important guidelines for the organization and running of the conference and for identifying a process to select future ICSEs that has proven to be robust and efficient.

“The First ICSE in the Southern Hemisphere - a Short History” by Karl Reed

In the Beginning

Looking back, I am still not quite sure how it happened, however, I was invited onto the PC for the 1989 ICSE in Pittsburgh. This happened prior to the 1988 ICSE in Singapore, I think. (My records show I received Victorian State Government funding support to attend Singapore) At the time, it was hinted that Australia might be a good site for an ICSE, so, I often wondered if it was plot, and that the Steering Committee wanted to come to Australia, and had been told I might have the connections to make that happen.

The exact chronology is lost (despite my rather good records), but, I think I clinched agreement from ICSE SC to make a bid in Singapore. What I DO recall was obtaining Australian Computer Society funding for a hospitality trolley with drinks to be served during the PC meeting in Washington DC (I think in December 1988). This caused a bit of a stir. (In those days I had a large commercial research project and used its travel budget to attend some of the PC meetings)

The Bid

In late 1988 and early 1989 I prepared a bid to be presented at the 1989 ICSE. I sought input from a number of people including Ross Jeffery, and, started to identify people who might play various rolls.

For the initial bid document, we obtained a letter of support from the Government of Victoria where Melbourne is located. The bid was based upon a break-even number of 450, and, played up Melbourne’s International and national air connections. Amongst the features of the bid were a detailed time line and, a list of senior Australians candidates

for Program and Local Arrangement Chair. We proposed to delay the choice of a GC until after ICSE 11 in Nice (1990).

We were very conscious of our remoteness, and, of the need to publicise the 1992 conference well in advance. One feature was that we proposed to offer support to PC members who were prepared to attend other conferences to publicise ICSE 14.

In addition, a preliminary call for participation was produced, to be distributed in Pittsburgh.

Early in 1989, my father, who had been my backup in a number of quite-well-in retrospect-rather adventurous activities promoting the Australian Software Industry overseas, was seriously ill with cancer, and, in the run up to ICSE 1989, had not long to live. Vic Basili kindly agreed to present the bid if I couldn't go, however, after discussing it with family and friends, and Dad, I decide to go. He was pleased I'd made that decision. Funding for this trip was, by the way, by some member of the Australian Software Engineering Conference (ASWEC) consortium.

I went to Pittsburgh, made the presentation, was criticised for bringing a handout out for our conference, and, got a call from a mate to say I needed to get home quickly, so, after two nights in Pittsburgh, I was on my way back to Melbourne before the SC voted.

I am eternally grateful to Peter Freeman who encouraged me to come to Pittsburgh, to Vic for offering to present the bid if necessary, and, Beau Reed, my father, who was so pleased I decided to go.

He died on 25/5/1989, about two weeks after I returned, but not before I'd been advised that our bid was successful...

The Run-up to ICSE 1992 in Melbourne

The Team

By early 1990, we were well under way. We set up a conference committee with number of participants. The key players were Tony Montgomery from RMIT, and Peter Dewidlt from Praxa as Local Arrangements chairs. The project was supported by the ASWEC consortium, that is, Australian Computer Society, the Institution of Engineers (now Engineers Australia), and the Institution of Radio and Electronic Engineers (now part of Engineers Australia). The Conference Commit-

tee included Peter DeWildt, John Zeleznikow, Kong Eng Cheng, John Colton, Rhys Francis, Shiela Howell, Ross Jeffery, Peter Juliff, John Leaney, Alva Purkiss, James Park with IE Aust's Barry Hewish as Conference Manager. (John Leaney took the role of Tools Fair Chair).

The team had representation from La Trobe University, Monash University, Praxa, RMIT, University of Technology Sydney, University of New South Wales and CSIRO. Tony Montgomery (Monty to those who knew him) brought to bare his experience with large conferences such as the 1st Pan Pacific Computer Conference in 1985 which had attracted about 750 people and had occupied Melbourne's Exhibition Building.

By ICSE in Nice, Peter Dewildt had settled into the role of Treasurer, and, was proving invaluable. His experience with the Digital Equipment Corporation Users Conference (DECUS) made him another team member with large conference management experience.

The Hotel and The Venue

In the late 1980's and early 1990's Melbourne's World Trade Convention Centre (WTCC), in those days, on of banks of the Yarra Rive (the CBD side), on the corner of Flinders and Spencer St. was available as the conference location. We had support from them, and, the local tourist promotion agency. Our analysis indicated that using the WTCC and the associated (but separate) 4 star hotel was selected as the conference hotel was the best option financially.

Publicity

We identified publicity as our greatest risk, and, our mitigation strategy involved brochures at ICSE 1990 and 1991, and, other conferences.

However, we met with some resistance from the SC who felt that distributing flyers for the 1992 ICSE 14, say, at the 1990 ICSE 12 in Nice might deflect papers from the 1991 conference. I recall telling them that we would be doing it anyway.

As it happens, we felt were ahead of ICSE 1991 in terms of publicity.

Travel Sponsorship-the Conference Airline

I think it was Peter Dewildt who drew attention to possibility of airline sponsorship, late in 1989. My records suggest we approached United and JAL as well as Qantas. We heard that Qantas was taking a very aggressive role in this regard, so, we fronted their conference support person, and, to put it mildly were blown away by the support offered. We ended up with four (4) full fare economy long haul tickets plus offers of marketing support from Qantas, at that stage, still government owned. This was worth about A\$20,000 to our budget, and meant we could send proper teams to ICSE 1990 and 1991 to observe and to promote. My notes remind me that United and JAL were not really very supportive by comparison. However, this drew some objection from the US backers, who wanted United as an airline, but, our arrangement with Qantas was for exclusive rights to be conference airline. As it happens, I cannot recall how this matter was resolved, but, it was.

As a matter of interest, the budget allowed for travel for key OC persons such as the Prog. Coordinator, the Treasurer, GC to ICSE 12 (Nice) and ICSE 13, (Austin) although some of this cost was picked up by individuals travel budgets. The costs of the two PC Chairs were met for a trip to Australia in early 1991, and, to at least one PC meeting.

ICSE 1990 at Nice resolves issues

The team who went to ICSE in Nice, myself, Peter Dewildt, John Leaney and Tony Montgomery had a number of issues outstanding. The Program Chairs and the General Chair had not been finalised amongst some less important issues. I had a list of Australian leaders in Software Engineering and hoped that one of these would be selected as a PC. The SC clearly believed that ICSE needed international leadership in this critical task and selected Lori Clarke and Carlo Ghezzi a team which did quite an outstanding job. My notes point out there was an error in the first CFP which listed Carlo and Lori as Regional Chairs, this was very quickly corrected when Dewayne Perry redrafted the CFP.

After some discussion between myself and the SC spokespersons, Tony Montgomery was accepted as General Chair.

Monty (as he was universally known in the Australian IT community, he died in) proved to be the inspired choice as GC that I had believed was required. He was calm, had experience with other very large conferences, and, as the Head of a large Melbourne central business district CS department (RMIT) could call on emergency resources during the conference as need be. I had a ball doing the back room stuff of negotiations with the SC, and the Australian professional societies (I held a senior position with the ACS), but, the nitty-gritty that made things really happen was managed by him.

Fun in Nice, May 1990 While not directly relevant, there were a number of humorous events for myself and the Australians. One was trying to order sauterne in a restaurant , only to be told “Monsieur, Nobody in Provence drinks sauterne!”. Another was when Peter Dewildt, myself, Vic and I think Dieter Rombach and some others went for a drive into the hinterland. We found a small café, and, reading the dessert menu, one of our number asked “My god, what the hell is Core de ice?!”. To which Peter Dewildt replied in a flash “Its like coup d’etat, but its done with ice cream!”

ICSE 13, 1991 In Austin

Tony Montgomery and myself, and, Peter Dewildt went to ICSE in Austin to report to the SC, to promote ICSE 14 and to generally observe another ICSE in action.

On my visits to the US, I had discovered that Australian wine was being sold at quite good prices, and, persuaded the Australian OC that we should stage an Australian wine event during ICSE in Austin. It took quite a bit of doing, and, the idea was not supported by the SC. Getting the hotel to agree was not easy, but, in the end, the event went ahead and was a huge success. The hotel raved about it, and, took the surplus off us at a nominal cost. This, BTW, was part of our promotion effort.

ICSE 14: The Event

Glitches

The run-up to the conference itself was relatively uneventful. Only two things stick in my mind...

Firstly, Monty shared a piece of conference planning wisdom that helped make sure we had the budget under control. “Set the banquet menu as late as possible. If numbers are down, choose the cheapest acceptable offering, and, if numbers are good you can choose a better one”. This was a simple but obvious budgeting trick, and, “all” that it required was to get the venue to set the notification date for the banquet menu as close to the banquet date as possible.

Secondly, John Leaney from Univ. Tech. Sydney who had taken the important role of recruiting exhibitors as Tools Fair Chair was not mentioned in this role on the Proceedings face page. It sounds like a small thing, however, John is one of the pioneers in the Australian SE community, and, it had to be fixed. So, I printed about 1000 sticky labels and added his role to the face page the night before the conference opened for registrations.

The Conference

Strangely, I don't recall much about the conference itself, so, it must have run smoothly. The theme was centred on Trusted Systems and, the keynotes were Nancy Levesen (USA), “High-Pressure Steam Engines and Computer Software” Dines Bjørne (Denmark) “Trusted Computing Systems: The ProCoS Experience” and Andrew Lister (Australia) “Design of Dependable Real-Time Systems”. Both Dines and Andrew focussed on formal methods, and Nancy's talk was absolutely riveting!

John Leaney ran a Hypothetical¹ on the subject “Software Engineering: Bondage or Discipline subtitled It's not only Doctors who

¹These are panel shows in which notable people, often including former and current political leaders and experts from the domain of the subject, are invited to discuss contemporary issues by assuming imagined identities in hypothetical situations. They were pioneered by the Australian lawyer and human rights advocate Geoffrey Robinson QC. John Leaney had been using these at conferences as means of airing difficult and contentious IT issues.

can bury their mistakes”. This was, I think, something of a surprise for non-Australian and non-British attendees.

Conclusion and Wrap Up

I don't seem to have kept much on the wrap-up to the conference, or, the financials. I think we came in break-even, and, that attendances were around 500.

It was a great experience, and, helped encourage our software engineering community in the following period.

One side bar to ICSE 14 was that the Japanese, Koreans and Australians present decided to start a regional conference, which went on to become the Asian and Pacific Software Engineering Conference, APSEC.

The 15th ICSE, 1993: “Co-Chairs’ Recollections”

*Victor Basili, Richard DeMillo,
and Takuya Katayama*

By May 1993, ICSE had become a yearly event. It was still referred to by edition number rather than by year, as it is now. The 1993 conference was the 15th in the series. There was an annual debate among conference organizers over whether ICSE should have a theme. Supporters believed that a theme attracted better, more interesting papers. Others thought that a theme had no effect on program quality and discouraged submission of papers. ICSE 15 had a theme that was designed to invite broad participation. It was to be the *Flagship*, a theme that referred to both its literal venue, the beautifully restored harbor of Baltimore, and its role as the premier conference for the international software engineering community, representing diversity and inclusiveness. In keeping with the idea of a flagship, the traditional conference reception and dinner was to be held at the National Aquarium in Baltimore Harbor.

The General Chair was Professor Victor Basili from the University of Maryland. The Program Committee was co-chaired by Professors Richard DeMillo from Purdue University and Takuya Katayama from the Tokyo Institute of Technology. The Program committee consisted of 32 members representing 10 countries: Belgium, Canada, Eng-

The 15th ICSE - Fact Sheet

Dates:	May 17–21, 1993
City:	Baltimore, MD, USA
Venue:	Stouffer Harborplace Hotel Baltimore
General Chair:	Victor R. Basili
Program Chairs:	Richard DeMillo and Takuya Katayama

land, Finland, Germany, Hong Kong, India, Italy, Japan, and the United States.

Professors Anita Jones from Carnegie Mellon University and Melvyn Kranzberg from Georgia Tech were keynote speakers. Jones was well-known to ICSE attendees for her technical work. She had recently been appointed Director Defense Research and Engineering, overseeing DARPA and many other programs of great interest to American software engineers. Kranzberg, an historian of science and technology was an unexpectedly controversial choice. He had no background in software technology, and the social themes that he emphasized in his talk, “Software for Human Hardware”, were out the ordinary for ICSE keynotes. There was a third keynote speaker, but there is no record of who that was or the subject of the address.

The 15th ICSE turned out to be a watershed of sorts. The 1993 conference was the first to expand the program by including other conferences and workshops. The Working Conference on Reverse Engineering, the First International Software Metrics Symposium, and the Fourth Software Configuration Workshop were incorporated into the ICSE program and papers were included in the conference proceedings. There were also parallel sessions, poster sessions, student presentations, a tools fair, and 12 tutorials, including 4 half-day tutorials.

That was not the plan the General Chair and Program Co-Chairs had anticipated, but a rather ominous 1991 “Welcome!” letter from the organizing committee set the stage for these and other programmatic changes that have been remarkably durable. The letter cited worries about the viability of ICSE. There had been a decline in attendance and in the number of papers presented. There were also concerns about

inconsistencies in conference organization and operations. There were many who were worried that the software engineering community had become too fragmented. Practitioners felt that case studies and other descriptions of practical experience were disadvantaged by program committees composed of academic researchers. The large number of special purpose conferences, symposia and workshops made it difficult to keep up with important developments.

What the letter to the Co-Chairs did not say was that the field was troubled by long-standing disagreements that were simmering just below the surface. Disputes between IEEE and ACM (the main sponsors of the conference) frequently spilled over into disagreement about conference organization and planning. Those problems did not affect the co-chairs greatly. In fact, Anne Marie Kelly from the IEEE Computer Society provided great conference support.

However, the overall vision for the conference was another matter. There were those who thought that the purpose of a conference was to showcase the broad range of work being carried out in the field. That view was in direct opposition to the vision of ICSE as a showcase for the *best* research in the field. Proponents of the latter view argued that program committees should be highly selective, even if that meant a smaller program with fewer papers. This disagreement was rooted in the history of software engineering as a field and the nature of conferences versus archival journals. Some of us had even argued that conferences were structurally unable to achieve the same quality standards and rigor as archival journals and that attempting to do so was not healthy for either ICSE or the field.

When ICSE began, there were no archival journals devoted to software engineering and very few annual conferences or symposia. Academic software engineers were under pressure from university administrators to document for promotion and tenure the quality of conferences as publication venues for research. ICSE took on the role of a pseudo-journal. As time went on, many archival journals were created allowing ICSE to take on the role of a conference as it exists in many other fields, giving exposure to new and often preliminary ideas early in their development, and especially encouraging the presentation of applied research.

In the end, the 15th ICSE instituted some successful innovations:

- *Independent workshops and conferences.* There were one conference and two workshops—The Working Conference on Reverse Engineering, the First International Software Metrics Symposium, and the Fourth Software Configuration Workshop— that met in conjunction with the main conference. Each had its own program committee that would coordinate with the ICSE Program Committee. Papers would be selected from the workshops for inclusion in the ICSE Proceedings.
- *Tutorials.* In addition to the full-day tutorials that normally preceded the main conference, 90-minute survey talks aimed at non-specialists who wanted to be able to participate more completely in the workshops would be solicited.
- *Additions to the Organizing Committee.* Chairs responsible for publicizing the conference in Asia, Europe, and North America would become full members of the Organizing Committee. A publications chair and a coordinator for the independent workshops would also be added.
- *Themes.* Conference themes always had a spotty track record at prior ICSEs, but the term “Flagship Conference” kept coming up in early stages of conference planning. That became a thematic element that appeared prominently in announcing the conference.
- *Affirm that ICSE is not an archival journal.* It became a shared value among program committee members that setting unrealistically high standards for acceptance (or, worse, applying those standards haphazardly) was having an overall negative effect on the conference. The standard was, aside from meeting threshold requirements for correctness, clarity, and currency, the primary characteristic sought by the program committee was whether inclusion of a paper would make the conference more interesting because of its topical, insightful nature or because it contains a new idea worth hearing.

Some of these changes created healthy discussion with past program committees, but several of these changes were adopted in future ICSEs. The 15th ICSE chairs hoped that the open discussions would be rewarded by a conference that lived up to its Flagship aspirations. The ICSE 15 program consisted of 42 published papers, plus workshop summaries and position statements. It was both broad and deep, and many of the contributed papers are still highly cited and impactful.

The 16th ICSE, 1994: “A Retrospective on ICSE in Sorrento”

Leon J. Osterweil and Axel van Lamsweerde

The 16th International Conference on Software Engineering was held in May 1994 in Sorrento, Italy, high upon a hillside looking across the Bay of Naples at ancient Mt. Vesuvius. This certainly was among the most dramatic and attractive settings to have ever served as the backdrop for an ICSE week. The meeting was organized by General Chair Prof. Bruno Fadini, who is now, unfortunately, deceased. ICSE 16 was one of the last ICSEs for which the General Chair was not an active member of the Software Engineering research community. The conference organization turned out to be challenging, requiring the PC co-chairs to deal with a variety of issues unrelated to the technical program. For this we greatly benefited from the generous and efficient assistance of Alfonso Fuggetta.

This ICSE augmented the main Conference with four workshops aimed at bridging gaps between software engineering and related disciplines, namely, on *Software Engineering and Databases*, *Software Engineering and Artificial Intelligence*, *Software Engineering and Human-Computer Interaction*, and *Software Engineering Education*. Each was well-attended by respective community members, and each was summarized and reported upon in a session that was part of the main ICSE Conference.

The 16th ICSE - Fact Sheet

Dates:	May 16–21, 1994
City:	Sorrento, Italy
Venue:	Sorrento Palace Hotel
General Chair:	Bruno Fadini [†]
Program Chairs:	Axel van Lamsweerde and Leon J. Osterweil

ICSE 16 also included a special session in memory of Prof. A. Nico Habermann, a highly-respected founder and early leader of the Software Engineering community, who had passed away in the year since the previous ICSE. Members of Prof. Habermann’s family attended the session and received the appreciation of the community. The Conference proceedings were dedicated to Prof. Habermann.

There were three invited keynote talks. Robin Milner, Turing Award recipient and leading researcher in Formal Methods, presented his views on the necessary conceptual foundations of Software Engineering. Raj Reddy, also a Turing Award recipient and founder of the Robotics Institute at Carnegie-Mellon University, shared his insights on the challenges of software understanding for reengineering. David Parnas, one of the most influential members of our own community, gave a lively presentation on software geriatrics. His talk analyzed the causes, consequences and inevitability of software aging, and recommended a series of geriatric treatments aimed at smoothing software evolution. According to standard bibliometric figures, his invited paper “*Software Aging*” in the Conference proceedings has had a profound impact. The ideas presented there were subsequently embraced by the Software Engineering community and gave rise to much research, improved practice, and to workshop and conference series, some of which continue to this day.

The Most Influential Paper of ICSE 6 was awarded at ICSE 16 to Sol Greenspan, John Mylopoulos, and Alex Borgida, for their paper, “*Capturing More World Knowledge in the Requirements Specification*”. From the perspective of the additional 24 years that have elapsed since ICSE 16, that choice still seems quite appropriate, as that paper still

seems to reflect and epitomize the focus at the time on the importance of requirements and their adequate representation and analysis for the engineering of high-quality software.

By the time ICSE 16 was held, the community's focus has shifted more in the direction of *Software Architecture*, and the conference proceedings reflect this with a heavy emphasis on this topic. And, indeed, the Most Influential Paper of ICSE 16, awarded 10 years later at ICSE 26, was the paper by Robert Allen and David Garlan, "*Formalizing Architectural Connection*". From the perspective of an additional 14 years that paper also still seems to be an appropriate choice, reflecting as it does the interest of the time and the subsequent direction of the software engineering research community.

Three state-of-the-art reports were delivered at well-attended plenary sessions: *Distributed Software Engineering* (Jeff Kramer), *Formal Specification Techniques* (Marie-Claude Gaudel), and *Configuration Management* (Alexander Wolf). The research paper topics that got more specific attention at ICSE 16 included formal methods, software testing, process modeling and analysis, software understanding, dedicated techniques for distributed systems, measurements for improvement, and knowledge-based software engineering.

The response to the Call-for-Papers was fairly modest compared with recent ICSEs. We received 200 submissions of research papers and 37 submissions of experience reports. The selection at a memorable PC meeting in Redondo Beach (CA) was draconian, with an acceptance rate of 10% for research papers and 16% for experience reports.

Many PC Chairs throughout the long history of ICSE have made innovations aimed at improving the reviewing process. For ICSE 16, we introduced a form of three-phase reviewing. During what now seems to be a primitive sort of Bronze Age, where no PC Chair support software was available, we supervised a manual process in which (1) Reviewers were asked to rate their competence in reviewing the papers they received based on their stated areas of expertise and conflicts of interest; (2) nearly one quarter of the reviewing assignments were changed to ensure more competent evaluation without conflicts of interest; and (3) email discussions were initiated and urged forward to inform and resolve conflicting viewpoints before the PC meeting. As a prerequisite to the reviewing, we tried to specify a comprehensive set

of rules defining conflict of interest as precisely as possible. Despite this, however, we remember having spent a significant amount of time identifying duplicate submissions and scolding their authors, resisting the acceptance of submissions that were below the Least Publishable Unit (LPU) threshold, and insisting that there be no changes to the authorship lists for accepted papers.

The technical proceedings were enlivened gratifyingly by a reception that featured music and dancing in the local style of the Italian Amalfi Coast. A planned boat trip out into the Gulf of Naples, planned for the evening after the end of the meeting was cancelled, unfortunately, due to unfavorable tides (as we were told). Further “enlivening” our ICSE was one of those unexpected events that so often cause last-minute problems in the organization of a big conference. Specifically we remember that the main access road to Sorrento was closed the afternoon before the meeting started due to a major religious procession. Attendees managed, eventually, to make it to ICSE 16 anyway.

Overall ICSE 16 seems to us to have been a technical, social, and community success, continuing to solidify the ICSE series as a flagship of the Software Engineering community and to serve as a basis for its continued vitality.

The 17th ICSE, 1995: “A Retrospective”

Ross Jeffery

The 17th International Conference on Software Engineering was held from April 23rd to 28th in Seattle, Washington. Perhaps a little less colorful in venue than adjacent meetings, coming as it did between Italy in 1994 and Berlin in 1996, the meeting was non-the-less a tremendous success both financially and intellectually. The meeting was organized by the general chair Dewayne Perry, and program co-chairs David Notkin and myself. It was with great sadness that we all learnt of David’s passing in April 2013, shortly before the ICSE meeting that year. His leadership and effort was key to making ICSE 17 a success. Also key was Dewayne’s hard work and leadership. The financial success of the meeting was largely the result of Dewayne’s attention to detail and the able assistance of Faith Perry acting as registration chair. The meeting was held in the Westin Hotel on 5th Avenue in Seattle, where the hotel provided us with a key to the secret passages deep in the hotel to allow easy movement of the assortment of equipment needed for the meeting. Of course many others took up the challenge of leading different activities in the meeting. Chris Marlin was tutorials chair, Hausi Muller and Tetsuo Tamai chaired the technology exhibits, Reino Kurki-Suonio and Wilhelm Schaefer chaired the workshops, David Rosenblum was publicity chair, Michael Gorlick telecommunications chair, and Betty Cheng birds of a feather chair. Peter

The 17th ICSE - Fact Sheet

Dates:	April 23–30, 1995
City:	Seattle, WA, USA
Venue:	Westin Hotel Seattle
General Chair:	Dewayne E. Perry
Program Chairs:	Ross Jeffery and David Notkin†

Marks handled local arrangement, and Gail Murphy coordinated the volunteers and ably provided fantastic help with all kinds of issues throughout the meeting.

The ICSE meeting of 26th, 27th, and 28th April was augmented by seven workshops and one symposium. The *Workshop on Asian Approaches to Software Engineering*, organized by Kouichi Kishida, was held on Sunday, April 23rd and the *Workshop on Software Engineering Education* was held on Saturday April 29th. John Jenkins organized this latter workshop. In addition to these two, five workshops on April 24th and 25th covered *Architectures, Software Evolution, Formal Methods, Programming Languages and Configuration Management*. The *Symposium on Software Reusability (SSR95)* was held over multiple days at the end of the meeting.

The tutorial program consisted of six full day tutorials and eight half-day tutorials.

ICSE 17 had three wonderful keynote presentations, the first by Fred Brooks speaking on his 20th anniversary edition of the Mythical Man Month. I think the most difficult part of this presentation was the use of real time internet video to make the presentation available for those who were not at the meeting. Mbone, developed in 1992 was used, but because we were using a fixed camera it meant that Fred Brooks was asked to stand on one spot on the stage and not move for the entire talk. I know I'd find this impossible. The second keynote was by Michael Cusumano on "Rethinking the Process of Software Development" and the third was Michael Jackson on "The World and the Machine". The Cusumano talk heralded the 1995 publication of his book "Microsoft Secrets" with Rick Selby. In a sense this process evolution

continues to today with the research and activities in DevOps. The talk by Michael Jackson was a beautifully crafted and structured talk, which is available as a full paper today¹. All three keynotes are relevant to software engineering today, some twenty-three years later. The principles of the mythical man month are still relevant in software project management. The software development process continues to evolve and change, and modeling and formalism is perhaps more important now than ever.

In addition to the three keynotes there was one invited talk by Larry Votta and Adam Porter concerning the state of the art in experimental software engineering. This was a talk that looked to the future and outlined some steps needed to improve empirical work, referring to the establishment of the International Software Engineering Research Network (ISERN) that has recently celebrated its 25th anniversary.

The technical program was composed of 28 accepted papers from 155 submissions. This was a relatively small submission set but the 18% acceptance rate was not abnormal. The reviewing process involving 29 program committee members was held in a very large room with difficult communication between members because of the room size. David and I took turns trying to make the meeting both effective and efficient. The most influential paper of 1995 was awarded in 2005 to Michael Jackson and Pamela Zave. In general the technical program showed an emphasis on process with three process sessions and continuing publication in testing, architecture and development.

Perhaps the final memory of ICSE17 was the large number of t-shirts remaining unsold at the end of the meeting, and David's decision to donate them to the homeless of Seattle.

¹<http://mcs.open.ac.uk/mj665/icse17kn.pdf>

The 18th ICSE, 1996

The 18th ICSE - Fact Sheet

Dates:	March 25–30, 1996
City:	Berlin, Germany
Venue:	Technische Universität Berlin: Mathematikgebäude
General Chair:	H. Dieter Rombach
Program Chairs:	Tom Maibaum and Marvin V. Zelkowitz

Memories by Dieter Rombach

ICSE-18 was organized in Berlin, the capital of Germany, during 25–29 March 1996. It was the first non-US ICSE that returned to a previous host country (ICSE 4 was organized in Munich, 1980).

As general chair I was able to rely on a competent and dedicated organizational team. This started with Tom Maibaum and Marvin Zelkowitz as program co-chairs, and continued with Ernst Denert, Albert Endres and Baerbel Hoerger as industrial liaisons, Mark Ardis and Wilhelm

Schaefer as tutorial coordinators, Claus Lewerentz as workshop coordinator, and many others. I would like to add a special thanks to Stefan Jaehnichen, who as local arrangements chair was largely responsible for the perfect organization of the entire event.

The breadths of the conference was reflected by the three keynote addresses

- Tom DeMarco—one of the key contributors to project and risk management—gave a very deep yet entertaining keynote on “The Role of Software Development Methodologies: Past, Present, and Future”.
- Tony Hoare—one of the key contributors to formal methods in software engineering—gave a very substantive keynote on “The Role of Formal Techniques: Past, Current and Future or How did Software Get so Reliable without Proof”.
- Victor Basili—one of the key contributors to empirical software engineering—gave a keynote on “The Role of Experimentation: Past, Current, and Future”.

All three gave a very interesting presentations—addressing the differences between research and practice solutions. Especially Tony Hoare addressed the practical relevance of formal methods if applied in an engineering manner. This was especially fitting as we remembered one of the other formal methods leaders during the conference—Harlan Mills who had died just a few months earlier (January 08, 1996).

The strengths of German software industry was reflected by the fact, that we had organized the technical conference in 4 parallel tracks—with the 4th track always being an “Industrial track” of experience reports in the form of papers and mini-tutorials. As a result ICSE-18 had a significant number of industrial participants (app. 40%).

Overall, the conference was a huge success. This was reflected by the number of overall attendees (app. 1250), the high attendance of tutorials by industrial colleagues, and last but not least the significant industry sponsoring.

ICSE-18 was designed to be the international flagship conference by addressing needs of all branches of software engineering as well as research & practice.

ICSE-18 added to the public recognition of software engineering in Germany. Most of all this is reflected by many related government funding programs.

Memories by Tom Maibum

I recall clearly my moment of involvement in this ICSE. I was sitting relaxing, with a beer in my hand, outside a cottage (holiday home) on a small island in a big lake about two hours north of Toronto. Suddenly the phone rang and when I answered it was Dieter Rombach, general chair of this particular instance of ICSE. I was a bit surprised as no one had the number, except my secretary at Imperial College, who was under strict instructions not to give it to anyone. She was only supposed to call me in a real emergency (I was Head of Department at the time). So, when Dieter asked me to act as co-chair of the PC, with Marv Zelkowitz, how could I refuse the persuasive talent who had made her give up my secret? It was the start of a fine working relationship between the three of us over the next couple of years.

I do not recall any outstanding events or issues leading up to the conference itself. We had, I think, a very routine organisational and preparational experience. Because of Dieter's complete grasp of the organisational aspects, everything ran very smoothly at the conference itself, at least as far as I can remember. For me, this included the usual visits with Carlo Ghezzi, Axel van Lamsweerde and Dewayne Perry to Tower Records and a very good, and expensive(!), restaurant. For us, these two activities were a regular focus at ICSEs. I also managed to get tickets for the premiere of a new production of *Das Rheingold*, conducted and directed by Daniel Barenboim, at the Berlin State Opera on Unter den Linden. The opera house was a perfect example of a classical opera building and had not been easily accessible before the fall of the iron curtain. It was certainly my most enjoyable and memorable experience of the conference!

I do not recall (though I am at an age when memory has become a problem and so I am not sure whether I am forgetting something) any outstanding or memorable technical event at the conference itself, but one. This was the invited talk by Tony Hoare on "The role of formal techniques: past, current and future or how did software get so reliable

without proof?” This talk generated a lot of heated discussion at the time and since. My view was that the whole talk was based on a false premise. (And it is well known in classical logic that you can derive anything you want from a false premise! And Tony should have known that. So, proof does not get you everything either!) It has always been my impression that most software developed before then and after then was pretty rubbish. This was because most so called software engineers did not take engineering seriously. But that is another long story ...

The programme of the conference was, I think, typical of that time. It still reflected the divide between the US and the rest of the world on subject matter, with the emphasis on formal methods on the one side and the lack of it on the other (modulo an ordering transformation). Thank god it was also *devant le deluge* of the bad science embodied in a lot of so called exercises in evaluation: spurious use of numbers and statistics to justify a piece of work, often to the exclusion of other forms of justification. I actually stopped going to ICSEs after the Hawaii conference because I was so unhappy with the programme. In the main conference, I was unable to find a single publication on software design. How could this have happened at the premiere international software engineering conference?

Memories by Marv Zelkowitz

The 18th International Conference on Software Engineering was held from March 25 through March 30, 1996 in Berlin, Germany. Dieter Rombach of the University of Kaiserslautern was General Chair and Tom Maibaum of Imperial College of London (and now at McMaster University in Hamilton, Ontario, Canada) and myself (now retired) were co-program chairs. The meeting was held on the campus of the University of Berlin.

Keynote talks were presented by Tom DeMarco (“The role of software development methodologies: Past, present and future”), Tony Hoare (“The role of formal techniques: Past, Current and Future or How did software get so reliable without proof?”) and by Vic Basili (“The role of experimentation: Past, Current, and Future”).

My recollections from over 20 years ago are somewhat hazy, but I remember that it was a somewhat typical ICSE with experimental

paradigms, testing, component development and formal models of design and validation as being the “hot topics” of the day.

The most amusing event to me occurred during a lunchtime press conference between the chairs of the meeting (Dieter, Tom and myself) and the German press. Since Dieter spent many years in the USA, his English was excellent. When asked a question he was supposed to act as translator to pose the question in the other language for the appropriate person to respond to it. However, when given an answer in English he proceeded to translate it into English! It took him about 2 questions to realize what he was doing and perform the correct translations.

There were two aspects of that ICSE that are still quite vivid in my mind. One was the location: Berlin. ICSE18 was the first time a non-US country was the host for a second ICSE Meeting. ICSE4 was the first meeting held outside of the USA and was held in Munich, Germany in 1979. The Soviet Union had collapsed in 1989 and dissolved in 1991. Germany was reunified in 1990. By 1996, Berlin was the center of a massive rebuilding project as the country was rapidly trying to reintegrate the former soviet eastern part into the more modern west. Bits and pieces of the Berlin wall remained as other sections of the city were being razed and rebuilt. This was a primary reason General Chair Dieter Rombach chose Berlin as the host city for the conference. Potsdamerplatz was a huge mess of construction cranes as various companies vied for the rights to build the most impressive intersection in the country that separated the old West Berlin from the former East Berlin.

My second vivid memory from that ICSE occurred the previous year in 1995. We held a program committee in College Park near the University of Maryland in the fall of 1995 to choose the papers we would accept for the conference. That was before *Skype*, *FaceTime* and the various other technologies existed to create virtual meetings. In those days the program committee was expected to show up in person to choose the program. This was about 5 years after the Soviet Union dissolved and we invited a Russian scientist to be on the program committee in order to foster scientific relations between the former Soviet Union and the west. Money was tight in Russia and we agreed that the conference would pay for his attendance. He showed up for the two-day meeting and on the last day of the meeting—a Friday—he was

petrified to learn that we would give him a check for his expenses. The banking system in Russia was not well regulated and he was afraid if he received a check, he would lose most of its value in “fees” involved in converting the money to Rubles. I called the Computer Society office in Washington on Friday afternoon and spoke with Anne Marie Kelly. We needed to have the several thousand dollars in cash by Saturday morning when the meeting ended. I’m not sure what Computer Society rules she broke or at least bended and I don’t know how she did it. She said she’d try, and she succeeded. I’ve always had amazing respect for her ability to get things done.

The 19th ICSE, 1997

*Rick Adrion, Alfonso Fuggetta,
Richard Taylor, and Tony Wasserman*

General Chair, Rick Adrion, with Program Coordinators Alfonso Fuggetta, Dick Taylor, and Tony Wasserman, designed the 1997 ICSE conference to address its theme “Pulling Together”. We hoped to create a conference that would help the software engineering community pull together, in the full sense of that phrase, challenging old beliefs, promoting new ideas and new synergies, and providing for a dynamic, exciting program.

In addition to the traditional sessions, ICSE97 included a widened range of conference activities, a widened range of participants, and new technical areas. ICSE97 was planned against a backdrop where many of the significant advances in software were coming from industry, so our goal was to bring some of that experience into the conference. In 1994-5, when conference planning first began, Microsoft was a dominant force in computing, and the release of Windows 95 quickly became the dominant platform, with thousands of independent software vendors building products for it. The World Wide Web was still very new, and the first commercial browsers (IE and Netscape) were only released in 1994, so the conference preceded the huge dot-com boom that followed in the late 1990s. Sun Microsystems introduced

The 19th ICSE - Fact Sheet

Dates:	May 17–23, 1997
City:	Boston, MA, USA
Venue:	Sheraton Boston Hotel & Towers
General Chair:	W. Richards Adrion
Program	
Coordinators:	Alfonso Fuggetta, Richard N. Taylor, and Anthony I. Wasserman

Java in mid-1995, which eventually became a preferred language for enterprise-scale web application development, and later the foundation for the Android platform.

In looking through the Conference proceedings and articles in Will Tracz' Windows on the World (WoW) conference newspaper, you'll find these comments by the organizers.

Tony Wasserman brought his experience in running an innovative software product company, his decade in academia, and his strong personal network in the software industry, to bring industry professionals into the 1997 program. Tony said:

“In thinking about the ICSE97 conference, we were strongly influenced by the CHI and OOPSLA conferences, large, successful conferences that bridge the research and ”practitioner” communities. Above all, we wanted to make ICSE the ”must attend” conference for those interested in the state of the art of software engineering.”

Alfonso Fuggetta added:

“In the selection of the program committee and in the definition of the programme we are paying much attention to the disciplines which are related to software engineering, such as multimedia, Computer Supported Cooperative Work (CSCW), the Web, and human computer interaction.”

Dick Taylor commented:

“I wanted to shake, if even only a little bit, the software engineering community out of its historic boundaries or emphases. It is very easy for a conference, or a community, to settle into a predictable and comfortable rut, talking about things that have always been of interest to software engineers, and which will probably remain of interest. But in the meantime, there are enormous changes occurring around us and fabulous opportunities. Some of those changes create new and important problems for software engineering to address. Some of them present opportunities for bringing new kinds of firepower to old problems. Some of them mean that some traditional topics are no longer of interest.”

Rick Adrion discussed setting high goals for the quality and management of the conference. He said:

“The primary goal [of ICSE] was to close the gaps in the community, particularly between researchers and practitioners ... [by adding] ... tracks of interest to practitioners (more tutorials, industrial panels, lessons, and exhibits) and researchers (traditional technical program, workshops, posters and doctoral consortium).”

Some Conference Highlights

Two traditions changed with ICSE97. First, the conferences had been numbered in sequence ICSE-1, ICSE-2, etc. and with ICSE97 (ICSE-19), the conferences began to be numbered with the year. The dates for earlier ICSE conferences had varied with conferences held in the spring, summer and fall. After ICSE97, the conference has usually been held in mid/late May or early June. Adrion added,

“The one hurdle we did not expect and did not overcome entirely was the conflict with the Boston area college graduations and the lack of hotel space on the weekend of May 17 - 18.”

Keynote Speakers

All three of our keynote speakers were industry professionals: 1) the late Ed Yourdon, a prolific author and well-known speaker on software analysis and design methods; 2) the late Mark Weiser, then Chief Technologist at Xerox PARC, and; 3) Guy Steele, Distinguished Engineer at Sun Microsystems. We hoped that these speakers would attract software engineering professionals to ICSE.

Technical Program

The Program included a balanced mix of technical papers; invited presentations; panels; lessons from organizations; state of the art reports; experience reports; and formal research demos. We knew that it would be difficult to get people in industry to write papers that would meet the standards of the traditional ICSE program committees, and also knew that few of those people would have the time or the interest in writing such papers. We created a committee to help organize the Professional Track, and the three new types of sessions (invited presentations, panels, and lessons in organizations) required no more than a 2-page summary for the Proceedings.

Awards

Peter Neumann of SRI International was honored for his longstanding service with the *ACM SIGSOFT Service Award*. Neumann is credited for creating the SIGSOFT Newsletter and is widely recognized for his Risks Forum. Peter thanked a number of people in his WoW interview, including Tony Wasserman, for talking him into creating Software Engineering Notes, Adele Goldberg, who inspired him to create the on-line Risks Forum, and Will Tracz who took over as SEN Editor. Peter said,

“Eighteen years was a lot of extra innings. Will is doing a marvelous job with SEN, and I enjoy the extent to which he puts himself into it. I hope he lasts as long as I did.”

Will, by the way, served as SEN editor from 1993–2012, and edged Peter out for longevity.

Barry Boehm won the *ACM SIGSOFT Technical Research Award*. Barry told WoW,

“Don’t be afraid to challenge current strongly-held beliefs in the field. These positions can be unpopular, but they’re part of the process of maturing the field and adapting it to change. I’ve done some of this, but now wish I had done more.”

Dan Bricklin received the *IEEE Computer Society Entrepreneur Award*. Barry Johnson noted,

“In 1979, Dan Bricklin was co-creator of VisiCalc, the first electronic spreadsheet, and founder of the Software Arts company. His pioneering entrepreneurial spirit and his demonstration of the business value of personal computing was the catalyst that allowed for the rise of the personal computing marketplace we know today.”

The ICSE97 program committee jointly honored Professors Leon J. Osterweil of the University of Massachusetts, Amherst, and M.M. Lehman of the Imperial College of Science and Technology, England, as having written the *Most Influential Papers for ICSE-9*. Osterweil’s paper and presentation 10 years ago, followed by Lehman’s contrasting remarks spurned a debate the split the attendees at the conference that year in Monterey California. Lee said,

“I have vivid recollections of ICSE-9 and the controversy that was kicked up by the talk, and Manny’s response. On one hand it was a bit jarring to be thrust into the middle of an impassioned debate. But on the other hand it was nice that the talk got serious attention.”

Manny Lehman remembered,

“The strength of the reaction to Lee’s paper and my response—how well the latter was received. The “debate” between Lee and myself appeared to divide the conference down the middle which suggested that there were some very fundamental issues at stake.”

As a postscript, we note that Most Influential Paper Award for ICSE97 went to Antonio Carzaniga, Gian Pietro Picco and Giovanni Vigna: *Designing Distributed Applications with Mobile Code Paradigms*.

Workshops and Tutorials

There were nine co-located workshops and symposia: Symposium on Software Reusability (Guillermo Arango); Living With Inconsistency (Steph Fickas); The Second ISEW Cleanroom Workshop (Graeme Smith); Software Engineering for Parallel and Distributed Systems (Stefano Russo); Software Engineering on the Web (David Eichmann); Seventh International Workshop on Software Configuration Management (SCM7) (Reidar Conradi); Process Modelling and Empirical Studies (Rachel Harrison); Migration Strategies for Legacy Systems (Rene R. Kloesch); and the Fourth International Workshop on Software Engineering Education (IWSEE4)(John Werth).

The first Doctoral Consortium held in conjunction with ICSE was chaired by Michael Young and included 10 participants selected from 39 applicants on the basis of submitted abstracts and recommendations. The students presented and discussed their research goals, methods, and results. Of the seven mentioned in the program, 3 are faculty members, 2 are working in the tech industry and two in financial services.

As Bashar Nuseibeh reported in WoW,

“the number of tutorials ... rose to twenty five — a marked increase from previous years. The highest number of attendees (43) was at Pree and Sikora’s half-day tutorial on ”Design Patterns for Object-Oriented Software Development”. Joint second place also went to half-day tutorials by Kramer and Magee — on ”Distributed Software Architectures”, and Fowler — on ”A Survey of Object-Oriented Analysis and Design Methods” (with 40 registered attendees apiece).”

Looking back

With more sessions and presenters than in any previous ICSE, we created a lot of work for everyone responsible for organizing the conference. We believe we were successful in opening up the conference to a much larger community than in the previous 18 conferences. Without the social media of today and a budget to advertise in publications most widely seen by industry professionals, we didn't attract as many industry professionals as we had hoped. Overall, though, the effort to involve both researchers and practitioners was a precursor to the current ICSE structure, in particular the Software Engineering in Practice track, which solicits contributions independently of the Technical Papers track. ICSE has continued to grow in the intervening 20 years, adding more workshops and affiliated conferences that may make ICSE97 seem small by comparison.

Closing Memory

Rachel Ostrand attended many software conferences with her mother, Elaine Weyuker, beginning when she was five months old. A few years before ICSE97, Rachel began to offer to decorate attendee's badges with colorful pencil drawings. Nine years old at ICSE97, she continued that tradition as she did in many later meetings. Today, Rachel is a cognitive scientist with a focus in psycholinguistics—the study of speech production and comprehension. She is a Postdoctoral Researcher at IBM Research, having completed her Ph.D. in 2016 at the University of California, San Diego. How time flies.

The 20th ICSE, 1998

The 20th ICSE - Fact Sheet

Dates:	April 19–25, 1998
City:	Kyoto, Japan
Venue:	Kyoto International Conference Center
General Chair:	Koji Torii
Program Chairs:	Kokichi Futatsugi and Richard A. Kemmerer
Technical co-chairs:	Takuya Katayama and David Notkin†

Memories by Koji Torii

ICSE 20, April 19–25, 1998, was held in Kyoto, Japan.

The plenary session was held for three days from April the 22nd to the 24th. Prince Takamado of the Japanese Imperial family welcomed all the participants at the reception on the 21st evening and at the opening ceremony.

Thirteen workshops were held on the 25th and 26th after the plenary session. Tutorial sessions were held on the days before the plenary sessions.

The General Chair was Koji Torii from Nara Institute of Science and Technology (NAIST). The program chairs were Kokichi Futatsugi from JAIST and Richard A. Kemmerer from University of California, Santa Barbara. Since there were several events other than regular papers, two technical chairmen, Takuya Katayama from Japan Institute of Science and Technology (JAIST) and David Notkin from University of Washington were assigned to organize those events.

Three keynote speakers were scheduled: Dr. Nobuaki Kumagai (former President of Osaka University and also a member of the Japanese Government Council for Science, Technology and Innovation), James Gosling (Sun Microsystems) and Cordell Green (Kestrel Institute). Unfortunately, Gosling could not come so David Harel served as a substitute, who was the best paper award winner of the 10th ICSE.

41 regular papers were selected out of 209 submissions from 26 countries. Each submission was reviewed by at least 3 reviewers.

Lessons Learned and Status Reports were solicited from industry. 23 lessons-and-status reports were selected out of 51 submissions from 17 countries. Software metrics, project management, and process assessment were the three major topics of interest.

Tutorial Sessions have traditionally been offered for two days before the plenary session. Out of 54 applicants 19 tutorials were presented which included fourteen 3 hours, three 6 hours tutorials, and mini tutorials (1.5 hours) which were part of the plenary session.

There were 25 Poster/demonstration displays: 14 from Japan, 3 from Belgium, 2 each from the United States and Australia, and one each from Germany, Russia, Austria, Brazil respectively

An Asia-Pacific Forum was held to provide a place to exchange opinions frankly. There were 43 Forum participants.

A doctoral symposium was held: 23 students applied from 14 countries and 9 were accepted. The program consisted of presentations, a lunch which allowed for interactive discussion of the work being done, problems, and the differences among countries in the degree process.

The tool fair of this time "ICSE 98 - EXPO" was held for hosting participants from industry despite the difficult economic situation of

that year. Exhibitions from 35 companies filled the big hall and was held as part of the plenary session. An advertising strategy aimed at having general attendees as well as conference participants. The total number of participants and attendees was over 3000.

Some technological issues in ICSE98 were summarized as:

- Software development in the Internet age; Network programming such as Java, hypertext/ multimedia technology, cooperative work through the network
- Further deepening of object-oriented development methods
- Development techniques of evolving software system, flexibly adaptable to changes in the environments
- Designing and creating software using scientific/mathematical methods based on precise and logical models, and
- Practical techniques and methods based on field experience and experimentation.

Since there were many categories other than regular papers, we divided the proceedings into two volumes. Volume One contains Technical Papers and Lessons and Status reports. Volume Two contains other materials.

Regarding the operation of the conference I want to highlight some points.

Traditionally a daily newspaper had been issued every 3 days of the plenary session. Eleven members of the editorial team were very active throughout the day and night for editing, and printing work.

As a working unit to implement of the plenary session, students and young colleagues from NAIST as well as from other universities were recruited for many tasks such as reception at each venue, load transporting, and setting up terminals. Some people worked at midnight and early in the morning. This voluntary support led to minimizing the cost, allowing for a reasonable conference fee.

I set this conference site and the date to highlight the beauty of the Japan. Kyoto's spring was very beautiful and many people commented on its beauty. The location was perfect for walking and viewing the

double cherry blossoms, dogwoods and fresh green. About 1000 participants may still have good memories of Kyoto ICSE.

“ICSEs before and after ICSE98” by Kokichi Futatsugi

The first Conference of ICSE (International Conference on Software Engineering) series was called a National Conference (NCSE) and held in Washington DC, USA in 1975. ICSE in 2018 will count up to 40th ICSE and will be held in Gothenburg, Sweden. I had a chance to co-chair the program committee of the 20th ICSE in Kyoto, Japan in 1998. 20th ICSE marks the end of the first half of the ICSE series, and it tempts me into thinking about the developments of software engineering through the changing focuses of ICSEs before and after ICSE98.

The foreword of the ICSE98 Proceedings contained the following, and the organizers of ICSE98 expressed their hope to help “forging new links” among not only many research areas but also many communities.

The software engineering discipline has gradually come to cover a wide area of different kinds of science and engineering fields. This tendency will continue as computer networks all over the world have a profound effect on many aspects of software engineering. The twentieth ICSE (ICSE98) takes place on this occasion in the old beautiful Japanese town of Kyoto, which itself links the old to the new.

ICSE98’s theme is “Forging New Links”. We have worked hard to ensure that ICSE98 will see an unprecedented increase in the level of international participation. At the same time, we have also tried to build bridges to other software disciplines, thus giving researchers and practitioners in allied fields the benefit of understanding the contributions that software engineering can make to their work. In turn, we must also address their problems in our research. New collaborations between academia and industry will enrich ICSE98 and our profession as a whole.

The above words reflected the atmosphere around ICSE98, in which it was expected that software made every dream come true and software engineering was the most important discipline for realizing the dream.

It is interesting to observe that Frederic P. Brooks, Jr. published the seminal book, *The Mythical Man-Month (MMM)*, in the same year when the 1st ICSE (i.e. NCSE 1975) was held. The 20th Anniversary Version of MMM was published in 1995 three years before ICSE98. 20th MMM included the famous No Silver Bullet paper published in 1986 and stated somewhat provocatively that software construction was still a big challenge for human being. We are now more than 20 years after 20th MMM, that is more than 40 years after 1st ICSE (NCSE 1975), and seem to have to admit that the challenge still stands steadily in front of us. ICSEs have been coping with the challenge for more than 40 years.

In nineteen seventies and early eighties, ICSE was a central forum for all software related disciplines. Many seminal papers on algorithms, data bases, programming languages, verifications, and formal methods are published in early ICSEs. These areas, however, became to have their own specialized conferences and ICSE lost the central status in them. The starts of ISRE (Intl. Symposium on Requirement Engineering) in 1993 and ICRE (Intl. Conference on RE) in 1994 can be seen in the similar context.

ICSE is now considered to be the flagship conference of software engineering. It is not easy, however, to see what the main focus of ICSE is, or more generally what software engineering is, by looking into contents of recent ICSEs. There should be several reasons for this. The technical environment of software engineering has changed radically in the past 40 years: sequential to parallel, single processor to multi processors, uni-thread to multi-thread, standalone to network, centralized to distributed, static to dynamic/adaptable/self-modifying, etc. The application area of software has expanded rapidly, and has gotten into every sector of modern society. As a result, technical issues relating to software construction have spread over a broad spectrum of sciences and technologies, and software engineering is difficult to be identified as a single engineering discipline. Current software engineering is better to be understood as a multi-disciplinary collection of sciences and technologies.

Even though it is difficult to identify cohesive principles in software engineering, it is interesting to see a tendency, can be called “data orientation” in contrast with “model orientation”, has become apparent in ICSEs. Software construction inherently involves concept/model formation because its goal is to realize a new unseen service/system. Hence model orientation naturally underlies software construction. However, after many services, systems, or applications are realized and available, studies of analyzing their functionality/quality based on data are undertaken. These studies are called empirical or metric-based, and even software construction methodologies themselves are studied with empirical data. Availability of a large amount of open-source program codes also encourages data oriented studies of program analyses. Data orientation seems to become an apparent feature of software engineering and ICSEs.

We can find another interesting and important data orientation recently. That is, the emerging technology of making use of big data, which is called machine learning or deep learning more specifically. Papers reporting the uses of machine learning for analyses/verifications have been published in recent ICSEs. Machine learning with big data has potential for solving an unsolved problem for which model is difficult to make. It is well known, however, that machine learning system is difficult to explain why the system works as expected and is not trustworthy enough. To find a nice balance between model orientation and data orientation should be a most significant and challenging issue of future ICSEs.

Memories by Richard A. Kemmerer

The 20th International Conference on Software Engineering (ICSE98) was held April 19–25, 1998 in Kyoto, Japan. It was the second ICSE held in Japan and the third in Asia. The conference took place at the Kyoto International Conference Center north of Kyoto city, which had a wonderful Japanese landscape garden where participants could enjoy taking a walk.

Koji Torii from Nara Institute of Science and Technology (NAIST) was the General Chair of ICSE98, and the program chairs were Kōkichi Futatsugi from Japan Institute of Science and Technology (JAIST)

and Richard A. Kemmerer from University of California, Santa Barbara (UCSB).

The theme of ICSE98 was “Forging New Links.” The idea was to increase the level of international participation, build bridges to other software disciplines, and to establish new collaborations between academia and industry. For me as program co-chair the conference also forged a new link between my American “cowboy” get it done approach and the Japanese consensus approach. At one of our first planning meetings in Boston at ICSE97, I showed up for a meeting that was initially delayed because the General Chair was not there. After a while we started the meeting without him. We had a number of issues to decide, and to my way of thinking they all took too long because we continued to discuss each nuance until there was consensus. After about two hours we had resolved most of the issues and were ready to adjourn the meeting. However, just as we were about to break up, the General Chair entered the room, and the Japanese contingency was ready to start the meeting over from ground zero. This was more than I could take. Fortunately, we eventually adjusted to each other’s operational style and had a successful conference in the beautiful countryside of Kyoto, Japan.

My main memory from ICSE98 relates to the opening ceremony, where Prince Takamado of the Japanese Imperial family was scheduled to welcome all of the participants to the conference. As a program chair I was to be formally introduced to the prince on stage. When my friends heard that this was going to take place, they started making bets as to whether I would bow to the prince when I met him. To this day there is still an ongoing debate as to whether I bowed when meeting him or just nodded my head. Needless to say no one was able to collect on the bet.

Another memory is of the incredible amount of work involved in managing the paper submissions, reviews, and reviewers. At that time we did not have a document management system for the conference, so the process involved a lot of manual labor. There were 209 full papers submitted, and each submission included five printed copies of the paper. Each paper was mailed or FedExed to at least three reviewers. When I think about this, I can only imagine how many trees were destroyed just to provide the paper for all of the submissions and re-

views. Today with the online manuscript systems things are so much more efficient.

In addition to the interesting memories from ICSE98, I have some fond remembrances of earlier ICSEs that I would like to share. The first ICSE that I was aware of was actually the International Conference on Reliable Software (now referred to as ICSE-0), which was held at the International Hotel in Los Angeles in April 1975. I was a first year graduate student at UCLA at the time, and even though I lived less than 10 miles from the venue I did not attend the conference because I could not afford the registration fee. Fortunately, I had asked a fellow student who was attending to buy a copy of the proceedings for me. The following summer I was interning at Rockwell International, and during every lunch period I could be found reading the papers from this conference. Many of the authors of these papers became close colleagues and friends in the future years.

Three years later, I attended my first ICSE in Atlanta (ICSE-3). A remembrance from that conference was riding on the elevator the first day with Barbara Liskov, who I knew of from reading her paper in ICSE-0. She started a conversation by asking me how far along I was in my studies and what areas of research I was interested in. I was in the final stages of my PhD at the time and very interested in formal methods. To me the idea that a famous MIT professor would be interested in what a grad student was doing made an impression on me at the time. Since my main area of interest was formal methods, one of my heroes was Tony Hoare, and he was on one of the panels at ICSE-3. I sat in the front row for the panel presentation and planned to introduce myself when it was over. This did not happen, but on the final afternoon of the conference I saw Tony talking to Michael Jackson, and I got up the courage to approach them and introduce myself. They were both very pleasant and showed interest in what I was doing. I found as years passed that this is more the rule than the exception for the ICSE community, and when I became one of the main players in this community I strove to emulate this behavior.

These memories from earlier conferences support my view that the International Conference on Software Engineering is a great place to meet with colleagues to learn about their current research and to catch up on how their families are doing. It is also a good place to make new acquaintances that often become future colleagues and friends.

The 21st ICSE, 1999

The 21st ICSE - Fact Sheet

Dates:	May 16–22, 1999
City:	Los Angeles, CA, USA
Venue:	Los Angeles Airport Marriott
General Chair:	Barry Boehm
Program Chairs:	David Garlan and Jeff Kramer

“Highlights” by Barry Boehm

The theme for ICSE-21 in Los Angeles in 1999 was “Preparing for the Software Century.” By 2018, we can already see that we are already well into the software century, with Apple, Alphabet/Google, Microsoft, Amazon, Facebook, and Tencent topping the list of most valuable companies in the world, and companies like Google taking on the automotive industry via self-driving cars. Scalable, agile, high-assurance, continuous delivery (DevOps) has been achieved by Amazon with a new release every 11 seconds, and is being pursued by a European con-

sortium of large manufacturing companies led by Jan Bosch, including Saab, Volvo, Ericsson, Siemens, Bosch, and Volkswagen, similarly committed to achieving scalable, agile, high-assurance, continuous software delivery throughout their cyber-physical products' lifetimes. Distributed hardware maintenance is being reinvented by software-driven 3D printing.

The main part of ICSE-21 was the sessions of accepted papers. The Program Committee, led by David Garlan and Jeff Kramer, reviewed 260 papers and accepted 49. Multiple sessions of papers addressed the key topics of Software Architecting, Distributed Systems and Projects, Software Metrics, and various forms of Software Verification and Validation. ICSE-21 also included a wide variety of state-of-the-practice events, such as tutorials (led by Kevin Ryan), workshops (Wilhelm Schaefer), case studies (Anthony Finkelstein and Will Tracz), industry presentations (Larry Bernstein), research demonstrations (Gail Kaiser), posters and informal demos (David Redmiles), and a Doctoral Symposium (Bill Griswold). The keynote speakers were Bill Wulf, the first and still the only software engineer to become President of the US National Academy of Engineering; Alan Kay, then at Disney, with his observation that "the best way to predict the future is to invent it"; and Butler Lampson, then at Microsoft but well known for his leading role in architecting and developing the pathbreaking Xerox-Alto complex of human-computer interaction capabilities, to be then adapted and adopted with the Apple Macintosh and Microsoft Windows. Dr. Lampson's keynote was followed by a panel of software engineering leaders: Steve Cross, Director of the CMU Software Engineering institute; Anita Jones; David Parnas, and Walker Royce.

ICSE-21 continued the practice of highlighting the most influential paper from ICSE-11: Dewayne Perry's paper, "Software Evolution and "Light" Semantics". Some other significant reflections from the past revisited and extended insights from the NATO-conference year of 1968. Edsger Dijkstra's 1968 contribution of Separation of Concerns was generalized in Peri Tarr et al.'s paper "N Degrees of Separation: Multi-Dimensional Separation of Concerns". Melvin Conway's 1968 contribution of Conway's Law, "The structure of a software system reflects the structure of the organizations that developed it", was extended into a software development strategy in Jim Herbsleb and Becky

Grinter's paper, "Splitting the Organization and Integrating the Code", which had been used in some successful projects which identified key software system capabilities, identified their place in an overall system architecture, and assigned them to the organizations best qualified to develop them.

"A Retrospective" by David Garlan and Jeff Kramer

Reflecting back on being program chairs of ICSE in 1999 provides an opportunity to consider the situation at the time and to observe some of the important changes that have occurred to the conference over the years.

ICSE'99 was held in Los Angeles. Barry Boehm was the general chair and we were co-PC chairs. This was the last ICSE of the 20th century, and this was reflected in its title: "Preparing for the Software Century: Software Engineering Challenges for the Global Electronic Community". These were certainly exciting times! We were standing on the brink of a digital revolution, which is now all too familiar. We wanted software engineers to recognize the opportunities offered and responsibilities entailed, to seize the initiative and ensure that we as a community would provide the necessary software engineering foundations.

The Conference Program: The conference was generally judged to be highly successful. The program committee included many of the most prominent researchers and practitioners in the field, and the quality of submissions was extremely high. The topics covered a wide spectrum of software engineering, from software evolution, reverse engineering, specification, verification, model checking and testing to distributed computing, including practical aspects such as metrics, reuse, inspections, debugging and prototyping. Based on surveys taken at the conference, attendees ranked the conference very highly in terms of value and content; the number of submissions and attendees exceeded all previous ICSEs. The conference introduced several innovative features aimed at attracting industrial practitioners, including a new track focusing on Case Studies in Software Engineering, seven sessions on

industry experiences from leading practitioners, and a reinstated Research Demonstration Track.

Thanks to Barry, the conference also brought in a number of highly influential and prominent speakers, who would in all likelihood not otherwise have attended, including:

- Three well-known keynote speakers: Alan Kay (then at Disney) entitled “The Computer Revolution Hasn’t Happened Yet”, Butler Lampson (Microsoft) entitled “How Software Components Grew Up and Conquered the World”, and William Wolf then (President of the U. S. National Academy of Engineering) entitled “Are We ‘Inventing the Future’ or ‘Fumbling’ It?”.
- A panel session following Lampson’s keynote including of Stephen Cross (then Director of CMU-SEI), Anita Jones (U. of Virginia), David Parnas (McMaster U., Canada) and Walker Royce (Rational).

Beyond the general goal of providing a high-quality and diverse program, the conference made a point to solicit papers that would address the increasingly important role of software systems in ordinary people’s lives. The foreword to the Proceedings put it this way:

“Software pervades the growing web of computers and communications systems providing diverse services: personal, commercial, financial, public, and entertainment services. Providing timely, cost-effective, high-quality software for these diverse services requires the best possible technology and practice that the software engineering community can provide. In addition, there has been a real shift in the needs, expectations and sophistication of our users. Users, rather than software engineers, should be enabled to configure and compose software systems so as to suit their particular applications and changing needs. We, the software engineers need to rise to the challenge of making this possible, of empowering our users. Many of the techniques and technologies that we have developed and

adopted over the last few years - Web-based user interfaces, software architectures, component composition, object interaction - are helpful towards this goal, but there remains much to be done.”

Changes over the years: Reflecting, now, on the differences between ICSE today and 1999, a number of things stand out:

Size: Interestingly, ICSE '99 lies at about the midpoint of the ICSE series, being the 21st conference in a series that now numbers 43. This seems to be reflected in the numbers. The conference seemed large by the standards of the time—and, indeed it was the largest software engineering venue in the world. However, by many measures, it now seems rather small:

- The program committee numbered 43 and reviewed 260 technical research papers (with a load of about 20 papers per reviewer). In 2017, ICSE had 93 program committee members and another 33 on the program board.
- The program had four parallel tracks; ICSE 2017 had eight.
- ICSE'99 conference organization had 13 Chairs including 15 people; ICSE 2017 had 26 Chairs including 42 People.

Technology: Although reviews were submitted on-line, this was the last ICSE to require submission of paper copies for review: authors had to send 6 copies of their papers, which then had to be manually sorted, assigned to reviewers and mailed out in reviewer-specific packets. As PC chairs, this required a 2-day meeting and a large room with plenty of floor space to manage this task, a process vastly simplified by today's on-line submissions—not to mention the many trees that are now spared. In addition, at the conference, display technology was finicky enough that we required all speakers to have physical transparencies as a back up to any electronic presentation. There was no social media facet to the program, nor a web chair.

Industry and Location: The conference attempted to include more practitioners than prior ICSEs. Beyond the case studies track, practitioner sessions, and demonstrations, the decision was made to locate

the conference at a hotel near the Los Angeles airport, with the goal of making it easy for industrial participants to get to the conference and to attend for a single day. While this ended up attracting about 30% of the attendees from industry, participation from industry was less than expected and not entirely successful. ICSE is and remains essentially a research conference. While convenient for travel, an airport hotel is not an ideal conference location for the majority of ICSE attendees, who come for the duration of the conference, and often also for pre- and post-conference workshops and events.

An attempt was made to make light of the location in the introduction to Alan Kay's keynote, which went something like this:

“Good morning Ladies and Gentlemen. Welcome to today's flight, which will be travelling into the future. I will be your flight attendant for this flight. I am pleased and honored to say that our Captain this morning is someone who has made numerous, profound and lasting contributions to our field.”

There followed a list of Alan Kay's accomplishments, ending with:

“One of his most famous quotes is ‘The only successful way to predict the future is to invent it’. Please fasten your seatbelts, put away your tray tables, put your chairs in the upright position and prepare for takeoff into the future with our distinguished Captain: Alan Kay.”

Did the introduction go down well? You will have to ask the attendees, but we do know that the keynote was highly appreciated!

All in all, ICSE '99 was certainly successful—the attendees' response confirms this. Thanks to Barry, the conference was extremely well organized. We worked hard—as all ICSE PC chairs do—but worked well together and had a lot of fun. It would have been nice to be able to claim that we set the agenda for software engineering research for the 21st Century, but that would certainly be presumptuous. Probably the best that we can claim is to have played our part in maintaining the great ICSE tradition in providing a venue for discussion and a forum for the exposition of the excellent research produced by our community.

The 22nd ICSE, 2000: “ICSE at the dawn of the new millennium”

*Carlo Ghezzi, Mehdi Jazayeri, Alexander Wolf,
and Kevin Ryan*

We started working on the conference when excitement about the new millennium was starting and we wanted to somehow build on that excitement to build enthusiasm about the field. On the other hand, there were doom sayers warning of impending disaster of the y2k, creating negative impressions in the public mind. Carlo was chosen by the steering committee, given Limmerick as the venue, with the able assistance of Kevin Ryan as the local organizer. Carlo picked Alex and Mehdi as the PC Chairs. We worked quite well with the usual hickups along the way but the conference was a big success with a huge number of submissions and attendance. FOSE, a new innovation at ICSE, was a big hit. The PC process followed the traditional ICSE process but it was clear that the numbers of submissions was exceeding the capacity of a single unique PC. In particular, we did not hold the PC meeting at another conference. Vienna was the site of the PC and organization meeting with coffee and pastry being appreciated. We also mention a couple of lasting impacts of the conference.

The 22nd ICSE - Fact Sheet

Dates:	June 4–11, 2000
City:	Limerick, Ireland
Venue:	University of Limerick: Main Building, Computer Science Building, Foundation Building, and Schumann Building
General Chair:	Carlo Ghezzi
Program Chairs:	Mehdi Jazayeri and Alexander Wolf
Conference Organization	
Chair:	Kevin Ryan

The beginning

Carlo was tagged by the ICSE Steering Committee to propose a team and a location for ICSE in the year 2000. The choice of the two PC co-chairs was easy for him. He had a long history of research collaboration with Mehdi, which dated back to the time in which both were active in programming languages and compilers. Collaboration and research interaction with Alex did not go back as long in time, but was also based on common interests and a shared vision of the depth and breadth of software engineering research. The selection of the venue was less obvious. Carlo initially looked for opportunities to hold the conference in Italy, which seemed to be a natural choice for him, since he played the role of General Chair. For various reasons, however, no real opportunities materialized. At the same time, there was a very strong push to host ICSE in Ireland. Kevin Ryan, then Professor at the University of Limerick, was investing a tremendous effort into creating in Limerick a strong competence center in software engineering, with strong local and national support. As part of this strategy, Kevin strongly pushed Limerick as a venue for a prestigious international event like ICSE. Kevin's passion and competence convinced Carlo that Limerick would be an excellent location to host ICSE. To facilitate the overall organization of the conference and reduce the inevitable fric-

tion due to the distance and lack of local knowledge, Carlo proposed that Kevin would play an expanded role as Organization Chair, adding all the financial and sponsorship responsibilities to the usual local ones.

The meetings

Crucial to the success of the conference were a set of meetings to decide on the principles and prepare everything. The ones that seemed important and instrumental to the final success were the following. Mehdi and Alex met in Boulder for a week to plan the process of the building the program. Today this can be done with Internet tools. But the dedicated week contributed to strengthening of relationships and deeper agreement about the decisions. Later Alex visited Mehdi in Vienna for a week for assigning papers to reviewers and preparing the PC meeting. This week included daily visits to coffee shops in the afternoon for the traditional Viennese pastry and coffee snack. Carlo, Mehdi and Alex went to Limerick in June of 1998 to see the venue and discuss logistics with Kevin. The visit included a memorable seafood meal on the Clare coast, with the sky still bright at 23.00 hours.

The meeting

There was a tradition, and one that continues to this day, that the PC meeting and the organization meeting are held at another conference. The benefit of this strategy is that it reduces the number of trips for the members (at the cost of a longer trip). It is assumed that the members attend the conference and then stay on for the PC meeting. The downside of this idea is that by the PC meeting the members are already tired and usually have to be in touch with their home institutions pretty much constantly. We decided to have the organization and PC meeting at the Technical University of Vienna with all PC members attending. This meant that people were there for one purpose only and could concentrate on ICSE 2000. The department and Vienna provided great support. Mehdi even had to intervene in a couple of cases with the embassy to facilitate some visa applications! The city of Vienna provided cultural (i.e. opera) that several PC members took advantage of. As usual, with a relatively small PC (50 people) the venue also

created good interactions among the people in a relaxed atmosphere, without preparing a paper presentation or coaching a student on paper presentation. Another advantage of not connecting the PC meeting to a conference is that we could set the schedule ourselves. Indeed, we were able to shorten the time between paper submission and paper notification considerable. Our paper submission deadline was November 11, as opposed to the usual end of August or early September one. We thought this was a great achievement. We gave a lot of thought to the actual running of the PC Meeting and the order of discussion of the papers. We had a running display of what paper was being discussed and a preview of the next one. This was unusual at the time where no conference management system existed. We also tried to seat the members based on minimizing conflicts of interests of those seated next to each other. The “level of control” was immediately rejected by a couple of members moving the nameplates and sitting where they wanted!

One thing we did that seemed new was try to establish a positive atmosphere by emphasizing acceptance over rejection. We started the meeting by noting that according to the submitted reviews about half of the submissions were already clearly below the bar of acceptance. Therefore, we pointed out at the outset that with so many rejections, our goal in the meeting was to look for acceptance. As usual, we had no limit on the number of papers being accepted but we wanted people to look for reasons to accept a paper rather than reasons to reject that paper. Even though the issue was not publicly debated, the point of view was met with mixed reaction. Traditionalists and the younger members insisted that we need to keep ICSE as a prestigious and selective conference. In the end, our acceptance rate was similar to other ICSEs. It turns out that the acceptance rate is determined by the capacity of the PC to discuss and review papers. We think that the important thing is to maintain a positive atmosphere which will, we hope, extend to the conference and the field itself.

We decided not to award a most influential paper award. This was probably an error. We discussed this with previous ICSE chairs and they gave their blessing. In retrospect, we were too severe. The idea is that the paper is not judged in absolute terms but relative to other papers of that year. Also, we should not be so severe on our colleagues and our field. This is indeed a problem of software engineering. We

tend to be too critical. Fortunately, the conference now seems to have a committee for the most influential paper award and will not repeat our mistake.

Impacts

As is usual when the responsibility for an ICSE is given to the chairs, life becomes hectic and we were thrown into handling all kinds of crises, mostly small ones which at the time appeared huge. One does not have time to think about longer term impact of the conference. But ICSE is indeed a big deal and it helps to think about what we will leave to the community after the conference packs up and leaves the conference center. Indeed, our ICSE did have some major impacts.

The Future of Software Engineering

Anthony Finkelstein was one of the major people who supported an Irish ICSE and he came up with the idea of a special track to summarize the state of the art in SE at the turn of the millennium. Furthermore he persuaded a host of distinguished authors to write commissioned articles on their areas of specialization. The result was the “Future of Software Engineering” volume, or FOSE as it was affectionately known thereafter. FOSE papers were highly cited, and often used as starting points for graduate students. FOSE has become a standard part of ICSE and every few years it appears again with a constantly impressive set of speakers and papers that help illuminate upcoming research directions.

Lero and Ireland

As hoped for, ICSE 2000 ended up having a big impact on the software engineering research landscape of Limerick and Ireland. The conference brought so many leaders of SE research to a (fairly) remote and (relatively) unknown country and city. When Kevin and his team set up Lero a few years later, the positive experience of ICSE made it much easier to attract research staff and graduate students. Lero has become a major software engineering research center in Europe.

What happened to y2k?

There was a lot of fear and panic about the impending doom brought on by y2k due to the fragility of software systems. Fortunately, these proved to be false and ICSE went on to be a success.

Personal notes

At some point we used Microsoft Project to build a humongous Gantt/Pert chart to guide and document our process. It was never used!

It was just before the widespread adoption of electronic submissions. At some point there were piles of submitted papers scattered across Mehdi's floor, one pile per reviewer. We stuffed FedEx packages manually with those papers. A graduate student, Michael Fischer wrote a lot of scripts to essentially simulate a conference management system. We were able to mail out the paper notifications two days after the PC meeting.

Being at our own university, we were able to hold the PC meeting in the majestic special meeting room of the Technical University of Vienna, probably once of the nicest PC Meeting rooms ever!

Despite some logistical problems and the usual unreliable Irish weather, everyone had a great time at ICSE 2000. The social program included plenty of music, singing, dancing and Guinness and many took the opportunity to spend a few days touring Ireland afterwards.

The 23rd ICSE, 2001: “Software Engineering Week in Toronto, Canada”

Hausi A. Müller

ICSE 2001, the *23rd ACM/IEEE International Conference on Software Engineering* was held May 12–19, 2001 in Toronto, Ontario, Canada. The conference venue was the Westin Harbour Castle overlooking Lake Ontario in downtown Toronto, with restaurants, theaters, shopping nearby and plenty of other attractions, such as the CN Tower and Niagara Falls. By all accounts and from all perspectives—attendance, technical program¹, proceedings, local arrangements, conference quality, conference management, and financial outcome, ICSE 2001 was a tremendous success. The Software Engineering Week was attended by 1,174 different people from academia, industry, and government across 44 countries. The conference attendees logged 2,217 different event registrations—ICSE main conference, tutorials, workshops, and collocated conferences. ICSE 2001 was a terrific team effort—the conference committee, the program committee, the student volunteers, the professionals, and of course the attendees—delivered and experienced a most memorable week in Toronto.

The main ICSE 2001 program included 47 technical papers, eight case-study reports, six education papers, an invited industry track,

¹www.icse-conferences.org/2001/print/fp.pdf

The 23rd ICSE - Fact Sheet

Dates:	May 12–19, 2001
City:	Toronto, ON, Canada
Venue:	Westin Harbour Castle Hotel
General Chair:	Hausi A. Müller
Program Chairs:	Mary Jean Harrold [†] and Wilhelm Schäfer

nine formal research demonstrations, and four panels. The program also contained six plenary sessions with outstanding invited keynotes²: “Software Engineering and the Internet” by *Daniel Sabbah, Vice President, Application and Integration Middleware Division, IBM Corporation*; “The Coming-of-Age of Software Architecture Research” by *Mary Shaw, Alan J. Perlis Professor of Computer Science, Carnegie Mellon University*; “‘Tolerating Inconsistency’ Revisited” by *Robert Balzer, Chief Technical Officer, Teknowledge Corporation*; “Software Engineering Challenges: A CIO’s Perspective” by *Bernd Voigt, Senior Vice President and Chief Information Officer, Lufthansa, Germany*; and “Reuse That Pays” by *Linda Northrop, Director, Product Line Systems Program, Carnegie Mellon Software Engineering Institute (SEI)*.

The main ICSE 2001 program featured³ two new tracks: *Challenges and Achievements in Software Engineering (CHASE)*, in which each session offered both research and industrial views on the same topic; and *Frontiers of Software Practice (FoSP)*, which provided mini-tutorials on new and promising software technologies. The CHASE track was inspired by the *Future of Software Engineering (FoSE)* track at ICSE 2000 to celebrate the new millennium. The annual IBM CASCON event, a conference which is held every year in Toronto, inspired the FoSP track. ICSE 2001 featured exciting panels orchestrated by famous software engineers: “Software Engineering Body of Knowledge Panel (SWE-BOK)” by *Peter Freeman, Georgia Institute of Technology*; “Impact Project” by *Leon J. Osterweil, University of Massachusetts, Amherst*; “Perspectives on Software Engineering (PoSE)” by *David Notkin, University of*

²<http://www.icse-conferences.org/2001/progkeynotes.html>

³<http://www.icse-conferences.org/2001/special.html>

Washington; “Software Engineering Research Agendas (SERA)” by Dieter Rombach, Fraunhofer Institute for Experimental Software Engineering.

The inaugural *New Software Engineering Faculty Symposium (NSEFS)* brought together faculty, who had survived their early years, with new and junior faculty. The main goal was to share and exchange ideas on practical methods for having a successful and fulfilling academic career as a software engineering professor. Daniel Hoffman and David Weiss organized the *David Lorge Parnas Symposium (DLPS): Thinking Hard About Software* in honor of Parnas’s 60th birthday. Other collocated events⁴ included the *IEEE International Workshop on Program Comprehension (IWPC 2001)*, *IEEE Symposium on Software Reusability (SSR 2001)*, *Engineering for Human-Computer Interaction (EHCI 2001)*, and *International Workshop on Model Checking of Software (SPIN 2001)*

Hard to believe, but ICSE 2001 had no wireless network access and no Twitter feeds. Instead, ICSE 2001 featured two *Internet cafés*, which provided high-traffic zones for meetings, discussions, and collaboration of researchers and developers from around the world. Starting with ICSE 1995, ICSE featured a daily newsletter called *Window-On-the-World (WOW)*⁵ to disseminate up-to-date information and interesting ICSE stories during the conference. The ICSE 2001 WOW was Volume 7. Note that ICSE 2001 WOW Issue 2 features an interview with ICSE 2001 Program Co-Chairs Mary Jean Harrold and Wilhelm Schäfer.

At the turn of the century, ICSE tutorial attendance started to decline while ICSE workshop attendance started to grow—in part due to tutorial materials being readily available on the web. At ICSE 2001, 434 people registered for the 22 tutorials and 649 people attended the 18 workshops that offered forums for interaction. Throughout the conference, there were also exhibits, posters, and informal research demonstrations. Finally, the conference featured three exciting receptions with great food and entertainment, including the Harvey Seigel’s “Speak-Easy Jazz Band”, to give attendees an opportunity to meet and network with old and new friends. The highlight of the conference gala dinner was a fabulous Canadian dance and singing troupe featuring the music

⁴<http://www.icse-conferences.org/2001/collocated.html>

⁵<http://www.icse-conferences.org/2001/archive/wow/>

of famous Canadian artists such as: The Rankin Family, Gordon Lightfoot, Anne Murray, Stomping Tom, Great Big Sea, Céline Dion, Bryan Adams, and Shania Twain.

ICSE 2001 was a big event for Canadian software engineering—research and practice. After lobbying for over a decade, ICSE was held for the first time in Canada. ICSE 2009, held in Vancouver, was the second time ICSE was organized in Canada. Next year, ICSE 2019 will be in the beautiful city of Montréal.

Organizing a successful ICSE requires a major four-year effort—starting three years before the conference takes place with the appointment of a *Tagee* and ending one year past actual conference, when the adrenaline has dropped, to finalize all the accounting and close the conference. In 1998, the ICSE Steering Committee selected Mary Jean Harrold, Georgia Institute of Technology, as the *Tagee* for ICSE 2001 in Canada. After considerable negotiations, the leadership team emerged with General Chair, Hausi Müller, University of Victoria and Program Co-Chairs, Mary Jean Harrold and Wilhelm Schäfer, University of Paderborn. Kenny Wong, University of Alberta, was one of the first people added to the organizing committee for the critical task of Webmaster. Kenny made huge contributions to all aspects of ICSE 2001. In the end, the ICSE 2001 website had over 250,000 hits and still serves as the most complete archive⁶ of any ICSE conference. In the process of orchestrating ICSE 2001, we became great friends and collaborators.

IEEE Computer Society and ACM SIGSOFT are the main sponsors of ICSE. The staff at both ACM SIGSOFT and IEEE Computer Society headquarters were extremely supportive and helpful throughout the entire four years. Since it was ACM's year, we worked more with ACM staff Julie Goetz and Ginger Ignatoff. The backing of ACM and IEEE with respect to legal and financial challenges is critically important and gives conference organizers much needed peace of mind. The ICSE 2001 proceedings⁷ were superbly produced by IEEE Editor Anne Jacobs.

The entire ICSE 2001 project was coordinated using the ICSE 2001 Web site, thousands of e-mail messages, and regular conference calls,

⁶<http://www.icse-conferences.org/2001/archive/>

⁷dblp.org/db/conf/icse/icse2001

involving the General Chair, Program Co-Chairs, Local Arrangements Chair, Exhibits Coordinator, and Conference Managers. All three communication tools helped to keep people informed, to build excitement, and to reduce communication problems. The executive worked extremely well together and there were no major problems with project or conference management. We contracted with CASCON's highly valued conference management and audio/visual companies (i.e., Carlson Wagonlit and Frischkorn). Danielle Robinson, our conference manager from Carlson Wagonlit contributed significantly to the social events and financial success of ICSE 2001.

We were extremely pleased how Canadian industry and government responded to our call for corporate donations with CAD 143,500. The top three patrons, IBM Corporation, Nation Research Council (NRC) and ACD Systems, were featured as the hosts of the three receptions. We even had a sponsor for the WOW Newsletter. These corporate donations contributed immensely to the success of ICSE 2001 and let the organizers orchestrate ICSE 2001 with the confidence of financial success. In hindsight, we are humbled that ICSE 2001 was held just four months before of tragic events of 9/11.

The 24th ICSE, 2002: “a Tale of Two ICSEs”

Will Tracz

The theme of ICSE 2002 was: “*Striving for perfection in an imperfect world*”. Ironically, the world lived up to its reputation as the September 11, 2001 terrorist attack resulted in delaying the deadline for paper submissions and the government turmoil in Argentina in early 2002 resulted in the last-minute relocation from Buenos Aires, Argentina to Orlando, Florida, (Hence the “Tale of Two ICSEs.”)

Planning for ICSE 2002 began in 1999 when the ICSE Steering Committee expressed the desire to hold the first ICSE in South America. Proposals were solicited from Argentina, Brazil and Chile resulting in a decision to hold ICSE 2002 in Buenos Aires, Argentina with the co-sponsor, SADIO (Sociedad Argentina de Informática e Investigación Operativa). The PC co-chairs were Michal Young, from the University of Oregon, and Jeff Magee from Imperial College. Local arrangements chair was Viviana L. Rubinstein from Liveware with assistance from Hector Monteverde and Pilar Suter from SADIO. A regional planning committee was established involving representatives from Brazil, Chile, Paraguay, and Uruguay. Several trips were made by myself, the general chair, for site selection and team building. A contract and down payment was made with the then Holiday Inn Crowne Plaza Buenos Aires with a reception planned at The Teatro Colón, the main opera house in Buenos Aires (ranked the third best opera house in the world

The 24th ICSE - Fact Sheet

Dates:	May 19–24, 2002
City:	Orlando, FL, USA
Venue:	Orlando World Center Marriott, Resort & Convention Center
General Chair:	Will Tracz
Program Chairs:	Jeff Magee and Michal Young

by National Geographic). At the time of ICSE 2001, the biggest concern expressed by the ICSE SC was providing vegetarian meals in a location known for its meat and fish.

Priorities changed abruptly in December of 2001 as the Argentine government devalued the peso by 50% leading to civil unrest and uncertainty as to the future safety and security of ICSE attendees. Augmented by concerns over the travel complications caused by the events of 9/11/2001, the ICSE SC requested the relocation of ICSE to elsewhere in South America or the United States with the acknowledgment of financial loss of the \$86,000 non-refundable venue pre-payment. With five months to secure a venue large enough for ICSE, there were two choices: Las Vegas, Arizona or Orlando, Florida. ACM HQ staff recommended Orlando and worked overtime to secure bids. As it turned out hotels, when given the opportunity to fill 1000+ room nights, knowing that the likelihood of major meetings booking 5 months out were extremely remote, were very willing to offer competitive rates (e.g., free meeting rooms and half-priced AV). Bottom line, ICSE 2002 was a success, both financially and technically, though two of the keynote speakers did turn out not as well-received as hoped for. Jim Cassel from Gartner Dataquest Research's planned talk on "*Information Technology Trends and Directions*" did not live up to its potential of providing a technology roadmap for industry and academic research into the next decade. Donna Rhodes from Lucent (and the then most recent past chair of the International Council on Systems Engineering (INCOSE)) keynote: "*Systems Engineering: An Essential Engineering Discipline for the 21st Century*" provided a vision of the commonality and synergy

between Systems Engineering and Software Engineering that failed to strongly resonate with some of the attendees. On the other hand, Bob Balzer from Teknowledge Corporation's keynote "*Living With COTS*" succeeded in stimulating much follow up discussion

By the Numbers

ICSE 2002 received 303 technical paper submissions which resulted in 972 reviews by 44 PC Members and 45 papers being selected. In addition to the main technical program, there were 16 Tutorials, 4 Co-located events and 13 Workshops. The ICSE social program included International Tango dancer demonstrations and lessons as well as a "Micro-Marathon" around the golf course adjacent to the Orlando World Center Marriott. Finally, a huge reason for the financial success was the efforts of Ken Anderson of the University of Colorado, Boulder for his countless hours in formatting the website and program along with the staff of SADIO who supported ICSE in Orlando by handling all the registration.

The 25th ICSE, 2003: “The Silver Anniversary Celebration - A Retrospective”

*Lori A. Clarke, Laura K. Dillon,
and Walter Tichy*

We had the honor of organizing ICSE 2003, the silver anniversary celebration for the premier conference in software engineering. Portland, Oregon was the perfect location to hold the event since the city is beautiful, especially in the spring when the roses are blooming. The conference was held in the Portland Hilton, a hotel that was just large enough to hold all the conference events, but nothing more. We basically had the run of the place; everyone there was there for ICSE.

Although there was a worldwide economic downturn, the turnout with respect to submissions for the various events and participation at the conference was healthy. The SE research community submitted 324 technical papers, 52 education papers, and 61 experience reports, leading to the acceptance of 42 technical papers, 16 experience reports, and 11 education papers. The 17 tutorials and 15 workshops were all well attended. Because of the world economy, we all breathed a sigh of relief when the final numbers came in. We are most proud of the quality of the program, but were also relieved and delighted that the

The 25th ICSE - Fact Sheet

Dates:	May 3–10, 2003
City:	Portland, OR, USA
Venue:	Hilton Portland & Executive Tower
General Chair:	Lori A. Clarke
Program Chairs:	Laurie Dillon and Walter Tichy

conference was a financial success.

In looking back, it is interesting to see the strong focus on trusted, component-based development. Bertrand Meyer, who at that time was at ETH, Zurich, and ISE Santa Barbara, gave an excellent keynote based on his work with Eiffel and his interactions with industry. He highlighted the need for trusted components and the challenges that arise in trying to provide them. Eugene Spafford, from Purdue University, gave an outstanding keynote that also addressed the growing importance of trusted systems, focusing on current work in security and the often-unrecognized overlap with software engineering. These themes were picked up repeatedly in the papers presented in the technical program and were the focus of all three Frontiers of Software Practice sessions, full session presentations by leading experts on selected topics: Clemens Szyperski, from Microsoft talked about component technology; Doug Schmidt, who was at Vanderbilt University and DARPA at the time, talked about patterns, frameworks, and middleware (technology supporting the development and composition of components); and Dick Kemmerer, from the University of California Santa Barbara, focused on the current state of cybersecurity and its importance to the development of trusted systems.

The late Joanne McGrath Cohoon, from the University of Virginia, gave the third keynote. She presented highlights from her research about the underrepresentation of women in computing. Although most computer scientists nowadays are well aware of the lack of gender diversity in computing, that was not so much the case in 2003. More problematic was the sense that the primary reason for the underrepresentation of women was that they did not have the aptitude or in-

clination to pursue computing (a myth that continues to be repeated by the uninformed). Joanne presented her results showing that in the US more female high school students successfully pursued advanced mathematics than male students. She also showed that, unlike fields like Physics, Mathematics, and Engineering, enrollment by women in Computer Science was declining. Although most of her data was based on the US, she also presented some international trends. Most importantly, Joanne talked about what could be done to change the environment in our introductory courses to encourage women to pursue careers in computing. Although a few participants complained to us about not having a technical keynote, many more commented on their surprise at seeing that the data contradicted many of their prevailing (mis)conceptions and expressed appreciation for the presentation and for getting concrete suggestions about what could be done to improve the situation. Although no longer the most up-to-date data, her presentation¹ is still relevant today.

During her too short career, Joanne went on to complete a number of interesting studies about the underrepresentation of women in computing and to conduct evaluations of approaches for remedying the problem. At ICSE 2003, she was delighted that she had an opportunity to talk to so many software engineering researchers and educators and to get their feedback and suggestions.

Most ICSE participants are aware that organizing such a large conference with so many moving parts (e.g., different paper tracks, workshops, tutorials, co-located events, etc.) is a major undertaking. Although it was a tremendous amount of work, there were many benefits. We greatly enjoyed working with the large number of volunteers who did so much to make ICSE 2003 a success. Although these volunteers are mentioned in the program, are invited to a thank-you dinner, and are acknowledged at the end of the conference, these are small recognitions in light of the amount of work that most of these volunteers undertake. For the conference to work, everyone has to do their share. The result is a large, distributed complex enterprise based on committed volunteers that, amazingly(!), works. For our part, we (the executive organizing committee) worked together as a team. Although the

¹<http://www.icse-conferences.org/2003/events/cohoon-keynote.pdf>

general chair was primarily responsible for the overall organization, logistics, and finances and the program co-chairs were responsible for decisions about the technical program, we talked almost weekly about pending issues and discussed alternatives before coming to consensus and making decisions. The conference leadership was truly a team effort that we believe led to a better product, better organizational experience, and lasting deep friendships.

The 26th ICSE, 2004: “Reflections”

David Rosenblum

The first ICSE I attended was ICSE-9 in 1987 Monterey, California, when I was a PhD student at Stanford, with David Luckham as my advisor. That’s the ICSE where Lee Osterweil gave his (in)famous keynote talk on “Software Processes Are Software Too”. Unfortunately I completely missed that talk because I was working David’s demo booth in the conference Tools Fair. (Yes, ICSE used to have a huge Tools Fair!)

For ICSE-17 in 1995 in Seattle, Washington, I graduated to the Organizing Committee as Publicity Chair, which is not the most glorifying job, but which allowed me to claim credit for setting up the first website that an ICSE had from start to finish (following the brief appearance of a web site for ICSE-16 to advertise its Advance Program). It was a real privilege and a lot of fun working with Dewayne Perry (General Chair) and Ross Jeffery and David Notkin (Program Co-Chairs) on that ICSE.

For ICSE-26 in Edinburgh in 2004, I had made it to the “big time”, 17 years after my first ICSE. Serving as ICSE Program Co-Chair is a major milestone for anyone in software engineering, and it was an especially gratifying experience working under Anthony Finkelstein’s enthusiastic and able leadership as General Chair, and with my Program Co-Chair Jacky Estublier (who is happily retired and presumably

The 26th ICSE - Fact Sheet

Dates:	May 23–28, 2004
City:	Edinburgh, UK
Venue:	Edinburgh International Conference Centre
General Chair:	Anthony Finkelstein
Program Chairs:	Jacky Estublier and David S. Rosenblum

climbing a mountain somewhere in the world as I write this). We made a great team with a really cohesive working relationship.

As many others will undoubtedly point out in these reminiscences, no amount of careful planning will prevent the unexpected from happening, and that is certainly true of my and Jacky's experience as Program Co-Chairs. A major hurricane had hit the East Coast of the US the week of the submission deadline, and we were fielding numerous requests for deadline extensions. Then several hours before the submission deadline, Jacky and I were a bit panic-stricken at what appeared to be a low number of submissions, with an email from me to Jacky predicting that "it will probably be below 300". ICSE 2003 had set a record with 324 submissions, so we were steeling ourselves to be disappointed. But in the minutes immediately following the close of submissions, I was sending a very different panic-stricken email to Jacky: "448 submissions???" This was unprecedented for ICSE, and our immediate worry was how we would break the news to the PC, who would have to review all those papers.

We ended up implementing a major change to the reviewing process (which has persisted in one form or another to this day), whereby we would have two rounds of reviewing. In the first round, each paper was reviewed by just *two* PC members rather than the usual three, cutting the number of reviews needed by one-third. Papers receiving at least one positive review then advanced to the second round, where a third review was obtained. The PC meeting went smoothly (with Anthony occasionally serving as a vocal *ex officio* member!), except that having a large PC of around 50 people made it difficult for everyone to hear each other in the meeting room.

We wound up with a fantastic program of accepted papers, with sessions on numerous topics that are not so well represented at ICSE these days, including software architecture (two sessions!), patterns and frameworks, UML, requirements, process and project management, dynamic reconfiguration, object-oriented programming, and software configuration management and deployment. We also had several well attended “Linkages” talks by prominent speakers invited from areas outside of software engineering (Jon Pincus, Ken Birman, Ian Foster and Mark Handley). In 2014 the ICSE Most Influential Paper Award was given to a seminal paper from ICSE 2004 on mining software repositories, “Mining Version Histories to Guide Software Changes” by Thomas Zimmerman, Peter Weisgerber, Stephan Diehl and Andreas Zeller.

I have many fond memories of the Edinburgh ICSE, not least of which is the whiskey tasting reception that Anthony organized. To this day, whenever I try a new whisky, I first rub a bit of it in my hand to test the aroma of the grain!

The 27th ICSE, 2005

The 27th ICSE - Fact Sheet

Dates:	May 15–21, 2005
City:	St. Louis, MO, USA
Venue:	Adam's Mark Hotel
General Chair:	Gruia-Catalin Roman
Program Chairs:	William G. Griswold and Bashar Nuseibeh

Memories by Gruia-Catalin Roman

The year is 2005. On the grounds of the Saint Louis Arch two long lines await entry into the underground Museum of Westward Expansion. It is a time to celebrate another successful conference in a grand venue that brings together history and innovation, culture and engineering, and diverse experiences of people from across the world. As a young child, I watched in awe, on the evening news, the last section of the Arch being inserted between the two separately erected legs of the tallest arch in the world—never expecting to spend 35 years of my life

in the shadow of the Saint Louis Arch. The esthetics, creativity, and engineering marvel it exhibited fit with my world view and played an important part in selecting the conference venue and iconography.

The key personal considerations in agreeing to organize ICSE 2005 were: a desire to bring the conference for the first time to the Midwest and St. Louis; the conviction that ICSE can be organized in such a manner as to have a lasting impact on the host region; and the hope that ICSE will have an increasingly stronger voice in shaping the future of the profession. At a time when software is a critical part of our social fabric and of our personal lives, using the conference as a way to carry out this message to society at large seemed a challenge worth pursuing.

While traditional engineering disciplines changed the world and our way of life over several hundred years, software is now accomplishing the same in a matter of decades. The juxtaposition of the Arch and the Software Engineering Conference appealed to my way of thinking and helped convey the message I was hoping to share with the conference attendees and the public at large. “Software Everywhere” became the conference theme and throughout the program planning phases we sought to be faithful to this theme. Each day had a specific sub-theme that carried into the keynote and also into two sessions of invited talks: state of the art, state of the practice, and extending the discipline. The keynote given by Richard Florida, author of the “Rise of the Creative Class”, was particularly poignant for an audience of computer scientists and engineers dedicated to building the world anew.

A major effort was extended to ensure that the conference will, in fact, have a lasting impact on information technology in the host region. This benefited the conference financially, increased attendance, mobilized important regional players, and gave us coverage in the business section of the St. Louis Post-Dispatch. Central to this effort was the initiative to form an IT Coalition to be unveiled as part of a regional IT Summit held at the conference, which attracted almost 100 regional IT leaders across a broad spectrum (CIOs of major corporations, entrepreneurs, politicians, academics). The effort generated a significant momentum for the region with key leaders supporting an initiative to plan for new major regional investments in IT.

Organizing ICSE was a wonderful experience and a major under-

taking by a large group of dedicated professionals. The outcomes reflected the composition of an outstanding team whose members, once having assumed specific responsibilities, worked independently while still maintaining a high degree of visibility at the level of the general chair. The process was intensely personal and gratifying for each member of the team. Having the community at large acknowledge the contributions of each and every member of the organizing team is empowering and serves to motivate others to volunteer in the future.

ICSE is an institution that served well our research and industrial community over the last four decades. However, as all institutions, it needs to evolve in order to continue to be relevant and impactful. Conversations along these lines are always part of the conference discourse, but fundamental changes are still to happen. One idea that I personally advocated is the notion of replacing the once a year proceedings publication with a continuous on-line presence, review, and analysis of research results with the conference becoming an annual event during which the most impactful discoveries of the past year are showcased and nascent ideas are unveiled. The conference would become a process instead of a single event and the annual meeting a celebration of our spirit of innovation—something akin to the academy awards, a political convention, and a car show all in one. Maybe my imagination is getting the better of me, but the year is 2018.

Memories by William G. Griswold

My first ICSE was in 1988 in Singapore, so thirty years later, many of the memories have blurred together. Still, a few memories stand out from ICSE 2005 in Saint Louis, Missouri, when I was PC Co-Chair with Bashar Nuseibeh, with Catalin Roman as the General Chair. The most durable memories are my time spent with Bashar and Catalin. I had known them only cursorily before beginning to organize this conference. Bashar was wise, generous with his time, and always smiling, the perfect PC Co-Chair. Catalin was the consummate General Chair, organized and disciplined, always consulting Bashar and me on matters, and giving us the freedom to run the PC as we envisioned. They put air under my wings, and my fondness for them has only grown over time. I have a couple of specific recollections.

During the PC meeting, there was a rancorous debate about a paper, and I sensed an impasse. Bashar, sitting next to me, suddenly raised his voice and declared the paper accepted. I was flabbergasted. I leaned over to Bashar to indicate my surprise. His response was that the “con” side of the debate was fueled by a long-running debate that had become somewhat personal, and that shouldn’t stop the acceptance of a strong paper: the debate should take place through dissemination of research. I was so impressed with Bashar’s judgment (and knowledge of the on-going debate). His unilateral decision worked for me because he’d earned my trust through our long collaboration. It was a big learning experience for me.

Another recollection is of being in Catalin’s sprawling executive suite for a small party. (These suites become available when they are comp’d as part of the package negotiated with the hotel.) Being that the conference was being held in Catalin’s home town at the time, seemingly all of Catalin’s students were present. Many stories were told about Catalin as an advisor, collaborator, and friend. Lots of smiles and laughter. (Catalin is a good dancer, it turns out.) The students’ affection and respect for Catalin was palpable. Although Catalin is quick to smile and a great story teller, he has a generally reserved disposition. I was honored to get a glimpse of Catalin’s inner world to see a master Ph.D. advisor at work, and my respect for Catalin grew even more.

Another recollection is Richard Florida’s keynote talk, blandly titled “Global Talent and Innovation”. Florida’s expertise sits between the social sciences and business, and he had long focused on the effects of technological innovation on the economy and society. The talk was far from bland, the most galvanizing keynote I’ve heard in my 30 years. He spoke of the growing divide between the coasts of the U.S. and the middle of the country, which can be loosely called the Midwest. Technological advances and their role in the economy was leaving the Midwest behind, as manufacturing was moving offshore. On the coasts, technology companies and the service economy that it enabled were ascendant, dominated by businesses operating on the East and West Coast. He painted a dark, chaotic picture, anticipating a seismic event in the near future. We walked out of the talk breathless with the insights he’d brought to us. Even Florida’s agent was blown away, and was hoping we’d recorded the talk. Apparently Florida had gone

off script, moved by his concern for what he saw happening in the U.S. (No, we hadn't recorded the talk, as the agent had prohibited recording of the talk.) Now, twelve years later, we can see that seismic event has occurred, with the election of Donald Trump to the U.S. Presidency. Ironically, the on-going debate is being framed the role of immigration in the economy, rather than technology. All the way back in 2005, Florida taught us that we should be looking to our technology-driven economy for the real problems. Today, it doesn't require a Richard Florida to tell us that robotics, especially robotic vehicles, could displace hundreds of thousands of workers. By some measures, commercial drivers are the largest job category in the Midwest, and in some of the coast States as well. Yet, the immigration debate rages on. Richard, keep talking.

A couple of years later, when I was Chair of ACM SIGSOFT, we stood on the precipice of the great recession. SIGSOFT was looking for a General Chair for FSE 2010. It was easy for me to support Catalin's nomination for General Chair for FSE 2010, given his ability to run a great conference and keep it in the black. Ultimately held in Santa Fe, Catalin worked his magic again, even as the world reeled from the on-going effects of the great recession.

“ICSE 2005 Plus or Minus a Dozen”, by Bashar Nuseibeh

By all counts, I'm an ICSE junkie.

Since I first attended the conference in 1993 to present my first paper there, I have been to all but three editions—I missed one in order to attend the birth of my daughter, and two to deal with a family illness and a family emergency. I served in most roles in the ICSE conference series, from student volunteer, to PC member, to running tutorials, to editing the then daily newsletter. By the time I served as PC Co-Chair in 2005, I was already addicted, and by the time I chaired the ICSE steering committee in 2007, I thought I was “in charge”.

Nothing was further from the truth—12 years after the 2005 edition, the ICSE roadshow continues, apparently autonomously, with some new faces and the regulars still turning up each year, spending dispro-

portionate periods of time in the foyers chatting rather than attending the main conference sessions. If you didn't know this already, ICSE is as much a social networking event as it is a technical one. And, unless you work in software testing (or whatever the dominant topic of the moment is), there will be few papers that justify travel to, or attendance at, the conference. This is not to belittle the social conversations—they are the lifeline of the conference and the mechanism by which researchers make connections, follow up on the details of some aspects of research, and find jobs or students.

But it does bother me that the core of the conference—the technical research track—is shrinking. Not in size—there are more research papers published than ever before—but in the *relevance* of the published papers. Papers on industrial practice are now published in the “software engineering in practice” track; papers on societal concerns are published in “software engineering in society track”; preliminary work is published and discussed at the many co-located workshops; mature work is presented in the technical briefings or in “journal first” sessions. So, what is left in the “main” track? Not much it seems.

When Catalin Roman, Bill Grisworld, and I put together the ICSE 2005 programme, the main track contained all of the above. Our keynoters reflected this: a mainstream researcher from our community (Luca Cardelli), a mainstream practitioner from our community (Erich Gamma), and someone to extend the discipline (Richard Florida). With a conference theme of “Software Everywhere”, the programme of papers and invited talks, drew in speakers from autonomic, mobile and ubiquitous computing; speakers from communities of software engineering practice; and speakers with empirical results to report and discuss. In other words, the ICSE main programme was a melting pot for discussing the breadth and depth of our discipline and beyond.

I may be reflecting on the past with rose tinted glasses, so allow me to make some observations and reflect about the present, which I hope will be debunked in this and future ICSEs. ICSE is at risk of scoping itself out of existence. If we—the ICSE community—confine ourselves to technicalities of developing software, then we will be confined to becoming the technicians of the software-enabled world. If instead we embrace the notion that software engineering is as much about engineering the way we live as it is about engineering software, then our

discipline will grow and mature into one that transforms society, with its intertwined digital, physical, and social manifestations.

I call upon my fellow future ICSE chairs to embrace this broadening of our discipline's scope, and to discard artificial and disappearing discipline boundaries, in favour of creating a conference series that is melting pot of people and ideas, focused around what software can create and not only how we build it.

The 28th ICSE, 2006

The 28th ICSE - Fact Sheet

Dates:	May 20–28, 2006
City:	Shanghai, China
Venue:	Shanghai International Convention Center
General Chair:	Leon J. Osterweil
Program Chairs:	Dieter Rombach and Mary Lou Soffa
Conference Coordination Committee	
Co-Chairs:	Dehua Ju and Kouichi Kishida

“A Retrospective on ICSE 28 in Shanghai, China”, by Leon J. Osterweil

Now, in 2018, it seems hard to believe, but back in 2003, when I proposed holding ICSE 28 in Shanghai, a number of ICSE Steering Committee members made snarky remarks to the effect that the main rea-

son I was proposing this was mostly to assure myself of a trip to an exotic place. What a difference 16 years makes! Chinese Software Engineering research is now a central and essential part of the international Software Engineering community. Accelerating progress in that direction was a key goal of ICSE 28, and a goal that seems to have been achieved. So, yes, we had an exciting experience visiting Shanghai when it was actively in the throes of transforming itself into one of the world's most vibrant and exciting cities. But we also played an important role in precipitating the emergence of the Chinese Software Engineering community as a major participant in the international ICSE community. So ICSE 28 seems to me to have been a double success.

But let's start back at the beginning. I was pleased to have been "tagged" by the ICSE Steering Committee in 2002 to put together a proposal for ICSE 28, to be held in 2006. At the time, ICSE was on a 4-year rotation, with ICSE being held in the US in odd-numbered years, in Europe in years evenly divisible by 4, and elsewhere in other places around the world in other years. So, in 2006 ICSE was to be held somewhere other than Europe or the US. I immediately thought about China because back in 2002 it was clear that exciting things were happening there, and many bridges between China and The West were being built in commerce, industry, and the arts. Far fewer bridges, however, were being built by the Computer Science community, and it seemed to me that it was important for someone to start doing this.

I recalled that my old friend Kouichi Kishida, had for many years been holding an annual Japan-China Software Engineering event, and thought that he would have ideas about where an ICSE might be held in China. At a wonderful dinner in Tokyo, Kishida-san suggested that ICSE 28 be held in Shanghai, and he pointed me towards his colleague, Prof. Ju Dehua, a professor at East China Normal University in Shanghai. He indicated that Prof. Ju would be able to help with local arrangements and with making the necessary connections with the Shanghai municipal government. How right Kishida-san was! Some preliminary email exchanges with Prof. Ju confirmed that he could, and that he would, be glad to assist with making the necessary contacts and arrangements in Shanghai. This led to my first trip to Shanghai, the first of at least 8 such trips, to meet with Prof. Ju and with Mr. Fan Xiping, the head of the Shanghai Municipal Informatization Commission, it-

self charged with fostering Shanghai's emergence as a worldwide center for the development of the information economy. Alex Wolf, then SIGSOFT Chair, also traveled to Shanghai for these meetings. One of our key questions was whether Shanghai had sufficient infrastructure to support an ICSE. We landed at the brand new, ultramodern Pudong Airport, drove into Shanghai on a road alongside a Maglev railroad track, and stayed in a magnificent room in the 88-story Hyatt Regency Shanghai Hotel. Infrastructure question answered! We also wanted to gauge the eagerness of the Shanghai government to support ICSE 28. Mr. Fan's explanation of the role of his Commission laid to rest any doubts about how well our plans meshed with his plans. Another key question was whether the Chinese government would allow participants from all countries, and from Taiwan, to enter China for ICSE. He assured us that all would be allowed to enter. Then, with a wry smile, he added that all would also be allowed to leave as well (!).

Based on these meetings with key people in Shanghai, I made a report to the ICSE Steering Committee in 2003. Skeptics continued to wonder if it was wise to hold ICSE in Shanghai, especially since few of us knew any active researchers in China, and many had read disappointing papers that had been submitted to prior ICSEs from authors in China. My response was that the key reason to hold ICSE in China was to foster the integration of the Chinese Software Engineering community with ICSE, and the international Software Engineering community, to the great advantage of both parties. Checking with the ACM, the lead sponsor of ICSE 28, I found that they had very little experience in holding meetings in China, but it was gratifying to hear that they felt it was time for them to start learning how to do so for the good of the Computer Science community. They assured me that they would do what was necessary to support holding ICSE 28 in Shanghai and encouraged me to proceed with the planning. Towards that end, I suggested that ICSE 28 not be a single one-off meeting, but rather that ICSE 28 be the culmination of a series of meetings aimed at introducing each community to the other, and preparing the Chinese Software Engineering community for fully participating in, and benefiting from, the great spectacle that is ICSE. Still somewhat skeptical, the ICSE Steering Committee asked that Mr. Fan attend the next ICSE Steering Committee meeting. Mr. Fan graciously agreed to do

so, flying from Shanghai to Europe to attend the Steering Committee meeting. Mr. Fan fully endorsed the desirability of integrating the Chinese Software Engineering community with the international community, strongly supported having a series of run-up events in China to facilitate that integration, and even promised to provide the funding for these events. With that meeting, support for having ICSE 28 in Shanghai strengthened and turned into enthusiasm.

Thus began a series of run-up meetings in China. The first event involved bringing some of the senior research leaders of the ICSE community to Shanghai to present their research in a daylong session. A large and enthusiastic audience of Chinese Software Engineering researchers and students attended. Some cultural differences (e.g. use of cellphones, and chatting loudly during lectures) was noted, and it was agreed that it would be strongly discouraged during the rest of the run-up events and during ICSE. Mostly due to the efforts of Prof. Ju and Kishida-san, a network of leading Chinese Software Engineering faculty members was set up and charged with passing the word about ICSE 28 to their colleagues and students. A pre-ICSE conference was held with some international researchers giving invited talks, and with submitted papers being presented by Chinese researchers. These run-up meetings having gone well, we were all encouraged that ICSE 28 would be a great success.

In the course of the run-up series of meetings, Mr. Fan was reassigned to another position, and was replaced as head of the Shanghai Municipal Informatization Commission by Mr. Fu, who proved to be equally enthusiastic and supportive of ICSE. We faced a difficult set of financial circumstances, wanting to hold ICSE in the sumptuously appointed Shanghai Convention Center, but while keeping the registration fee for ICSE 28 as low as possible. Reasoning that travel expenses to Shanghai would be high, we felt that it was important for registration fees to be kept low. But the Shanghai Convention Center rental costs were expensive. Mr. Fan and Mr. Fu arranged for the cost of these facilities to ICSE to be kept very low. We toured the city, inspecting hotel rooms in all price categories to be sure that attendees would be able to stay in clean and comfortable hotels, regardless of price point. We

were delighted to find a very impressive range of clean, comfortable hotel rooms ranging from modest to expensive luxurious world-class accommodations.

And so the stage was set. The Program Committee, ably co-chaired by Dieter Rombach and Mary Lou Soffa, solicited and selected the contributed research papers. Other committees selected workshops, tutorials, etc. To set an appropriately ecumenical tone, we invited Dr. Barry Boehm, winner of the first SIGSOFT Outstanding Research Award, to give a keynote talk about the history and current state of Software Engineering research from the ICSE point of view, and Prof. Yang Fuqing, of Peking University, to give a keynote talk about the history and current state of Software Engineering research in China. Dr. Reinhold Achatz, from Siemens Corp., presented a keynote on the industrial perspective. Again trying to keep registration costs modest we planned a very modest banquet as our ICSE Event. But Mr. Fu would have none of that, insisting on a lavish dinner and a great spectacle, with dancers, acrobats, mimes, and all manner of exciting performances, all at no cost to ICSE! In exchange for their very generous support, we granted free registration to several hundred Chinese software engineering researchers and students who were selected by the Shanghai Municipal Informatization Commission. This in itself fostered a great many exchanges, both technical and social. After the conclusion of ICSE 28, our victory party was held in the throbbing Xintandi neighborhood, across the Huang Pu River and through a great deal of Shanghai rush hour traffic. In their zeal to make ICSE 28 as wonderful as possible, the Shanghai Municipality arranged for traffic to be stopped so that our buses could reach the victory party without delay. I will never forget the giddy feeling of gliding through Shanghai rush hour traffic, being treated like we were dignitaries!

After ICSE 28 concluded we sat back to see if our goal of integrating the Chinese Software Engineering community into the ICSE community would be achieved. There were few papers from China submitted to ICSE 29, but, we reasoned, ICSE 29 would be too soon after ICSE 28 to expect to see many new papers from China. But then we noticed a sharp increase in both the quantity and the quality of submissions from Chinese researchers, starting with ICSE 30, and continuing even to the present. More and more other Software Engineering meetings were

held in China subsequent to ICSE 28, and this has also continued over the past years. Today it seems clear that Chinese software engineering is an integral and essential part of the ICSE and International Software Engineering communities. Indeed, it seems hard to imagine that that was not always the case. Those of us who were involved in organizing ICSE 28 in Shanghai in 2006 are very proud of our role in fostering the integration of Chinese Software Engineering into the ICSE, and the greater international Software Engineering, communities.

“A Retrospective Note”, by Kouichi Kishida

Summer of 1986, I was invited to an international event held in Beijing. The purpose of the event was to review result of 5-years national project for developing various software engineering tools. Social environment was rather chaotic not far from Cultural Revolution. Many things to do for social improvement were there. That was my first contact with software researchers in China. Next year I organized a small meeting to discuss co-operation between researchers/practitioners of Japan and China. This was the starting point of annual series of software international workshops in China. With strong help of Software Engineer’s Association of Japan, the events have continued more than 20 years traveling various cities all over China. Later, researchers from other countries like Korea, India came to participate. In that sense, these workshops functioned as a technology transfer gate to Chinese software engineering community.

So, when Lee Osterweil asked me about the place for 28th ICSE, naturally I recommended exciting international city Shanghai to him, and served as one of Local Arrangement staffs in 2006.

The 29th ICSE, 2007: “Reminiscences”

Wolfgang Emmerich and Gregg Rothermel

ICSE 2007 was held in Minneapolis, Minnesota. John Knight of the University of Virginia was the General Chair, and we (Wolfgang Emmerich and Gregg Rothermel) were the Program Co-Chairs. Sadly, John passed away in February 2017, so the task falls to us to reminisce about ICSE 2007.

Two cities were considered as sites for ICSE 2007: New Orleans and Minneapolis. Gregg recalls going with John on site visits. New Orleans had a lot going for it, given its rich history and culture and reputation for interesting cuisine. One potential banquet site was a large building where Mardi Gras floats were assembled and stored, and artisans demonstrated the construction process. The hotels that responded to the request for proposals in New Orleans, however, were on the small side, and would not have accommodated the numbers of workshops and tutorials that John had hoped ICSE 2007 would have. The Hilton in Minneapolis, in contrast, had more than enough space, and could also guarantee that we would be the only event using that space on the main days of the conference. We chose Minneapolis, and in hindsight this was fortunate for ICSE, because three months later hurricane Katrina badly damaged New Orleans, and recovery from that was a long process.

The 29th ICSE - Fact Sheet

Dates:	May 20–26, 2007
City:	Minneapolis, MN, USA
Venue:	Hilton Minneapolis
General Chair:	John Knight†
Program Chairs:	Wolfgang Emmerich and Gregg Rothermel

One thing we recall about Minneapolis was the banquet, which was held on a forested island in the middle of the Mississippi river. We thought of this as “a night in the great north woods.” A 10,000 gallon trout pond was brought in allowing attendees to fish, Native American elders made crafts and told stories, and archery and tomahawk tossing were available. We were fortunate that it was a beautiful, temperate, clear Minnesota night. But it wasn’t all woodsy. John somehow convinced the company that made Segways to provide several, and attendees lined up to try them out.

Beyond that, most of our memories are biased toward the technical program, since that was our responsibility. There were 335 technical papers submitted to ICSE in 2007, and 885 authors from 33 countries were involved. 37% of the authors were from the US, 27.5% were from Europe, and a full 8.5% were from China – at that time a larger portion than usual (not unusual anymore). Perhaps the latter was an consequence of ICSE 2006 being held in Shanghai. As far as paper topics, testing and analysis was the most prevalent (27% of submissions), with architecture and design close behind (22% of submissions). We note that a decade later, testing and analysis continues to dominate among ICSE topics, but there has been a sharp drop-off in papers on architecture and design.

The paper entitled “Feedback-directed Random Test Generation” by Carlos Pacheco, Shuvendu Lahiri, Michael Ernst and Thomas Ball was recognized as the Most Influential Paper of ICSE 2007 at ICSE 2017 in Buenos Aires. The paper describes a technique and tool that measures the usefulness of the test cases in a test suite and then uses these measurements to generate unit test cases that improve the effective-

ness of the test suite. At the time of this writing, this paper had been cited more than 600 times. We revisited the reviews of the paper and we were surprised that the paper did not have any particularly strong advocate, and that none of the three reviewers was overly excited it. We pleased that our Program Committee did ultimately accept what turned out to be the most influential paper of our conference.

These days, ICSE receives many more papers than we did, and uses two tiers of reviewers, but in 2007 the ICSE Technical Papers Track still relied on a single Program Committee. We assembled a Program Committee of 33 members to review technical papers. Persons who have served as program co-chairs for ICSE know about the various activities involved in this task, but those who have not may not realize some of the things co-chairs do to ensure that reviewing and the program meeting go well and allow papers to be considered fairly. With a great deal of input from prior chairs we defined several sets of constraints that readers of this reminiscence might find interesting.

First, when forming the Program Committee, we required the following:

- At least one of us had to have direct experience of a prospective PC member's performance on PCs, or information from a trusted source.
- PC members could not have served on the three previous ICSEs.
- PC members needed to be three years past receiving the Ph.D.
- PC members needed to have published in ICSE in the past 5 years.
- Collectively, PC members needed to possess diversity in terms of research areas, geographic location, gender, industry and academic research focii, and the PC needed to include persons new to ICSE PCs as well as several with prior service.

Another important factor involves the order in which papers are considered at the PC meeting. For example, it can be a grave mistake to consider papers in descending order of average review scores, because at some point down in the list PC members become tempted to reject

everything below that point. Also, getting the meeting started on a good note, and establishing expectations for papers, is important. So we used the following constraints when scheduling papers:

- For the first 20 papers there should be:
 - No conflicts of interest.
 - No papers authored by PC members.
 - Papers with wide varieties of scores, ordered pseudo-randomly to prevent sequences of consecutive low or high-scored papers.
 - A chance for every PC member to be involved in at least one discussion.
- After the first 20 papers, we continued to order papers pseudo-randomly in terms of score, while also trying not to require any reviewer to participate in two discussions in a row, or participate in a discussion immediately after returning from a conflict.

We even worried about seating at the PC meeting, insisting that nobody sit next to anyone with whose papers they had conflicts, and that potentially talkative friends were separated.

One of Gregg's own favorite memories about ICSE 2007 involved traveling to London to work with Wolfgang at University College London on the task of assigning reviewers to papers. This task was not simple; we felt it would be unsound to rely on an automatic assignment system, and handled the task manually with the aid of a great deal of spreadsheet programming (mostly by Wolfgang). But we had fun too, heading out to see Courtney Pine wail away on his saxophone.

It will probably come as no surprise, though, that the most memorable thing for us involves the people we got to meet and know while helping organize ICSE. The two of us enjoyed working together, and Gregg was delighted to be able to attend Wolfgang's wedding, in Wales, a few years later. Finally, we feel extremely fortunate to have had the chance to work with and get to know John Knight. He was a kind, gentle and thoughtful man, and he had a wonderful, somewhat dry sense of humor. His passion for research was matched by his passion for service to the software engineering community, and this was certainly evident in the success of ICSE 2007.

“Remembering ICSE 2008”

Matt Dwyer and Volker Gruhn

The 30th International Conference on Software Engineering was held from May 10–18 2008 in Leipzig, Germany. ICSE-Leipzig was the third ICSE held in Germany and it continued the long and instrumental role that Germany, and Germans, have played in founding and developing the field of Software Engineering. Wilhelm Schafer chaired ICSE-Leipzig and developed a program that connected participants to that history.

In addition to the typical program elements, ICSE 2008 celebrated the fortieth anniversary of the NATO Software Engineering Conference held in 1968 in Garmisch, Germany. The chairman of the conference, F.L. Bauer, was unable to attend, but his student Manfred Broy recounted the goals of the initiative and topics of the conference. The co-editors of the NATO conference proceedings, Peter Naur and Brian Randell, both attended ICSE in Leipzig and Professor Randell also highlighted topics from the meeting, e.g., component orientation, and lamented how, despite, great progress there are many critical areas in which the field has not advanced significantly. We recall multiple conversations with conference attendees who noted agreement with Professor Randell by observing that a number of topics identified in 1968 were still active topics of research 40 years later, as evidenced by ICSE research track sessions focusing on them.

The 30th ICSE - Fact Sheet

Dates:	May 10–18, 2008
City:	Leipzig, Germany
Venue:	Congress Center Leipzig, Westin Hotel Leipzig
General Chair:	Wilhelm Schäfer
Program Chairs:	Matthew B. Dwyer and Volker Gruhn

ICSE-Leipzig included a series of talks and panel discussions that brought together participants from the NATO conference, such as Douglas McIlroy, Albert Endres, and Luigi Dadda, to discuss topics such as “Software Engineering Economics, Cost Estimation, and Process”, “Middleware” (a term coined at the Garmisch meeting), and “Software Specification, Modeling, Design, and Architecture”. What was so striking about these discussions was the degree to which so many of the lasting challenges faced today were observed 40, and not 50, years ago.

ICSE-Gothenberg will celebrate the fiftieth anniversary of the founding of the field of Software Engineering, but ICSE-Leipzig will always hold a special place in our memories because it personally connected ICSE participants with a number of the key players in the Garmisch and, sadly, Professors Bauer, Naur, and Dadda have since passed away.

Like all ICSEs, ICSE-Leipzig included a rich technical program comprised of: 27 workshops, 14 tutorials, 56 research papers, 10 educational papers, 3 distinct industrial sub-tracks focusing on automotive, health care, and telecommunications domains, and a research demonstration track.

For many, ICSE-Leipzig is remembered through musical connections. Many participants took the opportunity to Thomaskirche where Johan Sebastian Bach worked as musical director, and where he is buried. A lucky few were able to attend a performance of the Thomanerchor, Leipzig’s world-famous boys choir. All participants were welcomed to a reception at the Gewandhaus concert hall where they enjoyed an orchestral performance just for ICSE attendees.

The 31st ICSE, 2009

Jo Atlee and Paola Inverardi

In 2009, ICSE returned to Canada, to the beautiful city of Vancouver. Our conference venue was situated in picturesque Coal Harbour and was within easy access to downtown attractions, the mountains, and historic Stanley Park. So, ICSE'09 had to be good to compete for attendees' attention!

We instituted a number of additions and refinements to the ICSE program—most of which continue to be essential components of current ICSEs.

Software Engineering in Practice Track (SEIP).

This track evolved from paper sessions on experience reports. Our primary goal for the Software Engineering in Practice track was to create an easily identifiable portion of the conference program that was dedicated to issues and advances that are of interest to practitioners. This first instance of SEIP was a two-day track that included not only presentations of experience reports but also papers and presentations on applied research and two invited speakers – including Steve McConnell as one of the ICSE keynote speakers.

New Ideas and Emerging Results (NIER).

ICSE'09 saw also the introduction of the NIER track, which was hugely popular from the very beginning. The goals of this track were twofold:

The 31st ICSE - Fact Sheet

Dates:	May 16–24, 2009
City:	Vancouver, BC, Canada
Venue:	Westin Bayshore Vancouver
General Chair:	Stephen Fickas
Program Chairs:	Joanne M. Atlee and Paola Inverardi

1. to elevate the status of poster presentations and give those authors a forum to deliver short (6 min 40 second!) public presentations of their work.
2. to provide a forum for publishing and presenting novel research whose early results look promising, but which has not yet been fully evaluated. The intent was to attract papers and ideas that were more significant and more mature than workshop papers, but did not yet have the “standard” level of evaluation expected in an ICSE research paper.

In this first offering of NIER, authors presented their work in Pecha Kucha style: 20 slides for 20 seconds each. Some authors automated the advancement of their slides, to keep their presentations on track. Given the quick pace of presentation, nobody was bored! The NIER sessions were standing room only, and they remain popular to this day.

Student Contest on Software Engineering (SCORE).

SCORE is an international software-engineering contest that is meant to be a counterbalance to typical programming contests and instead emphasizes the engineering aspects of software development. It was ideated by us in order to attract the interest of young talented students to the complexity of engineering large scale software. The contest runs for 18 months and involves bespoke projects proposed by SCORE PC members. The finals of the first SCORE competition were held at ICSE’09. Six teams were invited to the finals; ICSE’09 with sponsorship from FME paid the travel expenses for one member of each team, and all members of the finalist teams received complementary conference registration.

Pool Poster Session!

As far as we know, ICSE'09 is the only ICSE to have had their poster session by the pool. This allowed attendees to enjoy the pleasant weather during the conference reception, and for the posters to be located where the attendees were expected to congregate. There were some initial concerns that posters would not get the usual traffic in such a setting, but in fact poster presenters reported getting lots of feedback from attendees.

Other distinctive features.

ICSE'09 is unique for having two women PC co-chairs; we are wondering why this never happened again! ;-)

We will always remember that ICSE'09 took place a few weeks after a severe earthquake destroyed L'Aquila, Paola's home town affecting the homes and the University. Paola and all the other ICSE attendees from L'Aquila were embraced by the warm friendship of the ICSE community: the community's support was a sign of sympathy for the present and a source of strength for the future.

On the positive side, as with all the other ICSEs, ICSE'09 was a week full of scientific and social exchanges. For all of us who shared the responsibility for organizing the conference, it was the culmination of two years of constant teamwork, dedicated to the preparation of that single (extended) week. Every ICSE team works to achieve success, to make their event a memorable week for all the attendees: with respect to the program, the food, the social events, the location. We were not an exception; we wanted "our" ICSE to be a success and we worked hard for it.

For us, the most relevant legacy of ICSE'09 is the friendship we developed working together: sharing ideas and objectives; working late at night in the same room or on opposite sides of the world; exchanging frustrations and enjoying laughs—a lot of laughs. It was a memorable experience indeed!

The 32nd ICSE, 2010

*Jeff Kramer, Judith Bishop,
Premkumar Devanbu, and Sebastián Uchitel*

Every ICSE is special in some way, but ICSE 2010 was literally ground breaking as the first ICSE to be held in Africa. We all owe a lot to the ICSE community, where our careers, professional relationships and friendships are deeply rooted. We were therefore deeply honored to be asked to serve as GC and PC chairs. From 2007, we worked as a team to ensure that both organizationally and scientifically ICSE 2010 would be the best yet. Little did we know how many challenges would be thrown our way, but the rewards and the satisfaction made it worthwhile in the end.

From the PC Chairs

In an effort to improve the rigour and fairness of the ICSE peer-review process, we discussed two ideas that were unprecedented in the ICSE-world: double-blinded reviewing and rebuttals. After much debate, we decided that one change was enough to fight for, and resolved to push for a rebuttal phase at ICSE 2010. We felt that the term “rebuttal” was too loaded, so we decided to call it an “author response”.

The 32nd ICSE - Fact Sheet

Dates:	May 2–8, 2010
City:	Cape Town, South Africa
Venue:	Cape Town International Convention Centre
General Chairs:	Jeff Kramer and Judith Bishop
Program Chairs:	Prem Devanbu and Sebastián Uchitel

Supported by Judith and Jeff, we presented the idea to the Steering Committee, where there was considerable skepticism but a majority was in favour. One issue that was much debated was the extra work imposed on the PC members; a compromise was reached, to limit the response to 500 words.

Our first experience with author response was very positive. The opportunity was well-received by authors, many of whom told us that it helped them feel more involved in the process. On a number of occasions during the PC discussion, the responses were raised and, for several papers, actually changed the decision on that paper (mostly from reject to accept).

We are pleased to note that the response phase has endured at ICSE, and has now become an integral part of the culture of our flagship conference.

From the GC Chairs

We were excited to have the opportunity to show off the land of our birth to our friends and colleagues, and to introduce ICSE to the African and South African Computer Science communities. As often happens, though, our plans were complicated by changing circumstances. By the time ICSE was drawing near, we were both working outside of South Africa. We therefore contracted the services of a local conference organizer, Peter Aspinall of SBS in Cape Town. Peter and his team were fantastic, applying their local knowledge and experience to build the website, hire the facilities, handle registration and acquire local sponsorship.

With a team of five we were able to put together a terrific program as well as offer workshop dinners, local tours and a variety of evening events. Some of the highlights are described below.

Warm-up Workshop

In setting up the program, we wanted to highlight important issues of the day, and also involve South Africans and others from the rest of Africa as much as possible. We therefore pioneered the idea of an ICSE Warm-up Workshop, which took place in Gordon's Bay near Cape Town in 2009. Local researchers and students were invited to submit papers and posters. A group of experienced ICSE reviewers attended the workshop and assisted the attendees in getting their papers into shape for submission to the main conference and its workshops. This first Warm-up Workshop was a precursor for those in support of ICSE in Buenos Aires in 2017.

Program

ICSE 2010 in Cape Town had an excellent technical program (research, education, practice and other tracks) and outstanding keynote talks. There was also a wide variety of tutorials and workshops, poster sessions, and an exhibition by local companies. For the first time, there was an ACM Student Research Contest and the Harlan D Mills Award was presented.

The opening welcome and keynote talks were particularly carefully selected to suit the location and strengthen the conference theme of New Horizons, introducing participants to Africa and world issues. The conference was to be opened with a message of welcome from the Archbishop Desmond Tutu, Nobel Laureate. Unfortunately, at the last minute, he indicated that he would not be able to make a personal appearance. Jeff drafted a welcome speech, and it was prerecorded and broadcast at the opening. A benefit from this near disaster is that the speech is still available on YouTube¹ and you can hear Archbishop Tutu talking of software engineering!

¹<https://www.youtube.com/watch?v=W01-49-4MqQ>

For Keynotes, we selected a mixture of local, topical and scientific topics, some outside of but relevant to software engineering. Clem Sunter gave a great talk on scenario-based strategic planning (and reminded everyone that it's possible to give a fine talk with just one PowerPoint slide!). Then Fred Schneider gave an excellent talk on the "security crisis" in software development and the need for a Science of Security. Finally, Sir David King's talk on planning for climate change provided a fascinating technology-focused examination of the issues.

The Volcano

Volcanos are unheard of in South Africa, but ICSE 2010 bore the full brunt of the explosion of Eyjafjallajökull in Iceland which disrupted airtraffic in the Northern hemisphere for weeks. The team had to scurry around handling cancellations, and changes to the program.

Local meetings

The City of Cape Town, who were major sponsors of the event, were very interested to meet with the international experts who were gathering in Cape Town. We were able to extract a group of 15 top scientists to have a fruitful meeting with City Councillors and IT professionals about the way forward. The international visitors confessed afterwards that they learnt as much as they had contributed.

In Conclusion

The fact that this was the first time ICSE was held in Africa helped to strengthen ICSE's international claim: bringing new participants from Africa, and South Africa in particular, and opening new horizons to the participants from other parts of the world, most of whom had never been to South Africa.

To have the opportunity to host ICSE is a great privilege. For us personally, it meant a great deal. Sebastian went on to be GC chair of ICSE 2017 in Buenos Aires and carried on some of the ideas we had pioneered. We look forward to another ICSE in Africa.

The 33rd ICSE, 2011

Richard Taylor and Nenad Medvidović

Hawaii! That one name captures much of what makes ICSE 2011 especially memorable. The location was selected for many reasons, but chief among them were the desire to have a location that would be as convenient for Asian attendees as North American attendees, and that the conference itself would not just be a technical event, but a fun social event too, supporting the community of software engineering researchers and practitioners.

Hawaii drew 1074 individuals from 52 countries to a very wide-ranging technical program. Over 125 attendees were, in fact, from eastern Asia. ICSE 2011 also returned ICSE to financial success, relieving some strain on the ACM and IEEE sponsors.

The Program Chairs, Harald Gall and Neno Medvidović, tried to introduce some innovations into the paper review, discussion, and decision-making process. To put the Program Committee members into a proper frame of mind (accept, accept, accept!), Harald brought a chocolate bar for each PC member, all the way from Switzerland to Santa Fe where the PC meeting was held.

While review rebuttals had been “inherited” from a previous ICSE, Harald and Neno made it a point to explicitly consider the rebuttal in each paper’s discussion at the PC meeting, a practice that had not

The 33rd ICSE - Fact Sheet

Dates: May 21–28, 2011
City: Honolulu, HI, USA
Venue: Hilton Hawaiian Village Waikiki Beach Resort
General Chair: Richard N. Taylor
Program Chairs: Harald Gall and Nenad Medvidović



Swiss chocolate bars for the PC members

always been adhered to previously but that has continued much more regularly since.

ICSE 2011 was one of the last ICSEs where the entire Program Committee met physically. This made for some impassioned discussions of papers (for which ICSE was known and which have perhaps been less pronounced since the introduction of the dual Program Board-Program



The “trump card”

Committee structure), paper pre-accepts, and discussions at the physical meeting that do not include all of the papers’ reviewers. To shorten some of the especially long discussions and encourage the acceptance of controversial papers that had clear value, each of the 50 PC members was given a card that they could use as a “trump card” to accept one paper in which they personally strongly believed, despite other committee members’ reservations. Although this practice did not carry over to subsequent ICSEs, it was used by three reviewers at ICSE 2011. And guess what: these were right decisions. Looking back, the three papers in question have done really well!

The conference theme was “Software by Design” and featured two keynote talks by prominent design professionals. The distinctive fea-

ture of both talks was that software design was not the central focus of their talks as such, but rather design that encompasses human and physical design considerations, as well as software considerations. Kumiyo Nakakoji spoke on interactivity, continuity, sketching, and experience, while Bill Dresselhaus spoke on new trends in design thinking.

Perhaps what makes ICSE 2011 so memorable, though, were two of its non-technical characteristics: a fantastic luau with great fire dancers and audience participation (you know who you are!) and probably the most popular ICSE swag bag ever. It came pre-loaded with ICSE 2011 branded sunscreen and, because of its insulation, served well for beach picnics.

The luau was held at an adjacent site, ably arranged for us by Rick Kazman. Outdoors, setting sun, terrific dancing, and leis all made for a delightful evening.

Student volunteers sported not just your average “I’m a student volunteer at ICSE” t-shirt, but rather a stylish Aloha shirt. We suspect more than a few of these are still in the volunteers’ closets!

Key elements of the technical program, in addition to the research talks, included a Festschrift for Professor Lee Osterweil, a strong series of invited talks from industry (including “How Software is Engineered at Google” by Marija Mikic-Rakic), NEIR, SEIP, Demonstrations, many workshops, co-located events (MSR, ICSSP, SEAMS, CSEE&T), the Doctoral Consortium, Panels, the ACM Student Research Competition, and 12 technical briefings (in lieu of tutorials).

The conference’s success depended, of course, on the many organizers and committee members. Debi Brodbeck, as the Conference Director, made sure everything worked together to perfection, as always!

Aloha!

The 34th ICSE, 2012: “Reminiscence”

Martin Glinz, Gail Murphy, and Mauro Pezzè

About ICSE 2012

ICSE 2012¹ was held on June 2–9, 2012 in Zürich, Switzerland. Pre- and post-conference events occurred on the Irchel Campus of the University of Zürich with main conference events held at the historic Kongresshaus in central Zürich. The venues provided the attendees opportunities to explore the beautiful city of Zürich, to engage in discussion in the scenic environment, and to experience the wonders of the Zurich public transport system, of which many were experts after a few days.

ICSE 2012 was highly successful in every dimension: a superb technical program with (due to excellent work of the PC) more papers accepted and presented than usual and the highest number of attendees for all ICSEs in the period of 2000–2012 (1312 attendees overall, 872 for the main conference).

The ICSE 2012 core team consisted of Martin Glinz (General Chair) and the two Program Co-Chairs Gail Murphy and Mauro Pezzè. Although we had all interacted before in earlier ICSE events, we had never collaborated closely. We are thankful to the steering commit-

¹<http://www.icse2012.org>

The 34th ICSE - Fact Sheet

Dates:	June 2–9, 2012
City:	Zurich, Switzerland
Venue:	Kongresshaus Zürich, Irchel Campus of the Universität Zürich
General Chair:	Martin Glinz
Program Chairs:	Gail Murphy and Mauro Pezzè

tee for the opportunity to serve the community and to work closely together.

Martin was unbelievably organized as a General Chair, ensuring that the 46 members of the organizing committee, including 22 co-chairs of the various conference tracks, kept to a timeline with Swiss accuracy. An important, but often under-appreciated, aspect of being a General Chair is to raise sponsorship funds to help defray conference costs and provide an unforgettable experience for conference attendees. Martin performed this task amazingly well, raising the most amount of sponsorship ever for an ICSE conference. It is not every year that Swiss banks sponsor ICSE. Conference attendees might remember the conference gift of a Swiss army knife, one outcome of sponsorship. Many of us still wonder how we managed to carry the knife onto the plane and not be detected by security!

Although we were well organized, not everything worked as expected. For example, seven days before the conference, the supplier of the conference bags admitted that they could not deliver, and a substitute had to be identified quickly—eventually the bags arrived about four hours before registration opened. A few issues were more visible to the participants. Having more registrations than anticipated in our wildest dreams led to some sessions with larger audience than available seats. A tricky DHCP server problem impacted the internet access of many participants on the first day. Finally, lunches on the pre-conference days did not include salads, and we were not able to change the menu after discovering the problem. Overall, feedback from participants was positive. Some participants only remarked that the weather

was not as nice as it could have been in June, but this was out of control even of Martin, despite his proverbial Swiss precision!

Selecting papers for the technical program

Following the tradition, ICSE 2012 relied on a single program committee of 45 members for reviewing and selecting the technical papers. We considered introducing a two-level model with a program board, but we decided to stick with the traditional model as there was not time to ensure continuity with any change moving forward. We received 408 submissions, and implemented a two-phase review process, with two reviews of program committee members for each paper in the first round. Papers with no support after the first reviewing round were sent early rejection notifications to give those authors the opportunity to revise their work with the input of reviewers' comments available, and to help keep the field moving at a quick pace as revised papers could be submitted to other venues. All the papers reaching the second phase received a third review.

The technical paper discussion meeting, also known as the program committee meeting, was memorable for several reasons.

The room in which we met at the University of Zürich was wonderful for having natural light, but it also did not allow the usual seating arrangement around a large rectangular table. All algorithms to arrange seating of program committee members to minimize the chance of reviewers of a paper sitting next to those with a conflict for the same paper relied on a rectangular layout. Mauro showed his programming and algorithmic prowess at the last minute to devise an algorithm for the layered set of tables that fit into the room!

The program committee members had to discuss 174 papers in two days, which, in Martin's opinion, looked like a mission impossible. With Swiss precision, he informed Mauro and Gail that, with rather short coffee and lunch breaks, there was at most 5.5 minutes allowed per paper on average, which he proceeded to time during the meeting. Observing the fabulous preparation and steering of the meeting by Gail and Mauro and the highly engaged work by the PC members, Martin slowly became optimistic that the mission could be accomplished.

Eventually, the PC meeting was finished on time and with 87 papers (21.3%) accepted.

ICSE 2012 was the first ICSE for which summaries of the discussions were captured by program committee members and provided to authors to help explain decisions.

The dedication of the program committee members in working really hard for those two days stands out to all three of us. We are very grateful for the time and energy spent in that process. It only required a little bit of Swiss chocolate and continuous supply of coffee from coffee machines in the meeting room to keep everyone going.

Beyond the PC

The co-chairs and their committees of the other conference tracks also dedicated a lot of time and effort into assembling attractive and high-quality programs for their respective tracks.

Looking back

The three of us also have our own reminiscences about ICSE 2012, which we present subsequently.

Gail. I feel very fortunate to have worked with a wonderful team on ICSE 2012. Most especially with Mauro and Martin, but extending to all of the co-chairs of various tracks and events. There are two aspects of ICSE 2012 that truly stand out for me.

After the program committee meeting in Zürich, which involved substantial travel and jet-lag, intense planning in the day or two prior, and extensive concentration during the meeting, a group of program committee members ended up spontaneously going out for dinner in Zürich. The dinner was memorable being with so many great friends, new and old, having a wonderful meal and fantastic conversation and extensive laughter. It was a great antidote for an exhausting week.

ICSE 2012 was the last ICSE that Prof. David Notkin (University of Washington) was able to attend. David passed away in April 2013. David was my Ph.D. supervisor and my friend. We had many good discussions and moments during ICSE 2012, but I will be always thankful

for a cab we shared to the Zürich airport as it was one of the last times we had a conversation about life. David was an incredible asset to the software engineering community, always ready to serve and to share a joke. I will always miss him.

Martin. My personal liaison with ICSE began in 1985 with ICSE-8 in London, where I had a paper, but, being the second author, had no funding to attend the conference. The 9th ICSE, which was held in spring 1987 in Monterey, California, was the first ICSE I attended, although my paper had been rejected. Working in industry by that time, I had gotten travel funding due to the ICSE'87 tools fair. There, all the brand new CASE tools were on display and it turned out that the tools fair was one of the best attended events of that ICSE. Having become a professor in 1993 and having organized ESEC/FSE 1997 in Zürich, I also became involved in the organization of ICSE, serving as a PC member and track co-chair for several ICSEs between 2000 and 2008. Already back in 1999, Hausi Müller, a member of the ICSE steering committee, encouraged me to engage for bringing ICSE to Zürich. By that time, however, I had other priorities.

It was only at ICSE 2008 in Leipzig, when Mehdi Jazayeri told me that he had been tasked by the ICSE steering committee to form a team and propose a venue for ICSE 2012. I had worked closely with Mehdi when organizing ESEC/FSE 1997, where he was the Program Chair. Mehdi and I presented a pre-proposal for ICSE 2012 in Switzerland to the ICSE steering committee at ICSE 2009 in Vancouver and got the full proposal for holding ICSE 2012 in Zürich, with Martin, Gail and Mauro as the core team, approved at ESEC/FSE 2009 in Amsterdam.

After five relatively short bursts of initial work (assembling the proposal, negotiating venue pre-contracts, setting up the web site and initial publicity materials, forming the organizing committee and selecting the program committee members), the real work started about 15 months prior to the conference. From the beginning of 2012 until the end of the conference, I mostly worked in two shifts per day: the day shift was primarily devoted to my duties as a professor and department head (plus some ICSE work), while in the evening/night shift, I more or less exclusively worked for ICSE. The only exception was the week after Easter, where my wife and I went on vacation and my ICSE workload temporarily dropped to about 3 hours per day. A sabbatical in the

second half of 2012 served as a kind of rehab for me and allowed me to resume an activity called research.

Mauro. ICSE is my community. I served in my first ICSE program committee in 1997, and many times since, as a member of the organizing and program committees of many ICSE's, but I felt really nervous when asked to co-chair the program committee, which is a remarkable honor and responsibility, and the lack of experience in working with Gail and Martin made me particularly tense. Usually working under stressful conditions kills even the best and long lasting relationships, but ICSE works in the opposite way: The occasional knowledge with Martin and Gail before ICSE became a strong and enjoyable friendship that lasts since. Among the many nice memories, I like to mention few episodes.

I was extremely skeptical about the need of a face-to-face meeting for assigning papers for review, but: How to say no to the rigorous request of our Swiss general chair? And, Yes!, I flew to Vancouver indeed to spend a week with Gail to assign paper for review.

Landed in Vancouver on a Sunday morning, I found my way to the UBC dormitory, where I was hosted, to learn that all was closed due to Canadian Thanksgiving, an event I was not aware of before. Gail was out of town for Thanksgiving with the family unreachable till late! Of course, the dormitory management sent me a link with instructions through e-mail in advance, and then I did learn that it is better to download all information before a trip, when provided with Internet connection, and not to be alone in front of an empty building with a link to the instructions and no Internet connection. Meeting a friendly resident with Internet connection solved my problems.

Gail and I started assigning paper in the early morning of the Monday after, and continued Tuesday and Wednesday and Thursday, working full time, confirming Martin's advice, and contradicting my deep skepticism. In retrospect, the careful and tedious paper assignment process was the single best step for a smooth review process and the design of an excellent program. The long days in the office and the dinners at Gail's home were the best opportunity to consolidate a great friendship.

Few month later, Martin's expression, when he saw the list of 174 papers that we planned to discuss, is still unforgettable! Martin's ex-

pression changed only at the end of the first day, when, thanks to the flash coffee breaks and the amazing work of our postdocs in managing the flow of committee members entering and exiting the room due to conflicts, we were ahead of the most optimistic schedule.

I also remember the early reaction of the committee members to the proposal of review summaries that we introduced for the first time in ICSE, that moved from fairly skeptical to almost enthusiastic, and that raised the consensus of the authors so well that has become common practice after.

Acknowledgements

We thank everybody who, in whatever role, helped make ICSE 2012 such a great event. In particular, our thanks go to all chairs and committee members, the student volunteers and, last not least, to our families for their support, patience and understanding.

The 35th ICSE, 2013 “Reminiscences”

Betty H.C. Cheng and Klaus Pohl

During the closing session of ICSE 2011 in Hawaii, the relaxing and familiar song “Sittin’ on the Dock of the Bay” (a classic song about San Francisco sung by Otis Redding, 1968) ...officially launched and set the tone for ICSE 2013. From the early conversations (starting in 2009) and through the conclusion of ICSE 2013, our conference was about cherishing the old memories and creating new ones, forging new paths and friendships, and coming from afar to gather in a familiar place - San Francisco. Perhaps, its association with Haight-Ashbury where the “hippie” movement started in the 60’s, the notion of inclusivity, peace, and tie-dyed clothing, made the “City by the Bay” an attractive place to promote ICSE as the “networking, networking, networking” conference.

In keeping with the general spirit of the conference, ICSE2013 was a mix of the familiar and long-standing program elements, complemented by several innovations. We reflect on the innovations, overview the conference key elements, and close with final thoughts.

The 35th ICSE - Fact Sheet

Dates:	May 18–26, 2013
City:	San Francisco, CA, USA
Venue:	Hyatt Regency San Francisco
General Chair:	David Notkin†
Program Chairs:	Betty H.C. Cheng and Klaus Pohl

Innovations

ICSE 2013 introduced a number of innovations intended to promote networking among participants for both technical and social engagement, address conference efficiencies, and most importantly, to have fun in the “City by the Bay”.

To foster interaction and the creation of new memories we introduced teaser videos for all submissions. Teaser videos provided a platform for authors to create a 30 second entertaining and informative snapshot highlighting their paper. The teaser videos increased the visibility of the work both within our community and with others who might not traditionally attend ICSE.

Additional innovations included the following, all of which were geared to inform and customize the ICSE Conference experience for participants:

- **ICSE 2013 Trailer**, Promo Video (filmed @ ICSE 2012, Zürich)
- **Confero App**, a conference-program app that was developed for ICSE 2013 and was one of the first such apps to run on the majority of touch phones and tablets (and is still in use).
- **Distributed workflow with centralized data management** of all conference program-related information to ensure consistency, scalability, and dynamic updates by a large number of information providers to be consumed by an even larger number of users requiring data in different formats with dynamic updates (e.g., calendars, Confero, proceedings publishing, and the ICSE webpage).

-
- **Preprints of papers** @ ICSE 2013 website; on-demand publishing of proceedings.
 - **Student-Industry lunch:** Industrial benefactors and student attendees had “speed-dating” lunches to meet and better understand industrial needs and SE skills, respectively.

Overview

Program. ICSE 2013 followed the “ICSE design pattern” with all the standard program elements: strong technical research program based on a rigorous, peer-review process, 6 co-located events, 10 tutorials, doctoral symposium, new faculty symposium, 29 workshops on emerging areas, and several social events. We received a record number of 461 submissions from 49 countries; accepted 85 papers from 25 countries (18.5% acceptance rate); and received hundreds more submissions for other tracks (i.e., NIER, SEIP, CSEE, demonstrations, ACM Student research competition, and the SCORE contest).

Numbers. ICSE 2013 participation reached great milestones with a total of 1536 people registered across the pre-/post conference and main conference activities including 1083 people registered for the main conference. ICSE has always prided itself as an inclusive event, on many dimensions. ICSE 2013 reinforced the international nature of software engineering with participants coming from 50 countries (and all continents); 30% of the participants were students; and 42% of the participants were first time ICSE attendees—quite exciting as we continue to broaden the ICSE community.

Keynotes. Each ICSE has broad latitude in selecting its keynote speakers. In our case, we wanted to inform and inspire the participants with topics not typically covered, while also reflecting on emerging areas. Pamela Samuelson, an attorney and Director of the Berkeley Center for Law and Technology spoke about the advantages/disadvantages of software patents; Tony DeRose, Senior Scientist from the Pixar Research Group shared with us the past, current, and future roles of software engineering and movie making; and Linda Northrup, Director of the Research, Technology, and Systems Solution Program at the Software Engineering Institute, gave a reflective and prospective view of

scale of computing-based systems as it relates to her landmark report on Ultra-Large Scale Systems.

Social Events

Dare to be bold. In addition to the traditional conference receptions and industry-sponsored breaks, ICSE 2013 hosted its conference banquet on a cruise ship that took more than one thousand participants on a two-hour round-trip cruise to the Golden Gate Bridge. After being greeted by two wonderfully-dressed drag queens serving champagne during the boarding process, the participants could eat, dance (on two different decks of the ship), and be merry. The city lights of a beautiful San Francisco evening provided a perfect setting for everyone to continue networking with long-time and new acquaintances. From technical conversations to the history of tie dye and the hippie culture, the international ICSE community relaxing and cruising on the Bay captured the spirit of San Francisco.

Team ICSE. Given the venue and timing of the conference, for the first time, we had a *Team ICSE* participate in the infamous Bay 2 Breakers race. The annual 12K race, started in 1912, takes 50,000+ runners through nine of the most iconic neighborhoods of the San Francisco area, finishing where the “breakers crash against the Pacific Coast’s Ocean Beach”¹. People from all walks of life participate, each with their own reasons and causes for running. *Team ICSE* ran with their tie-dyed shirts in honor of the conference general chair, David Notkin, who had passed away shortly before the conference.

Summary

Acknowledgements: The success of the conference was only possible due to the amazing efforts of an incredible team of people who are changing the field of software engineering with their research and graciously and passionately volunteered their time to make ICSE 2013 a successful conference to remember. We express our sincere appreciation to the organizing committee, program committees, Jen Bevan

¹www.baytobreakers.com

and her army of student volunteers, local organization team, sponsors, our dynamic duo of Erik Fredericks and Nicole Ignaciuk, all participants, and especially, to our “SWAT Team,” Joanne Atlee, Gail Murphy, Bill Griswold, and Tom Zimmerman. They swooped in during the last month prior to the conference to help us complete the final steps in realizing our vision for ICSE 2013.²

Final thoughts: The initial concept for venue and plans for ICSE 2013 started as high-level discussions and, over a four-year time frame, grew into a successful conference. As general chair, David Notkin had a vision for the conference at the onset—make it inclusive, dare to be bold, and have fun. We both had the honor and privilege of our lives to work with one of the most amazing persons in our field. While David lost his courageous battle to cancer one month before the conference, his vision and the hundreds of hours that he spent planning the conference guided us through all the final steps of preparing and the realization of a memorable conference in the “City by the Bay.”

Their Legacy Lives On. Since 2013, the field of software engineering has been hit particularly hard with the loss of several of our colleagues and dear friends who have been leaders in our field, mentored numerous students and junior colleagues, and who will be sorely missed. As such, this retrospective is dedicated in the memory of these wonderful software engineers who left us too soon, but whose impact and memories will inspire us to make our mark and enjoy life: David Notkin (1953–2013), Mary Jean Harrold (1947–2013), Robert B. France (1960–2015), Bernhard Schätz (1964–2017), and John C. Knight (1947–2017).

²We also gratefully acknowledge the participants who provided pictures from ICSE 2013.

The 36th ICSE, 2014: “A Focus on the Review Process”

Lionel C. Briand and André van der Hoek

In Software Engineering, like in many sub-disciplines of Computer Science, conferences play a prominent role as publication venues. Getting articles published in such conferences plays a key role in the career of researchers, whether to get a position in the first place, achieve tenure, or be promoted at their institution. Therefore, striving to ensure the integrity and quality of conference review processes is a major endeavor of the utmost importance for our research community.

ICSE, as the largest and flagship conference in Software Engineering, is a particularly challenging case. With comprehensive coverage of the field, ranging from human factors and tool design to formal methods and distributed systems, the diversity of research topics it addresses is staggering. Every year, ICSE attracts around 1200 participants to the main conference and satellite events. Getting a paper accepted in ICSE, for any researcher, is considered a major achievement.

In 2012, when we were started to plan the review process, we quickly realized a number of key challenges needing to be tackled:

- With around 500 submissions expected, a major concern we had was the traditional program committee meeting—an entrenched

The 36th ICSE - Fact Sheet

Dates:	May 31–June 7, 2014
City:	Hyderabad, India
Venue:	Hyderabad International Convention Centre
General Chair:	Pankaj Jalote
Program Chairs:	Lionel C. Briand and André van der Hoek

institution until then for ICSE. With the growth of our community, the size of ICSE program committee had also been growing over the years, as had the review load for individual program committee members. Program committee sizes of more than 50 members and review loads of 25 papers or more were slowly becoming the norm. This had begun to create various difficulties, including large program committee meetings where communication was difficult and papers did not receive the discussion time they needed and deserved, qualified people who declined to be on the program committee because of the enormous review load, an increasing lack of expertise coverage in the program committee, and a subset of reviews of questionable quality. With an eye toward a future with more submissions yet, we thus sought a new review model that would more readily scale and in the process remedy these other concerns as well.

- A second concern we had was that the review standards to which individual program committee members collectively held each of the papers being discussed would lead to an implicit bias toward papers tackling smaller and simpler problems, deterring people from addressing large, multifaceted, and complex problems, and taking the excitement over new ideas out of main track of ICSE in favor of “simple incremental work”. With our field maturing, it can be expected that review standards tighten, which in and of itself is not necessarily a negative development. At the same time, throughout the years of our respective careers we noticed a subtle phenomenon: papers were increasingly not being evalu-

ated for what they contained, but rather according to what they left out. Additionally, review standards that are appropriate for one type of contribution were indiscriminately applied to other types as well, implicitly thereby asking for papers that “do it all”. The result was that a growing number of authors retreated, submitting small, safe papers that were difficult to criticize given the typical size constraints of an ICSE paper. We therefore sought to find a way to “scope the review process” so that each paper was judged for what it brought to the table.

- Our final concern was the relative subjectivity with which the ICSE review process was being decided upon. With all the best intent, each year the program co-chairs would seek to improve the review process in one way or another, with the steering committee providing oversight of the high-level choices being made. But all of this greatly depended on individuals, their beliefs and insights, ability to carefully argue and persuade, and more. Indeed, the two of us are no exception—the views that we express in the above and that guided our efforts are of course ours, and subject to debate! With the increasing complexities of the review process, however, we felt that it was important for both long-term decision making and transparency to the community to go further. We thus sought to collect appropriate data and perform a post-mortem analysis of that data.

To tackle these three challenges, we introduced for the first time at ICSE 2014 the following innovations:

- We introduced (and somewhat tailored) the Program Board (PB) model, which uses a two-tiered review committee consisting of: (1) program committee members who review the papers and write up detailed reviews, and (2) program board members who serve a role akin to that of an associate editor in a journal: monitoring review quality, moderating online discussions among program committee members, and attempting to reach a consensus on whether or not a paper should be accepted. Only program board members meet for discussing final decisions on papers for which no consensus was reached during the online discussion

phase, thus limiting the number of participants and the number of papers to decide upon. Although no model is perfect and every review model always involves trade-offs, the PB model had major advantages. First, it allowed us to have a very large program committee, thereby improving expertise coverage, decreasing review loads, and inviting to the process a much wider and more diverse community who traditionally may not have had the chance to be part of the ICSE review process. Second, since no pair of PC co-chairs can realistically and closely follow the reviews and discussions of 500 papers across so many different disciplines, PB members played a key role in ensuring review quality.

- We introduced papers categories, to be indicated by authors upon submission, that would signal the primary type of contribution a paper made: analytical, empirical, technological, or perspectives. Each category also carried with it a primary set of public criteria according to which to evaluate the papers. Program board and program committee members were expected to account for the paper category in the discussions. The effects of this choice were more difficult to assess. While we informally know of cases where the type of paper clearly entered the discussion, whether or not knowledge of paper category made a difference overall in terms of paper acceptance unfortunately does not clearly borne out of the data we collected.
- We systematically collected data concerning the perceptions of authors, program committee members, and program board members about the quality of reviews and decisions made. This resulted in the first post-mortem evaluation report of an ICSE conference that is publicly available.

As with any innovations, some stick and some do not. The program board model has now become standard for ICSE wit— as always—minor variations being introduced by new program co-chairs. Paper categories were unfortunately abandoned relatively quickly, possibly because their impact could not be adequately determined. Then again, post-mortem reports are now a standard practice for ICSE.

Being selected to serve as program co-chairs of ICSE 2014 was a great honor, an interesting challenge, and a unique opportunity to improve the conference. This was also the first ICSE in India, which was considered somewhat of a risky endeavor, but ended up being a major success under the leadership of Pankaj Jalote (General Chair), both financially and in terms of attendees.

As a final note, we, the PC co-chairs, did not know each other before working on this conference. Pairing people who know little or nothing of each other can be a risk and, in some past ICSEs, was not always as successful as it could have been. In our case, we found out that our experience and expertise were in many ways complementary, an aspect which is very important for a conference as large and diverse as ICSE. Perhaps more importantly, however, our personalities and ways of working aligned, which made it a joy to work with each other. We are thankful for the steering committee entrusting us with the flagship conference in our field and engaging deeply in redefining the review process.

We wish the conference and its future program co-chairs well!

The 37th ICSE, 2015

“Memories of ICSE 2015 in Florence” by Antonia Bertolino

ICSE is not the only conference I have chaired, but is for sure the most complex and memorable ever. I have been officially appointed the General Chair of ICSE 2015 in the 2012 edition in Zürich and since then its making has taken a growing part of my time and energy until I could give the official opening speech from the Auditorium stage in the beautiful Palazzo dei Congressi in Florence. Participating to ICSE is an intense experience already, but doing it from behind the scene is an extraordinary adventure. I keep many indelible memories of this adventure, and it is of some of these that I would like to talk here.

For the opening keynote of ICSE in Florence I wanted to get some testimony of Italian excellence in advanced information technologies, and who better than the Scuderia Ferrari, manufacturer of world-celebrated Formula One racing cars? I had no contact in the company and I simply (and not very convinced) called a telephone number from their web site. I still remember my astonishment when after a short wait I was put in line with the head of their engine and electronics department, at the time the internationally renowned Luca Marmorini! I il-

The 37th ICSE - Fact Sheet

Dates:	May 16–24, 2015
City:	Florence, Italy
Venue:	Palazzo dei Congressi, Palazzo degli Affari
General Chair:	Antonia Bertolino
Program Chairs:	Gerardo Canfora and Sebastian Elbaum

lustrated him what is ICSE and why we would have loved to hear about how they develop and test the software that goes on board of their racing cars. After more contacts, the Program co-Chair Gerardo Canfora (a Ferrari fan!) and I eventually visited their premises in Maranello to meet in advance Claudio Silenzi, who was the designated speaker. We were sitting in a room that faced their test racetrack, and I still can hear the roar of the racing cars in the background while we talked about ICSE program and audience. Silenzi's talk was remarkable and very well received.

Something astounding is the myriad of tasks and issues to be solved by the ICSE General Chair, while keeping the lucidity of coordinating all aspects and people and not panicking when something goes wrong. You eventually get to decide on all the questions for which the others in the team do not have an answer, and you need to give one. Constantly thinking about plan B (or even C) was the strategy that saved my life. Especially people interaction is fantastic: as for any life experience, you can get people that are extraordinarily helpful and dedicated, I could name many. At the same time, you also get to interact with people that are stubborn, and do not deliver to your expectation. Fortunately, I could only name a very few. So, for future ICSE GCs, the best advice is: be sure to select the right team. In this perspective, my best decision was by no doubt to select Gerardo Canfora and Sebastian Elbaum as the Program Co-chairs: not only I could completely forget any concern or task regarding the making of the technical program because they were fantastically reliable and proactive, but also they were always present to support me on any decision on whatever topic: thanks a lot Gerardo and Sebastian, it has been a privilege to share the journey with you.

Speaking of orchestrating people, I got for the first time in ICSE history that the Organizing Committee danced on the stage at the closure ceremony of ICSE 2014. The ICSE editions for the next years are announced during this closing session on Friday afternoon. Somehow I was reluctant to prepare the usual series of slides celebrating the pieces of the program in preparation (nothing particularly surprising), and the magnificence of Florence (everyone knows). So, in thinking what to do, somehow by joke I thought to prepare instead a flash mob on the music of the Italian famous song “Nel blu dipinto di blu” (well, the idea was to communicate the spirit of the nextcoming Italian edition). Knowing me it is not surprising that I got this idea, but what is really surprising is that the people from the committee followed me! And maybe the result does not show, but we worked seriously to prepare the performance first from remote and then in several “secrete” trials in Hyderabad (code name: *the Nebraska operation*). Our “Volare” flash mob is now in the history of ICSE: the sceptical ones can watch the video¹ of this serious scientists dancing and singing and clapping. After all, “mens sana in corpore sano” is an ancient piece of wisdom.

Among the things I am most proud of, ICSE 2015 offered as a social event the visit to the Uffizi Gallery, a landmark among the most visited museums worldwide. It opened in the evening, after the afternoon closure, exclusively for the ICSE delegates, who could comfortably and privately admire the intense glance of Botticelli’s Venus that inspired the ICSE 2015 logo, as well as many other world masterpieces by Giotto, Piero della Francesca, Leonardo da Vinci, Raffaello, Michelangelo and Caravaggio, just to mention a few. Moving around the Uffizi halls and meeting the ICSE colleagues strolling around was magic and rewarded the hard work that took longer than eighteen months until we could get all necessary clearances.

ICSE offered another social event, the banquet dinner at the Mercato Centrale: the market building is a beautiful structure in itself, and the food it offers is genuine and purely from the Italian tradition. Having the market reserved for us, and all shops at our disposal to order any food we wanted, was amazing. The day after, during the usual award ceremony, I got a surprise special award for the best ICSE ban-

¹<http://2015.icse-conferences.org/resources/videos/other-videos>

quiet ever, and still today when I meet people that attended ICSE 2015, they do not speak me about the world heritage of the Uffizi paintings, but of the banquet in the Mercato.

I would like to sincerely thank the ICSE Steering Committee for their trust and support before, during and after the event. Then, I would also like to thank warmly many people without whom the conference would have not succeeded, but the list of names I would like to include is too long. So let me give a collective big THANK YOU to the ICSE 2015 great family.

In retrospect, I am happy and honoured that I could contribute to the ICSE tradition, and I hope that participating to ICSE 2015 has enriched people from both scientific and cultural sides.

“PC Chairs Perspective” by Gerardo Canfora and Sebastian Elbaum

When we were invited to become ICSE Program Chairs we felt both **honored and anxious**. We felt honored because it put us in a position to build on what many research leaders that we admire had developed over the years. We felt anxious because becoming ICSE Program Chairs is one of the most significant service responsibilities in our community, one that demands significant planning, implementation effort, and careful judgment.

We took on organizing the technical track of ICSE like most program chairs, aiming to produce the best technical program and to offer plenty of learning opportunities. Our approach borrowed from some of the **true and tried software engineering methods**:

- Getting the brightest and most dependable team members. Just like there is a x10 productivity difference among software engineers, there seem to be a similar difference among the best and the worst reviewers: we are not all in the top group, so selecting a great team that provides high-quality and timely coverage of all areas is key.
- Carefully checking every artifact. In our case those artifacts are papers submitted by authors and paper reviews submitted by the

members of the program committee. We had multiple levels of checks and measures, including personally reading every review for quality control and for assisting every team member in crafting better, more complete, more precise, and more supportive reviews.

- Optimizing scarce resources to produce the best outcome. We allocated reviewing resources where they were needed the most. This meant that some submissions ended up with two reviews while others required five. The objective was not to provide a uniform allocation of resources but rather to make an informed decision about the outcome of each submission.
- Adhering to a process where the team members that know the most about about their domain have the power to make decisions about it. In our case, the members that knew the most about the strengths and weaknesses of the submitted papers, the reviewers, met in person to discuss the merits and limitations of the top submissions and to establish a common baseline for paper acceptance.

ICSE 2015 ended up receiving 452 submissions by more than 1250 authors. The paper selection process involved 48 program committee members and 33 reviewing committee members from 25 countries that generated 1137 reviews. The final program included 84 papers (18.5% acceptance) and 6 ACM SigSoft Distinguished Paper Awards. We leave to the reader the (hard) exercise of comparing the performances of the different ICSEs (hint: we did well, check the program chairs yearly reports²). Independent of the performance, at least a couple of aspects about our experience seem **universal to all ICSE Program Chairs**: 1) managing the reviewing process of the ICSE technical track is incredibly demanding, and 2) in spite of having the best intentions, extensive planning, and careful implementation, some weak papers are accepted into the program while some worthy papers do not make it.

One original way we decided to mitigate those weaknesses and to enrich the overall technical program was to pioneer in the software

²<http://www.icse-conferences.org/sc/ICSE/2015/ICSE2015-Technical-Track-Report-Canfora-Elbaum.pdf>

engineering community the **journal-first model**. Working tightly with the Editor-in-Chief of IEEE-TSE Matthew Dwyer and the Editor-in-Chief of ACM-TOSEM David Rosenblum, we defined a process to select recently accepted journals that have not appeared at a conference before, to be presented at ICSE. This initiative gives the possibility for journal authors to present their work to the broader ICSE audience while enhancing the ICSE program with some pieces of work and topics that otherwise may be lacking. Although this initiative is still evolving, we believe it offers some interesting tradeoffs to regular conference papers and is likely to become a staple of the regular ICSE program.

Throughout the process we learnt a lot about the diversity of the community, the richness of the program, and the tradeoffs and judgment calls that need to be made with limited time and information. We were also able to understand more intimately the **challenges** that ICSE and its technical program face moving forward including:

- Defining a process to better train and identify a larger pool of competent reviewers
- Striving for making the reviewing process more predictable in terms of the outcome and more uniform in terms of the quality of the reviews
- Promoting a more risk-prone attitude among reviewers to avoid that good ideas are missed due to over-conservative reviewing habits and misguided expectations
- Making authors cognizant about the reviewing investment we make as a community, and the need for everyone to control that load and to contribute to handle it
- Finding a better integration of the tracks that form the whole ICSE program, in particular by overcoming the traditional division between research and practice/industrial papers
- Devising new ways of organizing the program, in particular to increase interaction between the presenters and the audience

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- Strengthening the journal-first model so that conference submissions and journal-first papers become complementary first-class channels to present research at ICSE

We are extremely **grateful** to previous ICSE leaders that set the foundations for the conference to be the flagship in the community; to Antonia Bertolino, the general chair of ICSE 2015, for being such a great matchmaker (we feel very fortunate to have gotten the chance to spend hundreds of hours together), for trusting us with the technical program and with shaping the conference design; to our program committee members and reviewers for being a reliable source of expertise and for supporting the development and delivery of the technical program; and to the whole software engineering community for teaching us so much over the years.

ICSE 2016 in Austin

*Laura K. Dillon, Will Tracz, Willem Visser,
and Laurie Williams*

Asking conference organizers to chronicle the “memorable things” about their conference is somewhat misguided. Naturally, the things organizers tend to remember are the unforeseen “challenges” (a.k.a. problems) that rear their heads—like vegetarian food running out before vegetarians get through the lunch line because non-vegetarians help themselves to everything in sight (quickly remedied by changing from buffet to seated lunches), venue thermostats automatically resetting throughout the day (remedied only intermittently by prodding hotel staff to increase the settings as attendees complain), or discovering the acoustics in a room were not as originally represented (not remediable when all other meeting space is spoken for). In fact, the first memorable thing for organizers of ICSE 2016 was an email petitioning the ICSE Steering committee to reverse the decision to hold ICSE in Texas!¹ Of

¹The sender asserted that the Texas policy permitting people to openly carry firearms in public greatly increased the risk associated with holding ICSE in Texas, particularly for foreign visitors and members of minority groups. This petition sent us scurrying to investigate the impact of gun laws on safety. An investigation of crime statistics revealed that Austin continuously ranked among the safest big cities in the US, and that the conference venue was in one of the lowest-crime areas of Austin.

The 38th ICSE - Fact Sheet

Dates:	May 14–22, 2016
City:	Austin, TX, USA
Venue:	Renaissance Austin Hotel
General Chair:	Laura Dillon
Program Chairs:	Willem Visser and Laurie Williams
Finance Chair:	Will Tracz

course, some hiccups are inevitable for a conference with as many moving parts as ICSE, and participants do not attach the same importance to them as organizers. Thus, we expect that the software engineering research community will remember the 38th ICSE for many more important things. Here, we've chosen to highlight its strong technical program and keynotes, a particularly impactful town hall meeting, and a unique banquet experience.

Given the reputation of the ICSE series, it will come as no surprise that the ICSE 2016 technical program was a strong one. An unprecedented number of papers—530—were submitted to the technical track. These papers came from 40 countries and 1450 authors. From these, the program committee and the program board selected 101 papers. One innovation in the reviewing process was to ask authors to rate reviews during the author response period. The program co-chairs subsequently used these ratings to recognize the best reviewers in the program committee. The top five topics of the papers were (in ranked order): empirical software engineering; program analysis; mining software repositories; software testing; and software maintenance and evolution. Seven journal-first papers were mixed with the 101 accepted papers to create 27 themed technical research tracks at the conference.

The program co-chairs also undertook a study to determine how the software engineering research community had evolved since 2002. With the goal of helping software engineering researchers understand how to improve their papers, Mary Shaw had analyzed the abstracts

So, this first crisis was resolved by adding a Safety Section to the ICSE 2016 website informing prospective participants of risks.

of all papers submitted to ICSE 2002 to determine trends in research question type, contribution type, and validation approach. Shaw presented her result in “Writing Good Software Engineering Research Papers” at ICSE 2003. With the goal of further helping software engineering researchers understand how to design better research projects and write better papers, the ICSE 2016 program co-chairs repeated Shaw’s analysis with the abstracts of the ICSE 2016 submitted papers. Results of this analysis indicated that since 2002, reviewers had increased expectations that papers have solid evaluations of the research contribution. Additionally, the 2016 results included at least 17% mining software repository (MSR) papers, a category of papers not seen in 2002. The advent of MSR papers has increased the use of generalization/characterization research questions, the production of empirical report contribution, and validation by evaluation.

Three memorable keynotes complemented the technical program. In the opening keynote, Mary Shaw, winner of the 2014 US National Medal of Technology, contrasted the trajectory of software engineering as a discipline with that of a more conventional engineering discipline—bridge building. Besides characterizing progress in the last two decades and the maturity of the discipline, she highlighted important challenges ahead. ICSE 2016 participants also rated the two Friday morning keynotes very highly in post-conference surveys. In the first, Wolfram Schulte, winner of the 2016 Harlan D. Mills Award, spoke about challenges he encountered in his roles at Microsoft, and made the case that a combination of both formal methods and empirical software engineering is the most promising approach to impact existing practice. The second Friday morning keynote served also as the keynote for the Software Engineering in Practice meeting. In it, Gail Murphy drew from her experiences taking a research idea to market and from insights learned in interviews of industry leaders to explore questions around continuous adoption in software engineering practice

Few who attended the ACM SIGSOFT/IEEE TCSE Town Hall meeting at ICSE 2016 will forget the panel discussion of the ICSE 2017 three-paper limit policy. It drew record attendance, with a room officially approved for 275 filled to “standing room only”. Panelists and community members openly aired their views of the controversial policy to limit submissions by the same author. An important result of this meet-

ing was to point out the need for broader consultation with the software engineering research community on such controversial issues. The ICSE Steering Committee has therefore resolved to hold regular forums at ICSE and other venues for discussion of emerging issues and to publish regular “State of ICSE” reports in ACM SIGSOFT Software Engineering Notes.

We would be remiss if we did not also observe that the ICSE 2016 Banquet was a truly memorable event. Participants were treated to a uniquely Texan experience replete with two live longhorns (perhaps the largest and most unpredictable “extras” at any ICSE banquet), a burro, a trick roper, a Mariachi band and dancers, and a live country music band. The Bullock Texas State History Museum provided the perfect backdrop for the event. Buses transported participants to different areas of downtown Austin where they could experience both historic and contemporary aspects of the city known for its music and lively nightlife. A firm favorite was the music on 6th Street, and there were even reports that the program co-chairs were seen there in the early hours of the morning. Surely not.

Conference attendees wore Texas Ranger badges and left home with ICSE-branded Texas-sized coffee mugs and oversized “pint” glasses. Additionally, working with a dedicated community of volunteers, speakers, and attendees was a truly memorable and gratifying experience for the four of us. Happy trails to all!

The 39th ICSE, 2017

*Sebastián Uchitel, Alessandro Orso,
and Martin Robillard*

It took over 40 years for ICSE to go south of the Rio Grande. By 2010, with ICSE being held in Cape Town, all inhabitable continents but South America had hosted ICSE. South America had had its chance in 2002 when Buenos Aires, Argentina, was due to host the conference. Unfortunately, in December 2001 an economic and then social crisis unfolded, and the conference was moved at the last minute to Orlando, FL, USA.

Discussing the analysis that condoned abandoning Buenos Aires is beyond the scope of this text. However, it is worth mentioning that a major likely factor was that the ICSE 2002 General Chair was not local. He therefore lacked the local knowledge that was needed to mitigate the situation and retain Buenos Aires as the venue for ICSE.

During the subsequent decade, the few non-USA, non-European slots in the ICSE rotation were absorbed by China, India, and South Africa. In 2013, the Steering Committee decided that 2017 was to be Argentina's turn again. This time with a local General Chair. This time it worked.

We set out with three main goals for ICSE 2017. First, we wanted to retain the conference's high standards while tackling head-on the ever-

The 39th ICSE - Fact Sheet

Dates:	May 20–28, 2017
City:	Buenos Aires, Argentina
Venue:	Sheraton Buenos Aires, Pontificia Universidad Católica Argentina: Edificio San José Auditorios
General Chair:	Sebastián Uchitel
Program Chairs:	Alessandro Orso and Martin Robillard

increasing reviewing load imposed on the community. Our second goal was to continue to increase conference attendance to help make ICSE the venue where all software engineering researchers gather annually. Finally, we wanted to ensure that the Latin American software engineering community made the most of ICSE's first visit to the region.

ICSE 2017 was a huge success both in attendance (3rd most attended ICSE), in local participation (nearly a third of the attendees were from Latin America), and in overall submissions (totalling close to 1,800). The meeting itself was a lively event, with much discussion in the session rooms, meeting rooms, corridors and during the social events. ICSE even had some on-premise tango dancing!

One of the innovations that we put in place for ICSE 2017 contributed heavily to bringing an increasing number of new researchers to the conference: we changed the the poster track by making it much more inclusive and prominent in the conference. The goal was to provide all researchers working in software engineering the opportunity to attend the conference and communicate their results in the poster session. To achieve this, all submissions with some positive reviews in any track were automatically accepted as posters. As a result we had a fivefold increase in the number of posters presented, for a total of 110 posters.

Among the decisions we took to tackle the peer-reviewing effort ICSE imposes on the community, one was particularly noted: a policy to limit the number of submissions to the technical track to a maximum of three per person (the so-called "Limit 3"). This decision was vigorously opposed by a subset of the community, and hotly debated

in various forums. In the end, the policy, as a component of a general strategy to balance submission opportunities and reviewing cost, helped us achieve the lowest reviewing load for program committee members in recent memory. Time will tell if policies of this nature are a necessary means to ensure reviewers' time is used as efficiently as possible, but the immediate impact was to greatly raise the profile of the issue of reviewing effort in the community: The town hall event organized at ICSE 2016 to discuss the matter witnessed blockbuster attendance with standing room only. In the long run, our hope is that by generally raising awareness about the reviewing cost that conference submissions impose on our community, we can ultimately achieve an efficient and equitable use of reviewing resources with a minimum of regulation.

Regional attendance was boosted by the generous contributions from the Uruguayan and Argentine research councils, as well as by the fact that the annual Ibero-American Software Engineering Conference altered the conference's traditional schedule to co-locate with us.

The development of research groups in Latin American countries suffers, as many other countries of the world, from the problem of brain drain. This is fundamentally due to erratic funding policies that produce years, sometimes decades, of insufficient science budgets, expelling scientists to central countries. Certainly, science budget cuts have occurred in Argentina and Brazil since 2015, and similar situations dating back to the international crisis in 2008 can be reported across the globe. To better assess the extent of this problem in the context of Software Engineering, and increase its visibility, during registration we requested attendees to provide not only the country of the institution they worked for, but also their nationality. This does not account for dual nationalities and for researchers that left their country of birth early in their lives. Nevertheless, the difference between country of nationality and country of affiliation allows for at least approximating the extent of the brain drain and brain gain problems. The results for the top countries affected by these phenomena were presented at the opening session and were food for thought and discussion throughout the conference. We report these results in the table on the next page.

In summary, this was the first time ICSE was held in Latin Amer-

ica, which helped broaden the reach and impact of the conference, in addition to attracting new participants. For us, it was an honour and a pleasure to be allowed to make it happen. We truly hope that it will not take another 40 years for ICSE to return to Latin America.

Brain drain (left) and brain gain (right) at ICSE 2017. Data based on attendees who reported nationality and workplace country. Brain drain reports on proportion of attendees from each country that are working abroad (e.g., the 18 attendees reporting Iranian citizenship work elsewhere). Brain gain reports on the proportion of attendees working in a country but reporting a different nationality (e.g., the 11 attendees working in Luxembourg report a different nationality)

Nationality	Percentage	Attendees	Work Country	Percentage	Attendees
Iran	100%	18	Luxembourg	100%	11
Austria	63%	16	Switzerland	72%	35
Colombia	58%	12	Singapore	70%	10
India	45%	40	Norway	64%	11
Italy	42%	81	Sweden	57%	41
Netherlands	41%	17	UK	56%	43
China	40%	87	Canada	49%	79
France	38%	16	Netherlands	48%	21
Israel	31%	13	Australia	45%	18
Spain	30%	20	USA	45%	220
Germany	22%	64	France	43%	20
Belgium	21%	14	Chile	40%	15
Portugal	20%	10	Spain	40%	24
Canada	18%	44	Finland	30%	15
Chile	18%	11	S. Korea	29%	29
Finland	17%	12	Germany	27%	71
UK	15%	20	Belgium	23%	15
Brazil	11%	155	Portugal	20%	10
Uruguay	10%	10	Japan	19%	30
USA	7%	116	China	12%	65
Argentina	6%	158	Italy	6%	50
S. Korea	5%	19	Israel	5%	10

(a) Brain drain

(b) Brain gain

Celebrating 50 years of Software Engineering and 40th anniversary of ICSE

*Ivica Crnkovic, Marsha Chechik,
and Mark Harman*

This year is special for ICSE: while it reaches its 40th anniversary, it also celebrates 50 years of software engineering. This gives us an opportunity to look back over the incredible role that software is now playing in our daily lives and to reflect on the impact that software engineering had on this development. This also gives us a unique opportunity to meet the pioneers of software engineering who were first to recognize the needs for a systematic engineering approach in software development, and to meet many researchers that were building up and fostering the ICSE community over the 40+ years of its existence.

Our priority in organizing ICSE 2018 was to utilize these opportunities and make the conference unique and memorable. In addition, our goals were, on one hand, ensuring the highest possible quality of papers, keeping up with the ICSE tradition of excellence and aiming for a continuous improvement and, on the other hand, introducing new elements that will make the conference richer, modern, innovative. Here are some of our goals we wanted to achieve.

Rigorous quality criteria. ICSE is known for its focus on quality. A significant effort was put in selecting the very best program com-

The 40th ICSE - Fact Sheet

Dates:	May 27–June 3, 2018
City:	Gothenburg, Sweden
Venue:	Gothia Towers
General Chair:	Ivica Crnkovic
Program Chairs:	Marsha Chechik and Mark Harman
Conference	
Chair:	Michel Chaudron

mittee members (e.g., we built a giant matrix with 60 topics and an estimated expertise of hundreds of potential Program Board and Program Committee members), in setting up the review process with the PB reading all reviews and suggesting improvements (more than 5000 comments/emails have been exchanged between the reviewers), and in ensuring that all reviewers have proper and useful comments for the authors, as well as suggestions for improving their papers.

Double blind review. ICSE 2018 has introduced double-blind reviewing (DBR) in the main track and several other tracks. In the Technical paper track, DBR was applied “heavily”, i.e., all the way until the accepted papers were announced. Since DBR has been applied on such a large scale (the technical track received 502 submissions), we had to be very careful about the procedure, with the aim of being consistent and ensuring the highest quality of the review process. We also allowed the authors to engage in the rebuttal process with the reviewers (this practice was introduced in earlier editions of ICSE), in order to improve the overall acceptance of the review process and our confidence in the relevance of the reviews.

Inclusiveness rather than exclusivity. We aimed to be as inclusive as possible in allowing researchers and practitioners to participate in the conference, including publishing their results in different forums. Specifically, we have extended the poster session concept introduced at ICSE 2017. Researchers whose papers had valuable contributions but were not accepted in the regular tracks have been given a possibility to publish extended abstracts of their work and present posters at

the conference. Some tracks, e.g., Software Engineering in Practice, allowed a submission of talk proposals, aimed at practitioners who have less experience and/or opportunity to write research papers, but whose findings can be very important to our community.

Industrial participation. ICSE is seeking to include an active participation of practitioners. A new venture for ICSE 2018 is the *Industry Forum*, a one-day event aimed at creating synergy between new industrial participants and ICSE researchers. It has a specific program, with talks of interest to both practitioners and researchers, aimed to foster an interaction between them. While this report is written before the conference, we already know that the industry engagement in the Software Engineering in Practice track is the highest in the history of ICSE.

50 years and Software Engineering, and 40th anniversary of ICSE. We are fortunate to be able to organize a full-day event celebrating this important milestone in the history of software engineering. Pioneers of software engineering who created foundations and defined directions for the development of SE, ICSE organizers from the previous years, and other noted guests will give a perspective on Software Engineering – what we can learn from the last 50 years of SE and where the future of SE might lie. We also look forward to the outstanding keynotes. The first one is by Margaret Hamilton, who introduced software engineering at NASA leading the development of on-board flight software for Apollo Moon missions and giving software an extended role in a system control and quality assurance. The second one is by Fred Brooks, one of the most influential researchers in Software Engineering, known, among many other accomplishments, for his book *The Mythical Man-Month*.

Personal experience. ICSE 2018 is a very large operation which would not be possible without a dedicated involvement of many people. More than 500 researchers were involved in the realisation of the main tracks of the conference. In addition, ICSE 2018 has 32 workshops associated with it, with 400+ committee members, and 6 co-located events, with over 200 program committee members and organizers. During the conference, 50 student volunteers will help in the operations. And the core support group, the organising committee, counts 52 people. So, it really takes a village to put this together!

There is a reason why one would organize ICSE at most once in his/her lifetime. It is the most demanding effort that a researcher can offer in serving his/her community. (Too many) hours have been spent selecting the best people to serve on committees and give keynotes, in designing and running the review processes, in marketing the events, in kick-starting and following up on the many different events, in engaging with industry, and finally ensuring a prefect logistic for the entire event. ICSE 2018 has been a significant part of our lives all the way since 2013. During this time, we met many amazing people, witnessed hard work and dedication from other members of the community, heard many brilliant ideas and suggestions, and our lives have been enriched by this experience. We are indeed proud to be able to serve the community, and contribute to the research field, and, hopefully, to the society as well. Our thanks go to everyone who contributed to the success of this event and to our families for providing the much needed support.

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A History of the ICSE Most Influential Paper of ICSE N-10 Award

*Leon J. Osterweil, Barry W. Boehm,
and Dewayne E. Perry*

The Most Influential Paper of ICSE N-10 (ICSE MIP) Award is presented at the International Conference on Software Engineering (ICSE) to the paper, presented the tenth preceding ICSE, that is adjudged to have had the greatest impact on the software engineering community since the paper's presentation. The ICSE MIP has been awarded at nearly every ICSE since ICSE 11 in 1989. It is now one of the most coveted recognitions given by the Software Engineering research community. Since 1989 the idea of recognizing impact retrospectively (usually over the past 10 years) has been emulated increasingly widely. Other Software Engineering venues now also have Impact Awards, and such awards are now given by many other Computer Science communities, where they are also among the most coveted recognitions. But, the idea of these other 10-year retrospective awards seems to have originated with ICSE, and has been copied and adapted in various ways from our original idea. As this is one of ICSE's broader impacts it seems appropriate to document its origin. To be very specific, the idea of the ICSE MIP came up at the ICSE 11 Program Committee meeting when the subject of a Best Paper award came up. Lee Osterweil raised the question of what this award was to be given for. Was it to be a recognition of

the smartest idea, of the best writing, of the broadest applicability, or some combination of all of these, and perhaps others. Another Program Committee member suggested that it would be important to hear all of the paper presentations because presentation quality was important to this person. Being frustrated by all this, Osterweil stated that as far as he was concerned it would take about 10 years to know which paper was “Best” because that depended upon the impact that it had had and that would take at least 10 years to determine. He then suggested that ICSE give an award retrospectively to that paper that had been given at the ICSE that took place 10 years earlier, and that had had the greatest impact on the software engineering community. Barry Boehm then observed that since the committee was planning ICSE 11, it might be even better to give the award retrospectively to a paper presented at the tenth previous ICSE, in this case, ICSE 1 (actually The First National Conference on Software Engineering, NCSE 1). The committee liked the idea and agreed that such an award should be given.

A small contingent examined the NCSE 1 proceedings and found a paper written by Mark J. Rochkind, “The Source Code Control System”, describing SCCS, a system that had been built at Bell Labs. It was agreed that this paper, outlining the idea of source code control, and documenting a real system for doing it, should get the award. Since Rochkind had long since disappeared from our community, some sleuthing was required to track down Dr. Rochkind and let him know he had won this award, which he gratefully accepted at ICSE 11.

The permanence of this award was secured through its continued advocacy over the succeeding several ICSEs. Most notably Prof. Dewayne Perry took charge of the selection and awarding of the ICSE MIP for the next several ICSEs. Doubtless the immediate and continuing advocacy of the importance of this kind of recognition by Profs. Perry, Osterweil, and Boehm contributed greatly to the continued growth in enthusiasm and support for it, and for its becoming the fixture that it is today in our community and beyond.