



# Advance Program ICSE 2001

**23rd International Conference  
on Software Engineering**

**Westin Harbour Castle Hotel  
Toronto, Ontario, Canada  
May 12-19, 2001**

**<http://www.csr.uvic.ca/icse2001/>**

Released on April 10, 2001



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## Westin Harbour Castle Hotel

All paper sessions, tutorials, workshops, and exhibits are held entirely within the Westin Harbour Castle Hotel Complex and Conference Center. This beautiful hotel property is situated directly on the lake front overlooking Lake Ontario, and provides ample meeting and guestroom space for the entire conference. It is also located just a few blocks away from the heart of downtown Toronto, which abounds in restaurants, theaters, shopping and other activities. There is also very convenient and efficient public transportation within a few blocks of the hotel which places the entire city within easy reach.

All guest rooms feature individual climate control, two telephones, remote control cable TV with free and pay-per-view movies, minibars, and many other amenities. Smoking and non-smoking rooms are available. The hotel also has excellent indoor recreational facilities, including a pool, sauna and exercise room. It also features three fine restaurants. The Toulà is a newly opened, fine italian restaurant on the 38th floor atop the south tower of the hotel, which provides a panoramic view of the city and lake. The Mizzen offers first class service and opens seven days a week for breakfast, lunch, and dinner. The Chartroom Bar and Lounge are located adjacent to the main lobby.



## Westin Harbour Castle Hotel

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## *Welcome to ICSE 2001 Software Engineering Week in Toronto!*

Today, the engineering of software profoundly impacts world economics. For example, the desperate demands by all information technology sectors to adapt their information systems to the web has generated a tremendous need for methods, tools, processes, and infrastructure to develop new and evolve existing applications efficiently and cost-effectively.

ICSE 2001, the premier conference for software engineering will feature the latest inventions, achievements, and experiences in software engineering research and practice, and will give researchers, practitioners, and educators the opportunity to present, discuss, and learn. The ICSE 2001 Software Engineering Week, May 12–19, 2001 consists of the main ICSE conference and over 50 tutorials, workshops, collocated conferences, and symposia. The conference venue is the Westin Harbour Castle overlooking Lake Ontario in downtown Toronto, with restaurants, theaters, shopping and plenty of other activities.

The main ICSE 2001 program includes 47 technical papers, eight case-study reports, six education papers, an invited industry track, nine formal research demonstrations, and four panels. The program also contains six plenary sessions with outstanding invited keynote speakers. The main ICSE 2001 program also contains two new features: Challenges and Achievements in Software Engineering (CHASE), in which each session offers both research and industrial views of the same topic; and Frontiers of Software Practice (FoSP), which provides mini-tutorials on new and promising software technologies. Throughout the conference, there are also exhibits, posters, and informal research demonstrations. Finally, the conference features three casual receptions with great food and entertainment to give all an opportunity to meet and mingle with old and new friends.

Prior to the main ICSE 2001 program, there are 22 tutorials (full day and half day) on a variety of topics and 18 workshops that offer an informal forum for interaction. There are also three special symposia: the David L. Parnas Symposium, the New Software Engineering Faculty Symposium, and the Doctoral Symposium. Finally, both prior to and immediately following the main ICSE 2001 program, there are four collocated conferences: International Workshop on Program Comprehension (IWPC 2001); Engineering for Human-Computer Interaction (EHCI 2001); Symposium on Software Reusability (SSR 2001); and Spin Workshop on Model Checking of Software (SPIN 2001).

We hope that you will find time during this busy Software Engineering Week to explore the beautiful city of Toronto with its restaurants, theaters, shopping and plenty of other activities.

We cordially invite you to participate in ICSE 2001 to help us exchange ideas and experiences in this ever expanding and critical field of software engineering.

*Hausi A. Müller*

*Mary Jean Harrold*

*Wilhelm Schäfer*



Hausi A. Müller  
General Chair



Mary Jean Harrold  
Program Co-Chair



Wilhelm Schäfer  
Program Co-Chair



Association for Computing Machinery  
Special Interest Group on  
Software Engineering  
Special Interest Group on  
Programming Languages



IEEE Computer Society  
Technical Council on  
Software Engineering

CN Tower on Lake Ontario



## City of Toronto

Toronto is a clean, safe, cosmopolitan city with a wonderful network of parks, recreational, and cultural facilities. Toronto is the home of four professional sports teams and the third largest English-speaking theatre district in the world, behind New York and London. One of the world's most ethnically diverse cities, it is home to more than 80 ethnic communities from Africa, Asia, and Europe. Toronto is also the business centre of Canada. Exciting, vibrant and cosmopolitan, Metropolitan Toronto with a population of approximately 2.5 million people, reigns as Canada's largest city, the capital of the Province of Ontario, and Canada's cultural, financial and transportation hub. Metro Toronto is within a one hour drive for about five million Canadians, and is 90 minutes by air for about 60 per cent of the population

of the United States. Toronto is home to the CN Tower, the world's tallest free standing structure; two-time World Champion Blue Jays baseball team; SkyDome, the world's first retractable roof stadium; Ontario Place, which features the first permanent giant-screen IMAX theatre, a Canadian invention; and is in close proximity to the Niagara region featuring Niagara falls. Please find more details at <http://www.csr.uvic.ca/icse2001/toronto.html>.

## Entering Canada

A passport is preferred, but is not necessary, for U.S. visitors entering Canada. U.S. citizens should have their birth certificate or citizenship certificate as well as a picture ID; permanent residents (who are not citizens) need their alien-registration card and passport. Citizens from all countries other than the US must have a valid passport, and in some cases a visitor visa may be required. Canadian customs regulations apply for all personal and business travel into Canada. For most travelers, they may clear customs with their personal goods and belongings at the airport in Toronto. Please check your local customs regulations if you are planning on taking Canadian purchases home with you.

## Air Transportation and Discount Airfare

Air Canada and many US and international carriers provide direct flights to Toronto's Lester B. Pearson International Airport (YYZ) from major cities in North and South America, Europe, the Orient, and the Pacific Rim. Conference discounted airfares are currently available with:

- Air Canada, +1-800-361-7585, convention number CV931642

## Ground Transportation

The downtown Toronto hotels are approximately 13 km (8 miles) from Lester B. Pearson International Airport. The Pacific Western Airport Express bus to downtown hotels usually operates every 20 minutes and costs CAD\$12.50. The fixed-rate taxi/limo fares to downtown are about CAD\$36.

## Currency

Money may be exchanged at a favorable rate at the Westin Harbour Castle Hotel or at nearby banks. Shops and restaurants will often accept U.S. currency, but at a less favorable exchange rate. *Note, however, that all registration, short course, tours and luncheon or dinner fees paid at the conference will be collected in US dollars.*

## Sales Taxes and Sales Tax Rebate

Most items in Ontario, except food, are subject to both a 7% Provincial Sales Tax (PST) and a 7% federal Goods and Services Tax (GST). Non-residents of Canada, however, may claim a rebate for the GST paid on accommodation and most consumer goods taken out of the country. The GST Rebate Guide for Visitors, which includes the rebate form, will be supplied in the registration package. Please ensure that you retain all your receipts so that you can claim your rebate at a Duty Free Shop as you leave the country.

## More Information

Visit <http://www.csr.uvic.ca/icse2001/travel.html> and find out more details about all the above topics as well as many more informative hyperlinks.



## Sponsoring Organizations



### IEEE Computer Society

<http://www.computer.org/>

The IEEE Computer Society is the oldest and largest association of computer professionals in the world. It offers over 90,000 members a comprehensive program of publications, meetings, and technical and educational activities, fostering an active exchange of information, ideas, and innovation. The society is the world's leading publisher of technical material in the computing field. No other professional or commercial organization comes close to matching the Computer Society in terms of the quality, quantity, or diversity of its publications. Headquartered in Washington, DC, the society serves its members from offices in Los Alamitos, CA; Tokyo, Japan; and Brussels, Belgium. The society is the largest technical society within the Institute of Electrical and Electronics Engineers.



### IEEE Computer Society Technical Council on Software Engineering

<http://www.tcse.org/>

The Technical Council on Software Engineering (TCSE) is the IEEE Computer Society's coordinating body for innovative programs and services in software engineering. TCSE is at the forefront of information exchange and support for both practitioners and researchers throughout the software engineering field.



### Association for Computing Machinery

<http://www.acm.org/>

The Association for Computing Machinery (ACM), is the world's oldest and largest educational and scientific computing society. With a worldwide membership of 80,000 IT practitioners and academics, the ACM is the premier forum for all those that wish to keep abreast of the latest information, trends and developments in the IT industry. ACM offers its members an unprecedented number of publications, conferences, tutorials, and special interest groups.



### ACM SIGSOFT Special Interest Group on Software Engineering

<http://www.acm.org/sigsoft/>

ACM SIGSOFT focuses on issues relating to all aspects of software engineering, providing a forum for computing professionals from industry, government and academia to examine principles, practices, education, and new research results in software engineering. In addition to ICSE, SIGSOFT sponsors the Foundations of Software Engineering conference and a variety of one-time and on-going workshops that bring practitioners, researchers, and educators together to discuss and debate timely issues. SIGSOFT publishes a bimonthly newsletter, Software Engineering Notes, which includes articles submitted by members as well as the popular forum "The Risks Digest", which describes software safety mishaps and concerns.

## Cooperating Organizations



### ACM SIGPLAN Special Interest Group on Programming Languages

<http://www.acm.org/sigplan/>

## Corporate Sponsors

- ACD Systems  
<http://www.acdsystems.com/>
- Alberta Software Engineering Research Consortium (ASERC)  
<http://www.aserc.ab.ca/>
- Avaya Communication  
<http://www.avaya.com/>
- Bell Canada  
<http://www.bell.ca/>
- National Research Council of Canada  
<http://www.nrc.ca/>
- Cisco Systems  
<http://www.cisco.com/>
- Communications and Information Technology Ontario (CITO)  
<http://www.cito.ca/>
- IBM Toronto Laboratory  
<http://www.cas.ibm.ca/>
- Alberta Informatics Circle of Research Excellence (iCore)  
<http://www.icore.ca/>
- MacDonald Dettwiler  
<http://www.mda.ca/>
- Microsoft Research  
<http://www.research.microsoft.com/>
- Nokia  
<http://www.nokia.com/main.html>
- Rational Software  
<http://www.rational.com/>
- Software Productivity Center Inc. (SPC)  
<http://www.spc.ca/>
- Sun Microsystems  
<http://www.sun.ca/>

## Supporting Organizations

- Consortium for Software Engineering Research, Canada  
<http://www.cser.ca/>
- Carnegie Mellon Software Engineering Institute, USA  
<http://www.sei.cmu.edu/>
- Georgia Institute of Technology, USA  
<http://www.cc.gatech.edu/>
- University of Alberta, Canada  
<http://www.cs.ualberta.ca/>
- University of Paderborn, Germany  
<http://www.uni-paderborn.de/>
- University of Toronto, Canada  
<http://www.cs.utoronto.ca/>
- University of Victoria, Canada  
<http://www.csc.uvic.ca/>
- University of Waterloo, Canada  
<http://www.math.uwaterloo.ca/>



# CONFERENCE OVERVIEW

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## Registration

ICSE 2001 registration started on *January 23, 2001*. Make sure to register early as registration fees will rise after *April 12, 2001*. For more details and for downloading the pdf registration form or online registration, please visit <http://www.csr.uvic.ca/icse2001/registration.html>.

## Room Assignments

Meeting rooms have been assigned for most of the conference events. Room assignments are marked by a leading "@" (e.g. "@Frontenac"). However, meeting room assignments are subject to change. Please confirm the final room assignments at the conference.

ICSE 2001 at a Glance	Sun May 13	Mon May 14	Tue May 15	Wed May 16	Thu May 17	Fri May 18
Keynotes			@Frontenac	@Frontenac	@Frontenac	@Frontenac
Tutorials	see schedule on Page 8	see schedule on Page 9	see schedule on Page 10			
Workshops	see schedule on Page 8	see schedule on Page 9	see schedule on Page 10			
Technical Papers (TP)				see schedule on Page 11	see schedule on Page 12	see schedule on Page 13
Education Papers (EDU)				@Pier 7 & 8		
Invited Industry Presentations (IIP)				@Frontenac		
Frontiers of Software Practice (FoPS)				see schedule on Page 11		see schedule on Page 13
Challenges and Achievements in SE (CHASE)					@Queen's Quay	
Case Study Reports (CSR)					@Frontenac	
Formal Demos (FD)					@Pier 7 & 8	
Awards Presentations					@Frontenac	
Doctoral Symposium		@Dockside IV				
David Lorge Parnas Symposium			@Pier 4			
New SE Faculty Symposium			@Pier 2 & 3			
Perspectives on SE Panel (PoSE)						@Frontenac
SE Research Agendas Panel (SERA)						@Frontenac
Speaker's Breakfast				@Pier 6	@Pier 6	@Pier 6
Lunches		@Metro East	@Harbour Ballroom A & B & C	@Harbour Ballroom	@Metro East	
Receptions			@Harbour Ballroom and @Pier 2 & 3	@Harbour Ballroom and @Pier 2 & 3	@Harbour Ballroom	
Internet Cafés		@Bay	@Bay and @Pier 2 & 3 (see schedule on Page 39)			
Exhibits, Posters, and Informal Demos (EPIC)			@Pier 2 & 3 (see schedule on Page 39)			
Registration Desk	@CL-STF Foyer and @Frontenac Foyer alternate (see schedule on Page 8)					
Conference Office	@Wellington					



## Plenary Sessions

ICSE 2001 welcomes several outstanding plenary speakers:

- Daniel Sabbah
- Mary Shaw
- Robert Balzer
- Bernd Voigt
- Linda M. Northrop
- David M. Weiss
- Frederick P. Brooks, Jr.

## Tutorials

ICSE 2001 offers 22 tutorials with a broad range of topics. The full-day or half-day tutorials provide the opportunity to gain new insights, knowledge, and skills in a broad range of areas of software engineering.

## Workshops

18 workshops serve as formal forums to exchange opinions on topics in research and practice of software engineering. Workshops are offered as one-day or two-day events.

## Doctoral Symposium

Ph.D. students present their research objectives, methods, and preliminary results at an early enough stage to allow useful guidance for their further work and future careers.

## David Lorge Parnas Symposium (DLPS)

Come and help *"Thinking Hard About Software"*: A symposium in recognition of the work of David Lorge Parnas in honor of his 60<sup>th</sup> birthday.

## New SE Faculty Symposium

This morning symposium brings together faculty who have survived their early years with new and junior faculty. The main goal is to share and exchange ideas on practical methods for having a successful and fulfilling academic career.

## Panels

ICSE 2001 panel topics include pressing issues in theory and practice of software engineering, emerging trends, enabling technologies, and professional, organizational, and social issues associated with software engineering.

- SE Body of Knowledge Panel
- Impact Project Panel
- Perspectives on SE Panel
- SE Research Agendas Panel

## Technical Papers (TP)

The main ICSE 2001 program contains 47 technical papers that report on a full range of topics, including software engineering principles, theories, techniques, tools, and empirical evaluations.

## Invited Industry Presentations (IIP)

ICSE 2001 features an industrial track with invited presentations to discuss leading-edge software technology in practice.

## Frontiers of Software Practice (FoSP)

The FoSP sessions, a new feature of ICSE 2001, are mini-tutorials on new and promising software technologies.

## Challenges and Achievements in SE (CHASE)

The CHASE sessions, another new feature of ICSE 2001, offer both research and industrial views of the same topic.

## Case Study Reports (CSR)

Case study reports give an account of a significant project, with a critical review, and summary of lessons learned. These reports provide deep insights useful for future projects.

## Education Papers (EDU)

Proper software engineering education and training can significantly improve the current state of software development. ICSE 2001 themes include Ph.D. programs, distance education and training, and curriculum issues such as the SWEBOK project.

## Formal Research Demos (FD)

Formal research demonstrations show research systems in action. Use the opportunity to discuss the systems with their creators.

## Internet Cafés

The ICSE 2001 Internet Cafés provide central zones for meetings, discussions, and collaboration of researchers and developers from around the world.

## Exhibits

ICSE 2001 provides a hall for publishers, commercial exhibits, posters, and academic research demonstrations. The commercial exhibits feature leading companies offering software engineering capabilities and tools, education and training, books and journals, and consulting services.

## Collocated Events

Both prior to and immediately following the main ICSE 2001 program, there are four collocated conferences:

- IWPC 2001
- EHCI 2001
- SSR 2001
- SPIN 2001

## Receptions

ICSE 2001 features three casual receptions in and around the exhibits area with great food and entertainment to give all an opportunity to meet and mingle with old and new friends.

# CONFERENCE SERVICES AND SCHEDULE

## Conference Office

If you need assistance during the conference, the ICSE 2001 organization team in the *Wellington* room will be happy to help you.

## Registration Desk

During the conference, you can register at the Registration Desk, which is located in the *Frontenac Foyer* or the *Convention Level South Tower Foyer (CL-STF)*.

Schedule for Registration Desk		
Sunday, May 13	7:30 am–5:30 pm	@CL-STF
Monday, May 14	7:30 am–5:30 pm	@CL-STF
Tuesday, May 15	7:30 am–3:30 pm 3:30 pm–5:30 pm	@CL-STF @Frontenac Foyer
Wednesday, May 16	7:30 am–5:30 pm	@Frontenac Foyer
Thursday, May 17	7:30 am–5:30 pm	@Frontenac Foyer
Friday, May 18	7:30 am–5:00 pm	@Frontenac Foyer

## Child Care

Custom Comfort Care Inc. is a nursing resource that offers Care in a Crunch service, childcare for conference attendees who plan to bring their dependants with them. The caregivers are from nursing and ECE professions and have been trained to handle any health emergency. Basic services for a conference includes a minimum of two trained careproviders. The Day Nurseries Act requires staffing allocations for care of children according to the ages of the children in the group. Information required from conference attendees includes: name, hotel, room number, phone number, number of children and their ages, and pool supervisor. To book care, please call +1-416-698-3356 at least 4 hours prior.

Sunday, May 13, 2001			
7:30–8:30	Breakfast @Harbour Foyer	Registration Desk @CL-STF Foyer	
8:30–10:00	Full Day Tutorials T1 UML for Software Engineers @Pier 4 T2 The Intertwining between Risk and Project Management @Yonge	Morning Tutorials T3 Methods of Component-Based Software Engineering: Essential Concepts and Classroom Experience @Bay	Workshops W1 2nd International Workshop on Living with Inconsistency @Pier 2 W2 4th ICSE Workshop on Software Engineering over the Internet @Queen's Quay 2 W3 2nd ICSE Workshop on Software Product Lines: Economics, Architectures, and Implications @Dockside IV W4 2nd International Workshop on Automated Program Analysis, Testing, and Verification (WAPATV) @Pier 3 W5 Software Engineering and Mobility @Pier 9 W6 Software Visualization @Queen's Quay 1
10:00–10:30	Nutrition Break @Harbour Foyer	Registration Desk @CL-STF Foyer	
10:30–12:00	Full Day Tutorials continued	Morning Tutorials continued	Workshops continued
12:00–2:00	Lunch @Harbour Ballroom A & B	Registration Desk @CL-STF Foyer	
2:00–3:30	Full Day Tutorials continued	Afternoon Tutorials T4 From Use Cases to Code—Rigorous Software Development with UML @Bay	Workshops continued
3:30–4:00	Nutrition Break @Harbour Foyer	Registration Desk @CL-STF Foyer	
4:00–5:30	Full Day Tutorials continued	Afternoon Tutorials continued	Workshops continued





# CONFERENCE SCHEDULE

**Monday, May, 14, 2001**

<b>7:30–8:30</b>	<b>Breakfast</b> @Harbour and @Dockside Foyers		<b>Registration Desk</b> @CL-STF Foyer	
<b>8:30–10:00</b>	<b>Full Day Tutorials</b> <b>T5 OPEN: A Flexible OO/CBD Process for Software-Intensive Systems Development, a UML Exposition</b> @Pier 7 <b>T6 Describing Software Architecture with UML</b> @Pier 9 <b>T7 Software Product Lines and Software Architecture Design</b> @Pier 8	<b>Morning Tutorials</b> <b>T8 How to Do Inspections When There is No Time</b> @Pier 2 <b>T9 EasyWinWin: A Groupware-Supported Methodology for Requirements Negotiation</b> @Pier 3 <b>T10 Fundamental Concepts for Practical Software Architecture</b> @Pier 6 <b>T11 Introduction to Java 2 Micro Edition (J2ME): Java in Small Things</b> @Dockside III	<b>Workshops</b> <b>W5 continued @Harbour B</b> <b>W6 continued @Dockside I</b> <b>W7 Generative Techniques for Product Lines</b> @Queen's Quay 2 <b>W8 SEMINAL: Software Engineering using Metaheuristic INnovative ALgorithms</b> @Queen's Quay 1 <b>W9 From Software Requirements to Architectures (STRAW 2001)</b> @Yonge <b>W10 3rd Intl. Workshop on Net-Centric Computing: Migrating to the Web (NCC 2001)</b> @Pier 5 <b>W11 Global Aspects of Software Engineering Professionalism</b> @Harbour A <b>W12 3rd Intl. Workshop on Economics-Driven Software Engineering Research (EDSER)</b> @Pier 4 <b>W13 4th ICSE Workshop on Component-Based Software Engineering: Component Certification and System Prediction</b> @Dockside II <b>W14 10th Intl. Workshop on Software Configuration Management: New Practices, New Challenges, and New Boundaries (SCM 10)</b> @Harbour C	<b>Symposia</b> <b>A1 Doctoral Symposium</b> @Dockside IV Symposium chair: <u>M. L. Soffa</u> , University of Pittsburgh, USA
<b>10:00–10:30</b>	<b>Nutrition Break</b> @Harbour and @Dockside Foyers		<b>Registration Desk</b> @CL-STF Foyer	
<b>10:30–12:00</b>	<b>Full Day Tutorials</b> continued	<b>Morning Tutorials</b> continued	<b>Workshops</b> continued	<b>Symposia</b> continued
<b>12:00–2:00</b>	<b>Lunch</b> @Metro East		<b>Registration Desk</b> @CL-STF Foyer	
<b>2:00–3:30</b>	<b>Full Day Tutorials</b> continued	<b>Afternoon Tutorials</b> <b>T12 Improving Software Inspections by Using Reading Techniques</b> @Pier 2 <b>T13 Mining Components for a Software Architecture and a Product Line: The Options Analysis for Reengineering (OAR) Method</b> @Pier 3 <b>T14 Hyper/J™: Multidimensional Separation of Concerns for Java™</b> @Pier 6 <b>T15 Enterprise JavaBean Architecture and Design Issues: Avoiding JavaBean Soup</b> @Dockside III	<b>Workshops</b> continued	<b>Symposia</b> continued
<b>3:30–4:00</b>	<b>Nutrition Break</b> @Harbour and Dockside Foyers		<b>Registration Desk</b> @CL-STF Foyer	
<b>4:00–5:30</b>	<b>Full Day Tutorials</b> continued	<b>Afternoon Tutorials</b> continued	<b>Workshops</b> continued	<b>Symposia</b> continued

**Internet Café**  
@Bay, 12:00 pm – 5:30 pm



# CONFERENCE SCHEDULE

**Tuesday, May 15, 2001**

<b>7:30–8:30</b>	<b>Breakfast</b> @Harbour and @Dockside Foyers		<b>Registration Desk</b> @CL-STF Foyer	
<b>8:30–10:00</b>	<b>Full Day Tutorials</b>	<b>Morning Tutorials</b>	<b>Workshops</b>	<b>Symposia</b>
	<b>T16 State, Event, Time, and Diagram in System Modeling</b> @Pier 8	<b>T21 Bridging the Requirements/Design Gap in Dynamic Systems with Use Case Maps (UCMS)</b> @Pier 9	<b>W12 continued</b> @Dockside V	<b>A2 David Lorge Parnas Symposium (DLPS)</b> @Pier 4
	<b>T17 From UML to Java: Building a 3-Tier Architecture</b> @Pier 6		<b>W13 continued</b> @Dockside II	Symposium chairs: D. Weiss, Avaya Communication, USA D. Hoffman, University of Victoria, Canada
	<b>T18 Designing Concurrent, Distributed, and Real-Time Applications with UML</b> @Pier 7		<b>W14 continued</b> @Pier 5	<b>A3 New Software Engineering Faculty Symposium (morning only)</b> @Pier 2 & 3
	<b>T19 Using Transformation Systems for Software Maintenance and Reengineering</b> @Yonge		<b>W15 XML Technologies and Software Engineering (XSE 2001)</b> @Queen's Quay 2	Symposium chairs: L. Osterweil, University of Massachusetts, Amherst, USA; C. Silberman, Centre for Advanced Studies, Canada;
	<b>T20 Effective Software Architecture Design: From Global Analysis to UML Descriptions</b> @Dockside III		<b>W16 Describing Software Architecture with UML</b> @Dockside IV	K. Wong, University of Alberta, Canada
			<b>W17 Advanced Separation of Concerns in Software Engineering</b> @Dockside I	
			<b>W18 1st Workshop on Open Source Software Engineering</b> @Queen's Quay 1	
<b>10:00–10:30</b>	<b>Nutrition Break</b> @Harbour and Dockside Foyers		<b>Registration Desk</b> @CL-STF Foyer	
<b>10:30–12:00</b>	<b>Full Day Tutorials</b> continued	<b>Morning Tutorials</b> continued	<b>Workshops</b> continued	<b>Symposia</b> A2 continued
<b>12:00–2:00</b>	<b>Lunch</b> @Harbour Ballroom A & B & C		<b>Registration Desk</b> @CL-STF Foyer	
<b>2:00–3:30</b>	<b>Full Day Tutorials</b> continued	<b>Afternoon Tutorials</b>	<b>Workshops</b> continued	<b>Symposia</b> A2 continued
		<b>T22 Introduction to the Attribute Driven Design Method</b> @Pier 9		
<b>3:30–4:00</b>	<b>Nutrition Break</b> @Harbour and Dockside Foyers		<b>Registration Desk</b> @Frontenac Foyer	
<b>4:00–5:30</b>	<b>Full Day Tutorials</b> continued	<b>Afternoon Tutorials</b> continued	<b>Workshops</b> continued	<b>Symposia</b> A2 continued
<b>5:30–5:45</b>	<b>Break</b> @Frontenac Foyer		<b>Registration Desk</b> @Frontenac Foyer	
<b>5:45–7:00</b>	<b>S1 Closing for David L. Parnas Symposium (Open to all ICSE attendees)</b> @Harbour Ballroom			
	Software Fundamentals: The Ideas of David L. Parnas David Weiss, Avaya Communication, USA "Diogenes, Where Are You?" Frederick P. Brooks, Jr., University of North Carolina, Chapel Hill, USA Session chair: D. Hoffman, University of Victoria, Canada			
<b>7:00–9:00</b>	<b>S2 Reception – sponsored by ACD Systems</b> @Harbour Ballroom and Pier 2 & 3			

**Internet Café**  
@Bay, 7:30 am–9:00 pm

**EPIC**  
@Pier 2 & 3, 5:45 pm–9:00 pm



# CONFERENCE SCHEDULE

Wednesday, May 16, 2001				
7:30–8:30	<b>Breakfast</b> @Harbour and @Frontenac Foyers		<b>Speaker's Breakfast</b> @Pier 6	<b>Registration Desk</b> @CL-STF Foyer
8:30–10:00	<b>S3 Welcome and Keynote</b> @Frontenac Software Engineering and the Internet Daniel Sabbah, IBM Corporation, USA Session chair: <u>H. Müller</u> , University of Victoria, Canada			
10:00–10:30	<b>Nutrition Break</b> @Harbour and @Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer	
10:30–12:00	<b>S4 Technical Papers</b> @Pier 4 & 5  Design and Specification of Distributed Systems  Session chair: <u>A. Zündorf</u> , University of Paderborn, Germany	<b>S5 Technical Papers</b> @Queen's Quay  Static Analysis  Session chair: <u>J. Atlee</u> , University of Waterloo, Canada	<b>S6 Education Papers</b> @Pier 7 & 8  Practical Software Engineering Education  Session chair: <u>H. Saiedian</u> , University of Kansas, USA	<b>S7 Invited Industry Presentations</b> @Frontenac  Challenges in Software Development and Practice  Session chair: <u>D. Perry</u> , University of Texas at Austin, USA
12:00–1:10	<b>Lunch</b> @Harbour Ballroom		<b>Registration Desk</b> @Frontenac Foyer	
1:10–1:50	<b>S8 Frontiers of Software Practice</b> @Pier 4 & 5  Enabling Technologies for the Future of Voice-Based Web Access <u>S. Woods</u> , Quack.com, USA  Session chair: <u>S. Tilley</u> , University of California, Riverside, USA	<b>S9 Frontiers of Software Practice</b> @Queen's Quay  Jini™ Network Technology: Devices, Desires, and Designs <u>A. Ricciardi</u> , Valaran Corp., USA  Session chair: <u>G. Kaiser</u> , Columbia University, USA	<b>S10 Frontiers of Software Practice</b> @Frontenac  Simple Object Access Protocol (SOAP) and Web Services <u>A. Ryman</u> , IBM Canada Ltd., Canada  Session chair: <u>R. Holt</u> , University of Waterloo, Canada	<b>S11 Frontiers of Software Practice</b> @Pier 7 & 8  Auditing Legacy Systems for Security and Survivability <u>T. Longstaff</u> , Carnegie Mellon Software Engineering Institute, USA  Session chair: <u>P. Devanbu</u> , University of California, Davis, USA
1:50–2:00	<b>Break</b> @Harbour and @Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer	
2:00–3:30	<b>S12 Technical Papers</b> @Pier 4 & 5  Process Improvement for Multi-Site Environments  Session chair: <u>D. Berry</u> , University of Waterloo, Canada	<b>S13 Technical Papers</b> @Queen's Quay  Design Recovery and Program Understanding  Session chair: <u>G. Snelting</u> , University of Passau, Germany	<b>S14 Education Papers</b> @Pier 7 & 8  Degree Programs for Software Engineering Education  Session chair: <u>A. Finkelstein</u> , University College London, UK	<b>S15 Invited Industry Presentations</b> @Frontenac  Technology Drivers for Web and Mobile Phone Services  Session chair: <u>M. Aoyama</u> , Niigata Institute of Technology, Japan
3:30–4:00	<b>Nutrition Break</b> @Harbour and @Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer	
4:00–5:30	<b>S16 Technical Papers</b> @Pier 4 & 5  Effective Uses of Inspections  Session chair: <u>L. Briand</u> , Carleton University, Canada	<b>S17 Technical Papers</b> @Queen's Quay  Building Formal Analysis Tools  Session chair: <u>T. Ball</u> , Microsoft Research, USA	<b>S18 Education Papers</b> @Pier 7 & 8  SE Body of Knowledge Panel (SWEBOK)  Panel chair: <u>P. Freeman</u> , Georgia Institute of Technology, USA	<b>S19 Invited Industry Presentations</b> @Frontenac  Frontiers of Component Technologies  Session chair: <u>C. Hoffnagle</u> , IBM Corporation, USA
5:30–9:00	<b>S20 Reception – sponsored by IBM</b> @Harbour Ballroom and @Pier 2 & 3			

**Internet Café**  
 @Bay, 7:30 am – 9:00 pm

**EPIC**  
 @Pier 2 & 3, 7:30 am – 9:00 pm

# CONFERENCE SCHEDULE

**Thursday, May 17, 2001**

<b>7:30–8:30</b>	<b>Breakfast</b> @Harbour and Frontenac Foyers		<b>Speaker's Breakfast</b> @Pier 6		<b>Reg. Desk</b> @Frontenac Foyer
<b>8:30–10:00</b>	<b>S21 Technical Papers</b> @Pier 4	<b>S22 Technical Papers</b> @Pier 5	<b>S23 Case Study Reports</b> @Frontenac	<b>S24 Challenges and Achievements in SE</b> @Queen's Quay	<b>S25 Formal Demos</b> @Pier 7 & 8
	Dynamic Analysis and Testing  Session chair: <u>D. Rosenblum</u> , University of California, Irvine, USA	Construction of Component-Based Systems  Session chair: <u>D. Batory</u> , University of Texas at Austin, USA	Infrastructure Support  Session chair: <u>J. Kramer</u> , Imperial College, UK	Process-Centered Software Engineering Environments <u>R. Balzer</u> , Teknowledge Corporation, USA; and <u>V. Cruhn</u> , University of Dortmund, Germany  Session chair: <u>W. Schäfer</u> , University of Paderborn, Germany	Software Architecture  Session chair: <u>R. Keller</u> , University of Montréal, Canada
<b>10:00–10:30</b>	<b>Nutrition Break</b> @Frontenac Foyer		<b>Registration Desk</b> @Frontenac Foyer		
<b>10:30–11:30</b>	<b>S26 Keynote</b> @Frontenac  The Coming-of-Age of Software Architecture Research Mary Shaw, Carnegie Mellon University, USA Session chair: <u>M. J. Harrold</u> , Georgia Institute of Technology, USA				
<b>11:30–12:00</b>	<b>S27 ACM SIGSOFT and IEEE TCSE Award: Most Influential Paper from ICSE 13</b> @Frontenac  "Tolerating Inconsistency" Revisited Robert Balzer, Teknowledge Corporation, USA Session chairs: <u>M. J. Harrold</u> , Georgia Institute of Technology, USA; <u>W. Schäfer</u> , University of Paderborn, Germany				
<b>12:00–1:10</b>	<b>Lunch</b> @Metro East		<b>Registration Desk</b> @Frontenac Foyer		
<b>1:10–1:50</b>	<b>S28 Awards Presentations:</b> ACM Service, ACM Research, IEEE Computer Society Harlan D. Mills Award @Frontenac Session chairs: <u>ACM SIGSOFT and IEEE TCSE Chairs</u>				
<b>1:50–2:00</b>	<b>Break</b> @Harbour and Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer		
<b>2:00–3:30</b>	<b>S29 Technical Papers</b> @Pier 4	<b>S30 Technical Papers</b> @Pier 5	<b>S31 Case Study Reports</b> @Frontenac	<b>S32 Challenges and Achievements in SE</b> @Queen's Quay	<b>S33 Formal Demos</b> @Pier 7 & 8
	Reengineering and Software Evolution  Session chair: <u>J. Jahnke</u> , University of Victoria, Canada	Analysis of Architectures  Session chair: <u>N. Medvidovic</u> , University of Southern California, USA	Applications of New Paradigms in Software Development  Session chair: <u>D. Smith</u> , Software Engineering Institute, USA	Specification and Modeling <u>M. Broy</u> , University of Munich, Germany, and <u>B. Selic</u> , Rational, Inc., Canada  Session chair: <u>C. Engels</u> , University of Paderborn, Germany	Reuse and Integration  Session chair: <u>C. Heinemann</u> , Worcester Polytechnic Institute, USA
<b>3:30–4:00</b>	<b>Nutrition Break</b> @Harbour and Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer		
<b>4:00–5:30</b>	<b>S34 Technical Papers</b> @Pier 4	<b>S35 Technical Papers</b> @Pier 5	<b>S36 Case Study Reports</b> @Frontenac	<b>S37 Challenges and Achievements in SE</b> @Queen's Quay	<b>S38 Formal Demos</b> @Pier 7 & 8
	Improving the Testing Process  Session chair: <u>K. Inoue</u> , Osaka University, Japan	Mobile Agents  Session chair: <u>I. Ben-Shaul</u> , Technion-Israel Institute of Technology, VersEdge Technologies, Israel	Software Evolution  Session chair: <u>T. Lethbridge</u> , University of Ottawa, Canada	Impact Project Panel  Session chair: <u>L. Osterweil</u> , University of Massachusetts, Amherst, USA	Verification and Maintenance  Session chair: <u>E. Stroulia</u> , University of Alberta, Canada
<b>7:00–10:00</b>	<b>S39 Reception</b> @Harbour Ballroom				

Internet Café  
@Bay, 7:30 am –7:00 pm

EPIC  
@Pier 2 & 3, 7:30 am –7:00 pm



# CONFERENCE SCHEDULE

**Friday, May 18, 2001**

<b>7:30–8:30</b>	<b>Breakfast</b> @Harbour and @Dockside Foyers		<b>Speaker's Breakfast</b> @Pier 6	<b>Registration Desk</b> @Frontenac Foyer
<b>8:30–10:30</b>	<b>S40 Technical Papers</b> @Pier 4 & 5	<b>S41 Technical Papers</b> @Queen's Quay	<b>S42 Perspectives on SE Panel (PoSE)</b> @Frontenac	
	Analysis of Requirements  Session chair: <u>P. Tarr</u> , IBM T.J. Watson Research Center, USA	Formal Frameworks  Session chair: <u>K. Futatsugi</u> , JAIST, Japan	The Future of Software Engineering  Panel chair: <u>D. Notkin</u> , University of Washington, USA	
<b>10:30–11:00</b>	<b>Nutrition Break</b> @Frontenac Foyer		<b>Registration Desk</b> @Frontenac Foyer	
<b>11:00–12:00</b>	<b>S43 Keynote</b> @Frontenac  Software Engineering Challenges: A CIO's Perspective <u>Bernd Voigt</u> , Lufthansa, Germany  Session chair: <u>W. Schäfer</u> , University of Paderborn, Germany			
<b>12:00–1:10</b>	<b>Lunch</b> on your own		<b>Registration Desk</b> @Frontenac Foyer	
<b>1:10–1:50</b>	<b>S44 Frontiers of Software Practice</b> @Pier 4 & 5	<b>S45 Frontiers of Software Practice</b> @Queen's Quay	<b>S46 Frontiers of Software Practice</b> @Frontenac	<b>S47 Frontiers of Software Practice</b> @Pier 7 & 8
	Anti-Patterns in Software Architecture <u>T. Mobray</u> , World Wide Institute of Software Architects (WWISA), USA  Session chair: <u>M. A. Storey</u> , University of Victoria, Canada	Dependability of Embedded Systems <u>J. Knight</u> , University of Virginia, USA  Session chair: <u>A. Kark</u> , National Research Council, Canada	Inter-Language Object Sharing with the Common Language Runtime: Infrastructure for MS .NET <u>J. Hamilton</u> , Microsoft Corporation, USA  Session chair: <u>H. Müller</u> , University of Victoria, Canada	Collaborative Software Engineering <u>A. Brown</u> , Catapulte, Inc., USA  Session chair: <u>P. Sorenson</u> , University of Alberta, Canada
<b>1:50–2:00</b>	<b>Break</b> @Harbour and @Frontenac Foyers		<b>Registration Desk</b> @Frontenac Foyer	
<b>2:00–3:00</b>	<b>S48 Keynote</b> @Frontenac  Reuse That Pays <u>Linda M. Northrop</u> , Software Engineering Institute, USA  Session chair: <u>H. Müller</u> , University of Victoria, Canada			
<b>3:00–3:15</b>	<b>Nutrition Break</b> @Frontenac Foyer		<b>Registration Desk</b> @Frontenac Foyer	
<b>3:15–4:45</b>	<b>S49 Technical Papers</b> @Queen's Quay	<b>S50 SE Research Agendas Panel (SERA)</b> @Frontenac		
	Architecture for Emerging Applications  Session chair: <u>E. Di Nitto</u> , Politecnico di Milano, Italy	Panel chair: <u>D. Rombach</u> , Fraunhofer IESE, Germany		
<b>4:45–5:00</b>	<b>S51 ICSE 2001 Closing</b> @Frontenac  Session chair: <u>W. Tracz</u> , Lockheed Martin Federal Systems, USA			

**Internet Café**  
@Bay, 7:30 am – 2:00 pm

**EPIC**  
@Pier 2 & 3, 7:30 am – 2:00 pm

## Keynote Speakers



### Daniel Sabbah

Vice President Application and Integration Middleware Division  
IBM Corporation, USA  
Photo courtesy of IBM

Dr. Sabbah is the Vice President, Development, Application and Integration Middleware (AIM) Division of IBM. He manages software development for all application server, messaging, and development tools in IBM's portfolio. This is a group that spans over 9 locations worldwide with over 4000 software developers that produce the Websphere platform, CICS, all MQ Series products and the VisualAge tools across a base of 9 or more operating system platforms. Prior to that, he was vice president architecture and tools development where he was responsible for the architecture and strategy for IBM's application development tools as well as IBM's overall web application servers and business integration software. He began his career at IBM in 1974 in telecommunications software (VTAM) in Kingston, New York. He received his Ph.D. in Computer Science from the University of Rochester in 1981, specializing in artificial intelligence and computer vision. He returned to the IBM Research Division and was responsible for the artificial intelligence effort, then programming languages, and finally for software technology. Dr. Sabbah has direct experience in both product development and in software research.



### Mary Shaw

Alan J. Perlis Professor  
of Computer Science  
Carnegie Mellon University, USA  
<http://www.cs.cmu.edu/~shaw/>  
Photo courtesy of Carnegie Mellon University

Mary Shaw is the Alan J. Perlis Professor of Computer Science at Carnegie Mellon University. She has been a member of this faculty since completing the Ph.D. degree at Carnegie-Mellon in 1972. She had previously earned a B.A. (cum laude) from Rice University and worked in systems programming and research at the Research Analysis Corporation and Rice University. Her research interests in computer science lie primarily in the areas of programming systems and software engineering, particularly software architecture, programming languages, specifications, and abstraction techniques. She has participated in developing innovative curricula in Computer Science from the introductory to the doctoral level. Dr. Shaw has received the Warnier prize for contributions to software engineering and is a Fellow of the Association for Computing Machinery, the Institute for Electrical and Electronics Engineers, and the American Association for the Advancement of Science.



### Bernd Voigt

Senior Vice President and  
Chief Information Officer  
Lufthansa, Germany  
Photo courtesy of Lufthansa

Before joining Lufthansa in 1992, Bernd Voigt was doing research and teaching mathematics at various German universities. At Lufthansa, he directed the Frankfurt office of Lufthansa Informationstechnik und Software GmbH Berlin, and formed the new Competence Center Decision Support Technology at Lufthansa Systems GmbH. In 1995, he founded in Budapest, Hungary, the Lufthansa subsidiary Lufthansa Systems Hungary Kft. From 1996 to 1998, he was managing director of Lufthansa Systems Berlin GmbH. Since the beginning of 1999, he has been Senior Vice President and Chief Information Officer of Lufthansa German Airlines.



### Linda M. Northrop

Director, Product Line Systems Program  
Software Engineering Institute, USA  
<http://www.sei.cmu.edu/staff/lmn/>  
Photo courtesy of the Software Engineering Institute

Linda Northrop has over 30 years of experience in the software development field as practitioner, manager, consultant, and educator. She is currently director of the Product Line Systems Program at the Software Engineering Institute (SEI). The Product Line Systems Program works in the areas of software architecture, reengineering, component and product line engineering. Her current publications are in the areas of software product lines, software architecture, and object technology. She is a frequently invited speaker at technical conferences and was featured in a television special on object technology aired by the British Broadcasting Company. Before joining the SEI, she was associated with both the United States Air Force Academy and the State University of New York as professor of computer science and with both Eastman Kodak and IBM as a software engineer. As a private consultant, Linda also worked for an assortment of companies covering a wide range of software systems. She recently chaired the first Software Product Line Conference. Linda is an eight-year member of the OOPSLA Organizing Committee, was OOPSLA '99 Technical Program Chair, and is OOPSLA '2001 Conference Chair. She is also a member of the ACM and the IEEE Computer Society, and the Computer Science Accreditation Commission.

## Closing for DLPS



### David M. Weiss

Director of Software  
Technology Research  
Avaya Laboratories, USA

David M. Weiss is Director of Software Technology Research at Avaya Laboratories, where he conducts and guides research into ways of improving the effectiveness of software development. Formerly he was Director of Software Production Research at Bell Laboratories. He has also served as CTO of PacerLine Technologies and as Director of Reuse and Measurement at the Software Productivity Consortium. At the Congressional Office of Technology Assessment he was co-author of an assessment of the Strategic Defense Initiative, and he was a visiting scholar at The Wang Institute. He originated the GQM approach to software measurement as his PhD thesis at the University of Maryland, was a member of the A-7 project at the Naval Research Laboratory, and devised the FAST process for product-line engineering. He has also worked as a programmer and a mathematician.

### Frederick P. Brooks, Jr.

ACM Turing Award Recipient  
University of North Carolina  
Chapel Hill, USA

<http://www.cs.unc.edu/~brooks/>

Photo copyright by Jerry Markatos

Frederick P. Brooks, Jr., is Kenan Professor of Computer Science at the University of North Carolina at Chapel Hill. He was an architect of the IBM Stretch and Harvest computers. He was corporate project Manager for the System/360, including development of the System/360 computer family hardware, and the Operating System/360 software. He founded the Department of Computer Science, University of North Carolina, in 1964 and chaired it for 20 years. His research includes computer architecture, software engineering, and interactive 3-D computer graphics (virtual reality). His best-known books are *The Mythical Man-Month: Essays on Software Engineering*, and *Computer Architecture: Concepts and Evolution* (with G.A. Blaauw, 1997). Dr. Brooks has received the National Medal of Technology, the Bower Award and Prize of the Franklin Institute, the John von Neumann Medal of the IEEE, and the Allen Newell and Distinguished service awards of the ACM.

## ACM SIGSOFT and IEEE TCSE Award



### Robert Balzer

Chief Technical Officer and  
Director of Distributed Systems Unit  
Teknowledge Corporation, USA  
<http://www.teknowledge.com/>

Dr. Robert Balzer received his B.S., M.S., and Ph.D. degrees in Electrical Engineering from the Carnegie Institute of Technology, Pittsburgh, Pennsylvania, in 1964, 1965, and 1966, respectively. After several years at the Rand Corporation, he left to help form the University of Southern California's Information Sciences Institute (USC-ISI) where he served as Director of ISI's Software Sciences Division and Professor of Computer Science at USC from 1972 to 2000. Last year he joined Teknowledge Corporation as their Chief Technical Officer and Director of their Distributed Systems Unit. The Distributed Systems Unit combines artificial intelligence, database, and software engineering techniques to automate the software development process. Current research includes wrapping COTS products to provide safe and secure execution environments, extend their functionality, and integrate them together; instrumenting software architectures; and generating systems from domain specific specifications.

## Schedule

### Keynotes

#### Daniel Sabbah

Software Engineering and the Internet  
Session S3 @Frontenac  
Wednesday, May 16, 8:30 am–10:00 am

#### Mary Shaw

The Coming-of-Age of Software Architecture Research  
Session S26 @Frontenac  
Thursday, May 17, 10:30 am–11:30 am

#### Bernd Voigt

Software Engineering Challenges: A CIO's Perspective  
Session S43 @Frontenac  
Friday, May 18, 11:00 am–12:00 pm

#### Linda M. Northrop

Reuse That Pays  
Session S48 @Frontenac  
Friday, May 18, 2:00 pm–3:00 pm

### Closing for DLPS

#### David M. Weiss

Software Fundamentals: The Ideas of David L. Parnas

#### Frederick P. Brooks, Jr.

"Diogenes, Where Are You?"  
Session S1 @Harbour Ballroom  
Tuesday, May 15, 5:45 pm–7:00 pm

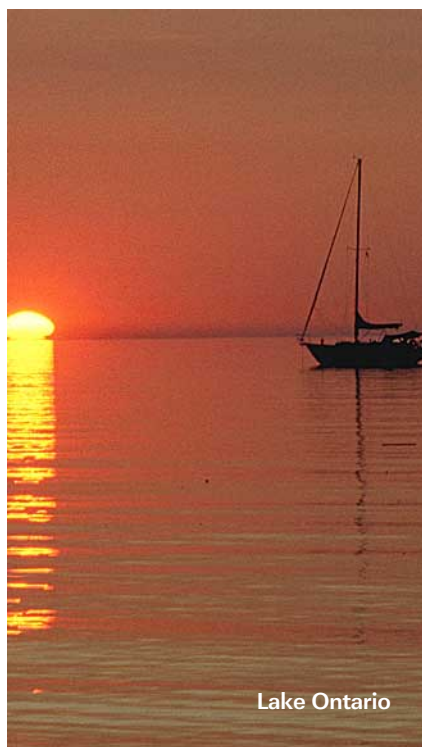
### ACM SIGSOFT and IEEE TCSE Award

#### Robert Balzer

"Tolerating Inconsistency" Revisited  
Session S27 @Frontenac  
Thursday, May 17, 11:30 am–12:00 pm

## At a Glance

7:30	<b>Breakfast</b> @Harbour Foyer
8:30–10:00	<b>Full Day Tutorials</b> T1, T2
	<b>Morning Tutorials</b> T3
	<b>Workshops</b> W1–W6
	<b>Nutrition Break</b> @Harbour Foyer
10:30–12:00	<b>Full Day Tutorials</b> continued
	<b>Morning Tutorials</b> continued
	<b>Workshops</b> continued
	<b>Lunch</b> @Harbour Ballroom A & B
2:00–3:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> T4
	<b>Workshops</b> continued
	<b>Nutrition Break</b> @Harbour Foyer
4:00–5:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> continued
	<b>Workshops</b> continued



Lake Ontario

## Full-Day Tutorials (8:30 am–5:30 pm)

### T1 @Pier 4

#### UML for Software Engineers

Robert France, Colorado State University, USA; and Cris Kobryn, Telelogic, Inc., USA; contact R. France, france@cs.colostate.edu

This tutorial assists participants in developing an understanding of UML with respect to its use for modeling software requirements and designs. The tutorial targets attendees familiar with basic object-oriented modeling principles and concepts. It covers both basic and some advanced features of the UML and gives an overview of efforts directed at restructuring UML to support the view of UML as a family of languages. A roadmap outlining the planned evolution of the UML is presented.

### T2 @Yonge

#### The Intertwining between Risk and Project Management

Karol Frühauf, INFOGEM AG, Switzerland; Karol\_Fruehauf@compuserve.com

This is a tutorial from a practitioner for software practitioners, especially software project leaders, software managers and software quality engineers. The participants should have some project experience in order to benefit fully from the material. Familiarity with process models for software development and with project management techniques is advantageous. Participants will learn how to integrate risk assessment principles and techniques with software project planning and controlling. The fundamental problems of software project management like what is a project (and not a process or a product) and what are the tasks of project management in this context are discussed. A thorough, practical approach to risk management presented. The main focus is the intertwining of project and risk management into a coherent planning and controlling process.

## Morning Tutorial (8:30 am–12:00 pm)

### T3 @Bay

#### Methods of Component-Based Software Engineering: Essential Concepts and Classroom Experience

Kurt Wallnau, Carnegie Mellon Software Engineering Institute, USA; kcw@sei.cmu.edu

The need for component-based development methods has become more pronounced as industry adopts software component technology. However, the idea of component is not monolithic; different forms of a software component introduce different engineering challenges. This tutorial provides an overview of "component space" and the methods that populate this space. Two classes of component-based design methods are discussed in detail: one where the task is to specify component interfaces, the other where components exist a priori from a commercial provider and must be integrated. The tutorial also describes a CMU Master of Software Engineering course focused on component-based methods and taught by the presenter. The design of team projects and their results are presented, along with lessons learned that may prove useful to other instructors.

## Afternoon Tutorial (2:00 pm–5:30 pm)

### T4 @Bay

#### From Use Cases to Code—Rigorous Software Development with UML

Albert Zündorf, University of Paderborn, Germany; zuendorf@uni-paderborn.de

The Rational Unified Process lacks technical guidance for the development of OO applications. This tutorial fills this gap. We first use UML scenario diagrams to analyze use-cases. Next, we show a method to analyze scenarios and to derive UML class diagrams and UML behavior modeling for active classes and methods. We show how to choose and embed design patterns in a design and how to employ different architectural styles. From such a precise design, smart CASE tools generate fully functional implementations. We explain state-of-the-art code generation concepts for UML and assess current CASE tools for their code generation capabilities and for their support through all software development phases more generally.



## 1-Day Workshops (8:30 am–5:30 pm)

### W1 @Pier 2

#### 2nd International Workshop on Living with Inconsistency

Steve Easterbrook and Marsha Chechik, University of Toronto, Canada

Contact: S. Easterbrook, [sme@cs.toronto.edu](mailto:sme@cs.toronto.edu); <http://www.cs.toronto.edu/~sme/IWLWI-01/>

In software engineering, there has long been a recognition that inconsistency is a fact of life. Evolving descriptions of software artefacts are frequently inconsistent, and tolerating this inconsistency is important if flexible collaborative working is to be supported. This workshop will focus on reasoning in the presence of inconsistency, for a wide range of software engineering activities, such as building and exploring requirements models, validating specifications, verifying correctness of implementations, monitoring runtime behaviour, and analyzing development processes. A particular interest is on how existing automated approaches such as model checking, theorem proving, logic programming, and model-based reasoning can still be applied in the presence of inconsistency.

### W2 @Queen's Quay 2

#### 4th ICSE Workshop on Software Engineering over the Internet

Frank Maurer, University of Calgary, Canada; Barbara Dellen, Fraunhofer IESE, Germany; John Grund, University of Waikato, New Zealand; and Boris Kötting, University of Kaiserslautern, Germany

Contact: F. Maurer, [maurer@cpsc.ucalgary.ca](mailto:maurer@cpsc.ucalgary.ca); <http://sern.ucalgary.ca/~maurer/icse2001ws/ICSE2001WS.html>

The 4th ICSE workshop on "Software Engineering over the Internet" will bring together researchers and practitioners that try to use Internet technologies to overcome problems in distributed software development. The goal of the workshop is to exchange ideas how distributed projects can utilize the Internet to overcome communication, collaboration, and coordination problems. Furthermore, the workshop will discuss how standard SE practice can benefit from open-source approaches and vice-versa. As large companies are deploying Internet-based process support, a major focus shall be on case studies on distributed software development practice.

### W3 @Dockside IV

#### 2nd ICSE Workshop on Software Product Lines: Economics, Architectures and Implications

Peter Knauber, Fraunhofer IESE, Germany; and Giancarlo Succi, University of Alberta, Canada

Contact: Peter Knauber, [Peter.Knauber@iese.fhg.de](mailto:Peter.Knauber@iese.fhg.de); G. Succi, [Giancarlo.Succi@ee.ualberta.ca](mailto:Giancarlo.Succi@ee.ualberta.ca); [http://www.iese.fhg.de/Events/iese\\_events/knauber\\_23ICSE/](http://www.iese.fhg.de/Events/iese_events/knauber_23ICSE/)

A product line is a set of products designed within a single strategy to exploit mutual synergies. Especially in areas where the competition is very high, companies adhering to a product line approach can benefit from cost reduction, decreased time-to-market, and quality improvement. These and other advantages often lead to better results in the market than the development of individual products alone. Following the remarkable success of the "First International Workshop on Software product lines: Economics, architectures, and implications" held at ICSE 2000 in Limerick, the objective of this workshop is to bring together again people from industry and academia to investigate the proposals and the practices that pertain to the domain of software product lines.

### W4 @Pier 3

#### 2nd International Workshop on Automated Program Analysis, Testing, and Verification (WAPATV)

Nigel Tracey, University of York, UK; and John Penix and Willem C. Visser, NASA Ames Research Center, USA

Contact N. Tracey, [njt@cs.york.ac.uk](mailto:njt@cs.york.ac.uk); <http://www.cs.york.ac.uk/icse2001/>

Software verification is an expensive process, typically costing upwards of 50% of the total software development costs. Automation has massive potential to reduce costs, increase quality and cut time-to-market. Many verification techniques exist and are being actively researched: static analysis, testing and formal verification. However, they have largely been applied as isolated technologies. Due to recent developments in static analysis, automated testing and automated program verification, the boundaries between these fields have begun to blur. There are many open questions regarding the integration of automated testing and verification, the relationships between different algorithms, and the use of static analysis to assist testing and verification. The goal of this workshop is to gather the most active researchers and industrial practitioners from the fields of automated program analysis, testing and verification to discuss the overlap and integration between these fields. Relevant issues include theoretical foundations, tools and techniques, empirical studies and industrial experience. The topics of interest include any aspect of automated program analysis, testing and verification from both industry and academia. These include, but are not limited to:

- static analysis techniques for program reduction
- static analysis techniques for error detection
- automated testing and test-case generation
- automated regression testing
- industrial case studies
- automated abstraction
- technology transfer issues
- integration of verification and testing techniques
- analysis techniques to support verification/testing



## 2-Days Workshops (Sunday–Monday; 8:30 am–5:30 pm)

### W5 Sunday @Pier 9; Monday @Harbour B

#### Software Engineering and Mobility

Gruia-Catalin Roman, Washington University, St. Louis, USA; and Gian Pietro Picco, Politecnico di Milano, Italy  
Contact: G.-C. Roman; roman@cs.wustl.edu; <http://www.elet.polimi.it/~picco/icse01mobility/>

Mobility is redefining the hardware and software fabric of distributed systems. Wireless communication allows network hosts to participate in a distributed computation while on the move. Novel middleware technologies allow software components to migrate across hosts for enhanced flexibility or performance. The software engineering implications of this wave of technological changes still await a thorough understanding. Researchers are invited to discuss fundamental models, emerging themes, research opportunities, technological trends, and market forces in the field of mobile computing and communication. The immediate objective is to provide a forum for intellectual debate. The ultimate goal is to define an influential research agenda for the area as a whole and to generate advocacy for it by stimulating new research initiatives.

### W6 Sunday @Queen's Quay 1; Monday @Dockside I

#### Software Visualization

Wim De Pauw, IBM T.J. Watson Research Center, USA; Steven P. Reiss, Brown University, USA; and John T. Stasko, Georgia Institute of Technology, USA  
Contact: Steven P. Reiss; spr@cs.brown.edu; <http://www.cs.brown.edu/research/softvis/icsesv.html>

This workshop will look at current work in the area of software visualization with an emphasis on software understanding through visualization. It will explore new visualization techniques, addressing software problems through visualization, frameworks for gathering and analyzing data for software visualization, software visualization systems, and experiments and experiences with software visualization. In addition to providing an overview of current research in the area, it will provide a forum for discussions and cooperation among researchers in this and related areas.



## At a Glance

7:30	<b>Breakfast</b> @Harbour and @Dockside Foyers
8:30– 10:00	<b>Full Day Tutorials</b> T5–T7
	<b>Morning Tutorials</b> T8–T11
	<b>Workshops</b> W5, W6 continued W7–W14
	<b>Symposia</b> A1
	<b>Nutrition Break</b> @Harbour and @Dockside Foyers
10:30– 12:00	<b>Full Day Tutorials</b> continued
	<b>Morning Tutorials</b> continued
	<b>Workshops</b> continued
	<b>Symposia</b> continued
	<b>Lunch</b> @Metro East
2:00– 3:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> T12–T15
	<b>Workshops</b> continued
	<b>Symposia</b> continued
	<b>Nutrition Break</b> @Harbour and @Dockside Foyers
4:00– 5:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> continued
	<b>Workshops</b> continued
	<b>Symposia</b> continued

Internet Café  
@Bay, 12:00pm –5:30 pm

## Full-Day Symposium (8:30 am–12:00 pm)

### A1 @Dockside IV

#### Doctoral Symposium

Symposium chair: Mary Lou Soffa, University of Pittsburgh, USA

The Doctoral Symposium is a forum for graduate students to present and discuss their dissertation research objectives, approaches, and preliminary results. The workshop aims to broaden the perspectives and improve the research skills of new entrants to the software engineering community. Students receive guidance and feedback on various aspects of their research from established researchers and the other graduate student attendees. The workshop is intended for students who have a specific research proposal and some preliminary results, but with sufficient time prior to thesis completion to benefit from the workshop experience. A summary of the workshop program and contributions will appear in the conference proceedings. Attendance is by prior application and invitation.

## Full-Day Tutorials (8:30 am–5:30 pm)

### T5 @Pier 7

#### OPEN: A Flexible OO/CBD Process for Software-Intensive Systems Development, a UML Exposition

Houman Younessi, Rensselaer Polytechnic Institute at Hartford, USA; and Brian Henderson-Sellers, Swinburn University of Technology, Australia; contact H. Younessi, houman@rh.edu

The increased complexity associated with large-scale software-intensive systems development requires an increase in the sophistication of the methodology utilized. Following a general discussion on the value of processes, one specific OO/CBD example, OPEN (Object-oriented Process, Environment and Notation) is described in detail. Emphasis will be placed upon the need for flexibility of processes and how they can be constructed and configured to individual circumstances. Some advice on how to transition to OO/CBD and deploy this process for the first time will be given. In addition, and using OPEN as the background process, the UML (Unified Modeling Language) is introduced through a number of case study examples. Modeling and notational issues of the UML are discussed at an introductory level, set in the relevant context of OPEN's modeling tasks and techniques.

### T6 @Pier 9

#### Describing Software Architecture with UML

Phillippe Kruchten and Bran Selic, Rational Software Canada Corp., Canada; and Wojtek Kozaczynski, Rational Software Inc., USA; contact P. Kruchten, pbk@rational.com

The presence of a solid architectural vision is a key discriminator in the success or failure of a software project. This tutorial examines what software architecture is and what it is not. It discusses and illustrates how to describe architecture through a set of design viewpoints and views and how to express these views in the UML, in the spirit of the new IEEE Standard 1471:2000: recommended practice for architectural description. The tutorial shows of how architectures drive the development process and how to capture architectural design patterns using the UML. It is illustrated by several widely applicable architectural patterns in different domains.

### T7 @Pier 8

#### Software Product Lines and Software Architecture Design

Jan Bosch, University of Groningen, The Netherlands; Jan.Bosch@cs.rug.nl

One can identify two important developments in software architecture, i.e. software product lines and software architecture design. This tutorial addresses these topics by presenting a method for architectural design explicitly focussing on assessment of and transformation for quality attributes. In addition, the notion of software product lines and the process, technology, business and organizational issues of adopting the approach are presented. Examples and experiences from numerous industrial cases are used to extensively illustrate both design and product-lines. This intermediate-level tutorial is based on a recently published book entitled Design and Use of Software Architectures: Adopting and Evolving a Product Line Approach, authored by the presenter, and published by Addison-Wesley. The expected audience is of two types: software engineers and technical managers considering the introduction of software architecture design and, potentially, product-line architectures in their organization, and researchers interested in the experiences of the presenter on this subject.

### T8 @Pier 2

#### How to Do Inspections When There Is No Time

Terry Shepard and Diane Kelly, Royal Military College, Canada; contact T. Shepard, shepard@rmc.ca

Research shows that software inspections are an effective, essential part of software development. Yet, according to some industry practitioners, inspections are difficult, costly, ineffective, and excessively time consuming. So what's gone wrong? The most likely answer is extreme pressure on resources, and above all, on schedules. Organized around the 3Ms of inspection, Management, Mechanics, and Metrics, this tutorial provides a toolkit of ideas to help you effectively tailor inspections to suit your software process. Whether your focus is personal, small group, or large group, a variety of new, lightweight, flexible inspection approaches are available. This tutorial provides background information for the novice and discusses new material of interest to both novices and experienced inspection practitioners. It will include a case study and an analysis of how the case study can be adapted to other situations. Opportunities for questions and discussions will be provided throughout.

### T9 @Pier 3

#### EasyWinWin: A Groupware-Supported Methodology For Requirements Negotiation

Barry Boehm, University of Southern California, USA; Paul Grünbacher, Johannes Kepler University, Austria; and Robert O. Briggs, GroupSystems.com, USA; contact P. Grünbacher, pg@sea.uni-linz.ac.at

EasyWinWin is a requirements definition methodology that builds on the win-win negotiation approach and leverages collaborative technology to improve the involvement and interaction of key stakeholders. With EasyWinWin, the stakeholders move through a step-by-step win-win negotiation where they collect, elaborate, and prioritize their requirements, and then surface and resolve issues. This tutorial introduces the EasyWinWin negotiation approach and situates it with respect to other leading requirements determination approaches, and within the spiral model of software development. We explain the objectives and deliverables of each step in the methodology, and offer tips and pitfalls from the field. We give a live demonstration of the collaborative tools and the methodology in action, and demonstrate facilitation techniques that keep the process moving forward. Throughout the tutorial, we will present the highlights from several real-world EasyWinWin projects. The intended audience are those professionals involved in requirements definition (e.g. as project managers, engineers, executives, users, customers); and software requirements engineering researchers. The level of presentation is introductory with no specific background knowledge required.

### T10 @Pier 6

#### Fundamental Concepts for Practical Software Architecture

Alexander Ran, Nokia Research Center, USA; alexander.ran@nokia.com

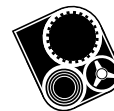
Architecture of software is a collection of design decisions that are expensive to change. How to identify which design decisions are expensive to change? What are architecture views and which views are needed to adequately describe the architecture of a specific system? How to create and manage software architecture for a product family? This tutorial will provide an answer to these and other questions that arise in the context of complex software development. We introduce a system of concepts useful in order to understand, design, and evaluate architecture of software intensive systems and system families. Our approach utilizes different software structures in order to control important system qualities related to its development, performance, and evolution. We draw our experience primarily from software embedded in voice and data communication systems. However the same principles can be applied to software architecture in other domains. This tutorial should be useful to software engineers and technical managers involved in construction or evaluation of complex software.

### T11 @Dockside III

#### An Introduction to Java 2 Micro Edition (J2ME): Java in Small Things

James White, Catapult Technologies, Inc., USA; jwhite@catapult-technologies.com

This tutorial is intended to be an introduction to the Java 2 Micro Edition (J2ME) for software engineers. J2ME is Sun's latest Java 2 platform and is meant for consumer electronics and embedded devices. An exploration of the technology as well as an introduction to programming in the J2ME environment is undertaken. The tutorial is divided into two major sections. The first section provides a general understanding of J2ME. Included in this half are discussions on J2ME's reason for being, architecture, and configurations/profiles --the specifications that really define J2ME. The second half focuses on developing applications in the various J2ME configurations/profiles. The various J2ME APIs are compared and contrasted with programming examples to the more familiar Java 2 Standard Edition (J2SE). To understand this tutorial, some knowledge of Java programming is helpful but not required.



## Afternoon Tutorials (2:00 pm–5:30 pm)

### T12 @Pier 2

#### Improving Software Inspections by Using Reading Techniques

Forrest Shull and Ioana Russ, Fraunhofer Center for Experimental Software Engineering, USA; and Victor R. Basili, University of Maryland and Fraunhofer Center for Experimental Software Engineering, USA; contact F. Shull, fshull@fc-md.umd.edu

Reading techniques are step-by-step procedures that guide individual inspectors while they uncover defects in a software artifact. Reading techniques provide a systematic and well-defined way of inspecting a document, allowing feedback and improvement. This tutorial introduces Perspective-Based Reading (PBR), a specific reading technique used to review software requirements. PBR verifies the quality of requirements specifications by requiring each reviewer to take the perspective of a specific stakeholder of the document (such as designer, tester, and user). The tutorial is aimed at industry practitioners, managers and developers alike, who want to learn more about ways to improve their software inspections with systematic reading techniques. Attending this tutorial will enable the participants to be more effective and more focused in looking for potential defects in software documents. Since the focus of the tutorial is on systematic reading techniques for defect detection, it is beneficial for participants to have some basic understanding about software inspections.

### T13 @Pier 3

#### Mining Components for a Software Architecture and a Product Line: The Options Analysis for Reengineering (OAR) Method

Dennis Smith, Liam O'Brien, and John Bergey, Carnegie Mellon Software Engineering Institute, USA; contact D. Smith, dbs@sei.cmu.edu

This tutorial discusses the problem of identifying components from legacy systems and determining which components will be useful for insertion in a new architecture, particularly in a product line architecture. Specifically, it outlines Options Analysis for Reengineering (OAR), a systematic method for evaluating the feasibility and benefits of mining existing components for a product line. OAR operates like a funnel in which a large set of potential assets is screened out so that the effort can most efficiently focus on a smaller set that most effectively meet the technical and programmatic needs of the product line or target architecture. The method provides a set of scalable techniques and exercises to collaboratively analyze existing components, determine viable mining options, and select the most promising option. It provides a structured approach to determine the cost, effort, and risk of mining a set of components from legacy systems. The tutorial is appropriate for researchers and advanced practitioners who are faced with making decisions on mining legacy components.

### T14 @Pier 6

#### Hyper/J™: Multi-Dimensional Separation of Concerns for Java™

Peri Tarr and Harold Ossher, IBM T. J. Watson Research Center, USA; contact P. Tarr, tarr@watson.ibm.com

Hyper/J™ supports a new approach to constructing, integrating and evolving software, called Multi-Dimensional Separation of Concerns (MDSOC). Developers can decompose and organize code and other artifacts according to multiple, arbitrary criteria (concerns) simultaneously—to some extent even after the software has been implemented—and synthesize or integrate the pieces into larger-scale components and systems. This tutorial describes how to accomplish MDSOC with Hyper/J™, a tool available for free download, in the context of standard Java™ development. The focus is on addressing some real, pervasive problems, especially in the areas of evolution, integration, reuse, and (re)use of design patterns, and showing how to encapsulate concerns like features, variants, roles and business rules. The tutorial is at an intermediate-level and combines presentation with interactive exploration of examples. Participants have the opportunity to select examples from a prepared set, and to contribute their own. Attendees must have experience with object-oriented software engineering, and some familiarity with Java™.

### T15 @ Dockside III

#### Enterprise JavaBean Architecture and Design Issues: Avoiding JavaBean Soup

James White, Catapult Technologies, Inc., USA; jwhite@catapult-technologies.com

Enterprise JavaBeans (EJB) have become a staple in distributed object and component architectures. However, like most technologies, EJB provides technology tradeoffs that must be weighted by the architect contemplating its use. Furthermore, like most technologies, EJB cannot save a poor system design. This tutorial is separated into two general sessions. The first half of the tutorial covers the larger "macro" architectural decisions surrounding EJB, such as decisions about whether EJB technology is right for a project and selecting an appropriate EJB server. The second half of the tutorial focuses on issues in bean design. These "micro" issues include: where to use entity versus session beans, when to use container versus bean managed persistence, the granularity of EJBs, and the impact of the underlying database on bean design. This session is intended for architects, analyst and developers examining or working with EJB technology. Attendees are expected to have some familiarity with EJB terminology and technology.



## 1-Day Workshops (8:30 am–5:30 pm)

### W7 Queen's Quay 2

#### Generative Techniques for Product Lines

Greg Butler, Concordia University, Canada; Don Batory, University of Texas at Austin, USA; Krzysztof Czarnecki, Daimler Chrysler Research, Germany; and Ulrich Eisencker, University of Applied Sciences, Kaiserslautern, Germany

Contact: G. Butler, gregb@cs.concordia.ca; <http://www.cs.concordia.ca/~faculty/gregb/icse-workshop/>

A software product line leverages the knowledge of one or more domains in order to achieve short time-to-market, cost savings, and high quality software. The highest level of reuse comes by using domain-specific languages or visual builders to describe a member of the product line, and to generate the member from the description. Generative techniques can help us to capture the configuration knowledge for a product line and use it to generate concrete family members. This workshop focuses on technical issues of product lines, rather than economic issues.

### W8 @Queen's Quay 1

#### SEMINAL: Software Engineering using Metaheuristic INnovative ALgorithms

Mark Harman, Brunel University, UK; Bryan Jones, University of Glamorgan, UK; Nigel Tracey, University of York, UK

Contact: M. Harman, mark.harman@brunel.ac.uk; <http://www.brunel.ac.uk/~csstmmh2/seminal2001/>

Metaheuristic algorithms, such as genetic algorithms and simulated annealing, have been applied successfully to a number of engineering problems ranging from load balancing in the process industries, through electromagnetic system design, to aircraft control and aerodynamics. It is surprising that these essentially software driven technologies have not yet fully penetrated the software engineering research community and are not widely applied when compared to the more traditional engineering disciplines. Software engineers often face problems associated with the balancing of competing constraints, trade-offs between concerns and requirement imprecision. Perfect solutions are often either impossible or impractical. Therefore, like other engineering disciplines, software engineering is typically concerned with near optimal solutions or those which fall within a specified tolerance. It is precisely these factors which make robust metaheuristic search-based optimization techniques readily applicable. The goal of the workshop is to broaden awareness within the software engineering community of metaheuristic algorithms and their application to software engineering problems and to bring together researchers and practitioners in software engineering and metaheuristics to build upon the embryonic community which currently occupies the intersection of the two fields.

### W9 @Yonge

#### From Software Requirements to Architectures (STRAW 2001)

Jaelson Castro, Universidade Federal de Pernambuco, Brazil; and Jeff Kramer, Imperial College, UK

Contact: J. Castro, jbc@cs.toronto.edu; <http://www.cin.ufpe.br/~straw01/>

Requirements Engineering and Software Architecture have become established areas of research, education and practice within the software engineering community for a considerable time. Despite the advances on both fronts we still need frameworks, techniques and tools to support the systematic achievement of architectural objectives in the context of complex stakeholders relationships. For example, little effort has been devoted to date to techniques for deriving architectural descriptions together with the requirement specifications. It also remains very difficult to show that a given software architecture satisfies a set of functional and non-functional requirements. This is somewhat surprising, as software architecture has long been recognized to have a profound impact on the achievement of non-functional goals ("ilities") such as availability, reliability, maintainability, safety, confidentiality, evolvability, and so forth. Therefore greater effort should be devoted to bridging the gap between Requirements Engineering research and Software Architecture research.

### W10 @Pier 5

#### 3rd International Workshop on Net-Centric Computing: Migrating to the Web (NCC 2001)

Jens H. Jahnke, University of Victoria, Canada; Kostas Kontogiannis, University of Waterloo, Canada; Eleni Stroulia, University of Alberta, Canada; Scott Tilley, University of California, Riverside, USA; and Kenny Wong, University of Alberta, Canada

Contact: S. Tilley, stilley@cs.ucr.edu; <http://mulford.cs.ucr.edu/stilley/ncc2001/>

The underlying principle of Net-Centric Computing (NCC) is a distributed environment where applications and data are downloaded from servers and exchanged with peers across a network on an as-needed basis. NCC relies on portable applications running on multiple platforms, mobile data accessed via high-speed network connections, and low-cost appliances for local processing. In keeping with the theme of "Migrating to the Web," the 3rd International Workshop in Net-Centric Computing (NCC 2001) will focus on issues related to reengineering legacy systems for use in an NCC environment. Of particular interest are holistic techniques for Web-enabling existing applications that integrate various reengineering aspects (e.g., code, data, and user interface reengineering) into a "whole system" modernization process. The workshop will be structured around three central issues: decomposing legacy systems to identify logical components representing essential functionality, developing a new Web-enabled system using these components, and deploying the new system in an NCC environment.



## 1-Day Workshops (8:30 am–5:30 pm)

### W11 @Harbour A

#### Global Aspects of Software Engineering Professionalism

J. Barrie Thompson and Helen M. Edwards, University of Sunderland, UK

Contact: J. B. Thompson, barrie.thompson@sunderland.ac.uk; <http://www.cet.sunderland.ac.uk/seis/icse2001workshop/>

The workshop will provide a forum to consider the global dimensions of a Software Engineering Profession and determine the relevance and usefulness to the Software Engineering community of an initiative by the International Federation of Information Processing (IFIP) concerning harmonization of professional standards. The prime objectives of the workshop will be to examine:

- The current situation with regard to certification of licensing in different countries
- The drivers and constraints regarding Software Engineering Professionalism and to determine:
- The extent to which world-wide Software Engineering Professionalism is achievable (particularly in the light of IFIP's proposals)
- Possible strategies that would assist in achieving such world-wide Software Engineering Professionalism.

## 2-Days Workshops (Monday–Tuesday, 8:30 am–5:30 pm)

### W12 Monday @Pier 4; Tuesday @Dockside V

#### 3rd International Workshop on Economics-Driven Software Engineering Research (EDSER)

Kevin J. Sullivan, University of Virginia, USA; Mary Shaw, Carnegie Mellon University, USA; Barry Boehm, University of Southern California, USA; David Notkin, University of Washington, USA; and Warren Harrison, Portland State University, USA

Contact: K. J. Sullivan, sullivan@virginia.edu; <http://www.cs.virginia.edu/~sullivan/edser3/>

The overall objective of the Third International Workshop on Economics-Driven Software Engineering Research (EDSER-3) is to advance the theory and the practice of software design and engineering by viewing them as value-seeking activities. The term value is construed broadly. It includes but is not limited to meaning monetary value in capital markets. Other dimensions in which value can be defined include national security, solution of major social problems, the advance of democratic society and values, and so forth. To date, the field of software economics has focused largely on cost estimation, largely ignoring benefits and their realization. We now need a theory and practice of software design and engineering that is based on modeling of, and design and dynamic management for, net value creation, including costs and benefits, risks and opportunities. Sources for theoretical insights and advances can be found in many quarters: finance, strategy, decision theory, game theory, politics, ethics, aesthetics. EDSER-3 seeks leading-edge contributions that can advance the emerging discussion in this area.

### W13 Monday @Dockside II; Tuesday @Dockside II

#### 4th ICSE Workshop on Component-Based Software Engineering: Component Certification and System Prediction

Ivica Crnkovic, Malardalens University, Sweden; Heinz Schmidt, Monash University, Australia; and Judith Stafford and Kurt Wallnau, Carnegie Mellon Software Engineering Institute, USA

Contact: J. Stafford, jas@sei.cmu.edu; [http://www.sei.cmu.edu/pacc/workshop\\_call.html](http://www.sei.cmu.edu/pacc/workshop_call.html)

Components play a critical role in many software systems. Such systems suffer from (1) a lack of information about component behaviour (or lack of confidence in the information that is available), and (2) an inability to determine properties of the whole system from properties of the parts. CBSE4 will bring together researchers and practitioners from the areas of component trust and certification, component technology, and software architecture to ensure that work in the areas of certification of software components and architectural analyses for prediction of system quality attributes will be mutually aware, if not mutually reinforcing. The output of the workshop will be a defined set of community model problems that reflects this intersection of interests.

### W14 Monday @Harbour C; Tuesday @Pier 5

#### 10th International Workshop on Software Configuration Management: New Practices, New Challenges, and New Boundaries (SCM 10)

André van der Hoek, University of California, Irvine, USA

Contact: A. van der Hoek, andre@ics.uci.edu; <http://www.ics.uci.edu/~andre/scm10/>

The goal of SCM-10 is to bring together industrial and academic researchers from a variety of disciplines to investigate and determine the future of configuration management. SCM-10 specifically aims to step outside of its traditional boundary of just managing source code, and is intended to be a rich, open forum for discussing such issues as component-based CM, CM for Open Source projects, Web-site management, hypermedia, deployment, the relation between dynamism, run-time change, and CM, and other such relevant topics. Discussion will be fueled via several invited presentations and presentations based on materials drawn from submitted position papers.

## At a Glance

7:30	<b>Breakfast</b> @Harbour and @Dockside Foyers
8:30–10:00	<b>Full Day Tutorials</b> T16–T20
	<b>Morning Tutorials</b> T21
	<b>Workshops</b> W12–W14 cont. W15–W18
	<b>Symposia</b> A2, A3
	<b>Nutrition Break</b> @Harbour and @Dockside Foyers
10:30–12:00	<b>Full Day Tutorials</b> continued
	<b>Morning Tutorials</b> continued
	<b>Workshops</b> continued
	<b>Symposia</b> continued
	<b>Lunch</b> @Harbour Ballroom A & B & C
2:00–3:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> T22
	<b>Workshops</b> continued
	<b>Symposia</b> continued
	<b>Nutrition Break</b> @Harbour and @Dockside Foyers
4:00–5:30	<b>Full Day Tutorials</b> continued
	<b>Afternoon Tutorials</b> continued
	<b>Workshops</b> continued
	<b>Symposia</b> continued
	<b>Break</b> @Frontenac Foyer
5:45–7:00	<b>S1 Closing for DLPS</b> (Open to all ICSE Attendees) @Frontenac
7:00–9:00	<b>S2 Reception</b> @Harbour Ballroom and @Pier 2 & 3

Internet Café  
@Bay, 7:30 am–9:00 pm

EPIC  
@Pier 2 & 3, 5:45 pm–9:00 pm

## Full-Day Symposium (8:30 am–5:30 pm)

### A2 @Pier 4

#### David Lorge Parnas Symposium (DLPS)

Symposium chairs: David M. Weiss, Avaya Communication, USA; and Dan Hoffman, University of Victoria, Canada

David L. Parnas is one of the grandmasters of software engineering. His academic research and industrial collaborations have exerted far-reaching influence on software design and development. His groundbreaking writings capture the essence of the innovations, controversies, challenges, and solutions of the software industry. Together, they constitute the foundation for modern software theory and practice. This symposium is being held in Recognition of Parnas's work and in honour of his 60th birthday. It is an opportunity for everyone in the software engineering community to celebrate his contributions, and to think hard about where we are today and where we are going. The symposium program consists of talks by leading software engineering experts, including keynotes by Fred Brooks and Jon Bentley, a short presentation by Parnas, and a panel on software engineering education. Each symposium attendee will receive a copy of the book "Software Fundamentals: Collected Papers by David L. Parnas" a new book from Addison-Wesley.

## Morning Symposium (8:30 am–12:00 pm)

### A3 @Pier 2 & 3

#### New Software Engineering Faculty Symposium

Symposium chairs: Leon J. Osterweil, University of Massachusetts, Amherst, USA; Gabriel Silberman, Centre for Advanced Studies, Canada; and Kenny Wong, University of Alberta, Canada

New software engineering faculty face many challenges in this ever-changing world of software. They are typically under tremendous pressure to teach courses for new software engineering programs, supervise many graduate students, collaborate with industry, raise research funds, be leaders in their field, and publish journal papers. While trying to obtain tenure, they are also enticed by the high salaries of those who have chosen to work in industry. There is a tremendous shortage of software engineering faculty in many countries around the world. The ICSE community is committed to help new software engineering faculty survive in academia. This symposium grew out of the need to support and encourage new software engineering faculty in their early careers. This morning symposium will bring together faculty who have survived their early years with new and junior faculty. The main goal is to share and exchange ideas on practical methods for having a successful and fulfilling academic career. The attendees can work together on strategies for success and shop from the best ideas and experiences of their colleagues.

## Full-Day Tutorials (8:30 am–5:30 pm)

### T16 @Pier 8

#### State, Event, Time, and Diagram in System Modeling

Jin Song Dong, National University of Singapore, Singapore; dongjs@comp.nus.edu.sg

The design of complex systems requires powerful mechanisms for modeling data, state, concurrency, and real-time behavior; as well as for structuring and decomposing systems in order to control local complexity. Method integration has become a recent research trend in software specification and design. In the graphical area, many object-oriented methods have merged into one, the Unified Modeling Language (UML) which combines various diagrammatic modeling techniques to model static and dynamic aspects of software systems. Although traditional formal methods have not scale-up well, new integrated formal methods show great promise. This tutorial will present the state of the art in formal modeling techniques (state-based Object-Z and event-based Timed CSP), their integration (TCOZ), and transformation techniques from the integrated formalism to UML. An XML web environment for projecting integrated formal models to UML diagrams will also be demonstrated. The tutorial material contains both introductory and intermediate level and should be of interest to software designers, software engineers, as well as software engineering researchers and graduate students.





## Full-Day Tutorials (8:30 am–5:30 pm)

### T17 @Pier 6

#### From UML to Java: Building a 3-Tier Architecture

Timothy Korson, Southern Adventist University, USA; korson@southern.edu

The successful use of object technology requires far more than simply the adoption of UML, Java, CORBA or COM. What is crucial, is knowing how to use these technologies to build commercially robust software systems. In this session the speaker draws on his experience at NASA, AT&T, IBM, and other leading companies to illustrate the pitfalls and best practices of component based software development. The case study will explore the recent experience of the author in developing a multi-currency, multi-lingual financial application for an international organization. The focus of the tutorial will be on exploring the modeling, architecture, Java implementation, and database issues as well as the other design tradeoffs that were considered. Each design tradeoff is related to the system requirements and business goals.

### T18 @Pier 7

#### Designing Concurrent, Distributed, and Real-Time Applications with UML

Hassan Gomaa, George Mason University, USA; hgomaa@gmu.edu

Object-oriented analysis and design of concurrent applications are described with particular emphasis on real-time, client/server, and distributed applications. Object-oriented concepts are crucial in software analysis and design because they address fundamental issues of adaptation and evolution. To successfully design real-time and distributed applications, it is essential to blend object-oriented concepts with concurrent processing concepts. Although the Unified Modeling Language (UML) has emerged to provide a standardized notation for describing object-oriented models, for the UML notation to be effectively applied, it needs to be used in conjunction with an object-oriented analysis and design method, as presented in this tutorial. This tutorial is based on the instructor's book: Designing Concurrent, Distributed, and Real-Time Applications with UML, Addison Wesley, 2000, <http://www.aw.com/cseng/titles/0-201-65793-7>. Topics covered include OO requirements, analysis, and design modeling; distributed software architecture; component based distributed design; concurrent task structuring; design of message communication interfaces, including synchronous, asynchronous, brokered, and group communication; performance analysis of real-time designs. This tutorial should be of interest to software professionals responsible for designing, implementing, or managing the design of concurrent applications. The material is presented for an intermediate level audience who have some familiarity with object-oriented and concurrency concepts.

### T19 @Yonge

#### Using Transformation Systems for Software Maintenance and Reengineering

Ira Baxter, Semantic Designs, Inc., USA; idbaxter@semdesigns.com

Software maintenance costs dominate software engineering costs, partly because most such engineering is done manually. Program transformation tools leverage an engineer-provided base of "transforms" (a kind of generative reuse of programming knowledge), to automate analysis, modification, and generation of software, enhancing productivity and quality over conventional methods. This tutorial provides a complete overview of Program Transformation, from theory to implementation to application. Several real transformation systems are examined, with application examples including automated detection and removal of duplicate code from large systems, and the potential for semi-automated refactoring of large object frameworks. The tutorial progresses from introductory to intermediate, but all the necessary background will be provided. Attendees need only have basic software engineering knowledge and motivating experience in modifying software. The presenter has been designing and using transformation systems for 20 years, and is the principal behind the DMS transformation system for large scale software reengineering.

### T20 @Dockside III

#### Effective Software Architecture Design: From Global Analysis to UML Descriptions

Robert L. Nord, Daniel J. Paulish, and Dilip Soni, Siemens Corporate Research, USA; and Christine Hofmeister, Lehigh University, USA; contact R. Nord, rn@sei.cmu.edu

It is now generally accepted that separating software architecture into multiple views can help in reducing complexity and in making sound decisions about design trade-offs. Our four views are based on current practice; they are loosely coupled, and address different engineering concerns. This tutorial will teach you how global analysis can improve your design, and how to use UML to describe these four views: the conceptual, module, execution, and code architecture views. You will also learn:

- the purpose of having separate software architecture views.
- the difference between using UML for software architecture and the use of UML for designing OO implementations.
- how to apply global analysis to analyze factors that influence the architecture and to develop strategies that guide the design.
- the importance of designing for anticipated change to produce more maintainable architectures.
- how to incorporate software architecture design and its artifacts in your software process.

The tutorial is aimed at experienced software engineers, architects, project and technical managers. It is assumed that participants know the basic UML diagram types. Experience in developing models and software design is helpful.



## Morning Tutorial (8:30 am–12:00 pm)

### T21 @Pier 9

#### Bridging the Requirements/Design Gap in Dynamic Systems with Use Case Maps (UCMs)

Daniel Amyot and Gunter Mussbacher, Mitel Corp., Canada; contact G. Mussbacher, [gunter\\_mussbacher@mitel.com](mailto:gunter_mussbacher@mitel.com)

Use Case Maps (UCMs) concepts, the UCM notation, and how UCMs fit into the software development process are presented. UCMs help bridge the requirements/design gap and provide dynamic (run-time) refinement capabilities for scenario/structure variations often characteristic of dynamic software systems (e.g. e-commerce applications). The tutorial will show how UCMs address functional requirements expressed in use cases and performance requirements as well as high-level design and testing. Exercises are provided for the participants along with a brief demonstration of the freely available UCM Navigator tool. The intended audience includes requirements engineers, system architects, test engineers, and software engineers with an interest in scenario-based system development and/or responsible for the development of dynamic systems. Participants will be assumed to have some experience in system modeling and be familiar with software development processes.

## Afternoon Tutorial (2:00 pm–5:30 pm)

### T22 Pier 9

#### Introduction to the Attribute Driven Design Method

Felix Bachmann and Len Bass, Carnegie Mellon Software Engineering Institute, USA; contact L. Bass, [ljb@sei.cmu.edu](mailto:ljb@sei.cmu.edu)

The Attribute Driven Design (ADD) method is introduced. ADD is a method for designing the conceptual architecture for a product line. The conceptual architecture includes the decomposition of function for the final systems, identification of possible threads of parallelism, identification of possible physical network configurations and allocation of the functional decomposition to processors. The ADD method is based on: 1) explicit identification of quality attribute goals for a system and 2) coupling these goals to architectural mechanisms and styles that are intended to achieve those goals. It treats quality goals as first class requirements on the level of functional requirements and makes explicit the dependence of architecture on quality and business requirements. The ADD method can begin once architectural drivers (those requirements that shape the architecture) have been identified and this allows the architecture design to be carried on in parallel to the requirements process.



Toronto Eaton Centre

**1-Day Workshops (8:30 am–5:30 pm)****W15 Queen's Quay 2****XML Technologies and Software Engineering (XSE 2001)**

Cecilia Mascolo, Wolfgang Emmerich, and Anthony Finkelstein, University College London, UK

Contact: C. Mascolo, c.mascolo@cs.ucl.ac.uk; <http://pizza.cs.ucl.ac.uk/xse01/xse01.xml>

The aim of this workshop is to bring together the efforts in the areas of software engineering with XML and engineering software with XML. The first stream addresses the use of XML and related technologies for the construction of software engineering tools and environments. The second stream focuses on the exploitation of XML for the development of new generations of distributed software architectures and middleware in order to provide new degrees of flexibility in terms of integration, security, and interoperability. The focus of the workshop stretches from pure research on XML and related technologies to applications and reports of industrial experience with mark-up languages and tools. Technologies relevant to the workshop include XML, XSL, DOM, XLink, XPath, Schema, SOAP, Biztalk, XML Query, XMI, XPL, and RDF.

**W16 @Dockside IV****Describing Software Architecture with UML**

Alan Brown, Catapult, Inc., USA; Wojtek Kozaczynski, Rational Software, Inc., USA; Philippe Kruchten, Rational Software Canada Corp., Canada; and Grant Larsen, Catapult, Inc., USA

Contact: P. Kruchten, pbk@rational.com; <http://www.rational.com/events/ICSE2001/>

This workshop focuses on the use of the UML for representing and modeling architectures of software-intensive systems. We will look at experience reports, discuss UML subsets and patterns of use, and examine identified difficulties and limitations. How can UML support IEEE 1471? How does it map to ADLs? How can we use a model-based architectural representation for ADLs? How can we use a model-based architectural representation for reasoning about various architectural qualities: performance, scalability, robustness, fault-tolerance, safety, or security? We will look at extending UML via stereotypes and UML profiles to support representation of architectures and possible extensions or improvements in the future UML 2.0 to help reason about architectural issues.

**W17 @Dockside I****Advanced Separation of Concerns in Software Engineering**

Peri Tarr, IBM T. J. Watson Research Center, USA

Contact: P. Tarr, tarr@watson.ibm.com; <http://www.research.ibm.com/hyperspace/workshops/icse2001/>

Separation of concerns can provide a host of well-known and crucial benefits, but only if the concerns that are separated and modularized match the concerns one needs to deal with—which can be of dramatically different kinds in different development contexts. Traditional modularization approaches have proven inadequate. Work in the growing area of advanced separation of concerns seeks to provide more powerful and flexible modularization, capable of encapsulating multiple kinds of overlapping, interacting and crosscutting concerns. This workshop is intended to bring together researchers and practitioners in this and related areas, to explore some of the many open issues.

**W18 Queen's Quay 1****1st Workshop on Open Source Software Engineering**

Joseph Feller, Brian Fitzgerald, University College Cork, Ireland; and André van der Hoek, University of California, Irvine, USA

Contact: J. Feller, jfeller@afis.ucc.ie; <http://opensource.ucc.ie/icse2001/CFP.htm>

Open Source Software (OSS) has recently become the focus of considerable interest, yet there remains a need for rigorous analytical inquiry into the subject. This workshop seeks to articulate OSS as an SE paradigm, addressing the requirements of OSS in terms of methodology and process, tools and enabling technologies, and human resources and project management. Format: Round-Table Discussion. Size: Maximum 40 participants. Position Papers Required. The Workshop Report will be published in a special issue of IEE Proceedings - Software on Open Source Software Engineering, and workshop participants will be encouraged to submit full research papers based on their position papers for possible inclusion in the special issue.

5:45 pm–7:00 pm

## S1 @Harbour Ballroom

### Closing for David L. Parnas Symposium — Open to all ICSE Attendees

Symposium chair: Dan Hoffman, University of Victoria, Canada

This keynote and personal retrospective is part of and concludes the David L. Parnas Symposium, but is open to all ICSE conference attendees. David M. Weiss will deliver the keynote and then Frederick P. Brooks, Jr. will give a personal retrospective.

#### Software Fundamentals: The Ideas of David L. Parnas

David M. Weiss, Director of Software Technology Research, Avaya Laboratories, USA

At ICSE 2001 we are honoring the work of one of the grandmasters of our field, highlighting the fundamental ideas that David L. Parnas invented and expounded, including such ideas as information hiding, abstract interfaces, the uses relation, program families, explicit layered exception handling, and deterministic scheduling for hard real-timesystems. Do you need to understand how to organize your software into modules so that it can be easily maintained and your modules are reusable, whether they are expressed as classes, packages, or other forms? Dave Parnas identified the information hiding principle and showed how to use it to construct workable, reusable modular structures that are stable over time. Are you struggling to create APIs to make your software useful to application programmers? Dave Parnas devised the idea (and coined the term) for abstract interfaces, and showed how to design interfaces that provided services without revealing their implementations. Languages like C++ and Java directly support this idea with abstract classes. Are you wondering how to create your software as a set of layers that define a hierarchical structure that meets your requirements, lets you build your system a few layers at a time, and lets others add to the structure that you have created? Dave Parnas clearly explained what a hierarchical structure is, what some of the important hierarchical structures that we use are, why people often confuse them, and how to create a layered structure that meets your needs. Do you know that your software is going to exist in many different versions, but are having difficulty designing your software not just to accommodate the different versions, but to take advantage of your situation to make your development process more efficient? Dave Parnas defined program families to help with just this situation and showed how to create them in a cost-effective way. However, Dave has been busy in more than just technical areas. His work includes commentary on the social responsibility of software engineers, both by exposition and by example, and on how we should educate our students so that software development becomes an engineering profession. His stance on our inability to create trustworthy software for the Strategic Defense Initiative, as well as his thoughts on how to teach software engineering have influenced how we think, act, and teach, as well as how the public perceives us. David Parnas is both a clear and creative thinker and an extraordinary expositor of seminal ideas. The issues that he addresses are at the heart of software engineering today; his explanations are still relevant and his solutions, trialed on real systems, transfer well to today's software development organizations and environments.

#### "Diogenes, Where Are You?"

Frederick P. Brooks, Jr., ACM Turing Award Recipient, University of North Carolina, Chapel Hill, USA

What kind of person do we honor today? Fearlessly honest; honestly fearless. Dave is brilliant; many people are brilliant. Dave is impressively productive; many are productive. Dave is articulate and lucid; many are articulate, some are lucid. As much as we admire that profound, tough, clean mind, it is the attributes of character that we admire more. I submit that it is Dave's character attributes, as much as his mind, that have produced this incredible body of work. First his honesty. Dave is ready to question his own assumptions, ready to accept such critique by others, and ready to let the chips fall where they may as the logical consequences of assumptions emerge. "Our first duty in research is to the truth." Second, his principled approach to every task. He has technical principles, which he articulates, which he follows in his research, and which he tests and demonstrates in practice. His principles of professional ethics he has clearly enunciated and consistently followed. His social conscience, his professional conscience, and his personal conscience are all keen. Third, his boldness. He likes to question assumptions, to challenge widely held beliefs and attitudes. He is not shy about criticizing, even satirizing, work he considers shoddy. He freely states opinions, as such, that cannot yet be supported by data, but which he bases on experience and judgment. "I am not a modest man." Fourth, his commitment. Mili has put it well: Dave has not looked for quick or superficial contributions, but has made a "long-term, focused, painstaking effort." Each of those four words is crucial for his contributions. An honest sketch of an honest man must remark that any one virtue—even honesty—fully embraced, makes some other virtues difficult.

## At a Glance

7:30	<b>Breakfast</b> @Harbour and @Frontenac Foyers  <b>Speaker's Breakfast</b> @Pier 6
8:30–10:00	<b>S3 Welcome and Keynote</b> D. Sabbah @Frontenac  <b>Nutrition Break</b> @Harbour and @Frontenac Foyers
10:30–12:00	<b>S4 TP</b> @Pier 4 & 5 <b>S5 TP</b> @Queen's Quay <b>S6 EDU</b> @Pier 7 & 8 <b>S7 IIP</b> @Frontenac  <b>Lunch</b> @Harbour Ballroom
1:10–1:50	<b>S8 FoSP</b> @Pier 4 & 5 <b>S9 FoSP</b> @Queen's Quay <b>S10 FoSP</b> @Frontenac <b>S11 FoSP</b> @Pier 7 & 8  <b>Break</b> @Harbour and @Frontenac Foyers
2:00–3:30	<b>S12 TP</b> @Pier 4 & 5 <b>S13 TP</b> @Queen's Quay <b>S14 EDU</b> @Frontenac <b>S15 IIP</b> @Pier 7 & 8  <b>Nutrition Break</b> @Harbour and @Frontenac Foyers
4:00–5:30	<b>S16 TP</b> @Pier 4 & 5 <b>S17 TP</b> @Queen's Quay <b>S18 EDU</b> @Pier 7&8 <b>S19 IIP</b> @Frontenac
5:30–9:00	<b>S20 Reception</b> @Harbour Ballroom and @Pier 2 & 3

Internet Café  
@Bay, 7:30 am – 9:00 pm

EPIC  
@Pier 2 & 3, 7:30 am – 9:00 pm

## 8:30 am–10:00 am

### S3 Welcome and Keynote @Frontenac Software Engineering and the Internet

Daniel Sabbah, Vice President Application and Integration Middleware Division, IBM Corporation, USA

Session chair: Hausi A. Müller, University of Victoria, Canada

To successfully compete in the drive towards e-business, businesses are faced with challenges that strain their resources across all fronts. In their bid to win new market share, businesses must balance the necessity of new innovative products, released on ever shortening cycles, with the maintenance of their core business—a core that provides the capital leverage needed to fuel this new growth. Businesses must succeed in these changes with a skills base that is, relative to the market requirements, diminishing. Achieving equilibrium between demands that historically have been treated as dichotomous will require nothing less than a change in the very culture of the software engineering community. This change is evident, but how will we, as a the software community, be successful in effecting this change? Successful modification of this culture begins with an understanding, at all levels, of the change in the skills pool and the exponential rise in the need for reliable, scalable systems that can accommodate millions of customers on ever more complex internet based e-business applications. While an increasing number of businesses deploy mission critical applications and begin to build e-market places on the internet, we need to be able to adapt our software engineering philosophy to create software in a more flexible environment that focuses on delivering capability in a more time-critical fashion than we have been challenged to do in the past. The paradigm of designing to perfection must be scaled back to a model that facilitates progressive discovery for the growing population of programmers who are relatively new to the business. Only when we can deliver flexible software to support the deployment of these new e-business applications will we succeed in supporting the drive to e-business.



Niagara Falls

- TP Technical Papers
- EDU Education Papers
- IIP Invited Industry Presentations
- FoSP Frontiers of Software Practice

10:30 am–12:00 pm

## S4 TP @Pier 4 & 5

### Design and Specification of Distributed Systems

Session chair: Albert Zündorf,  
University of Paderborn, Germany

- Composition Patterns: An Approach to Designing Reusable Aspects  
S. Clarke, Trinity College, Ireland;  
R. J. Walker, University of British Columbia, Canada
- MAS-An Interactive Synthesizer to Support Behavioral Modeling in UML  
E. Mäkinen, University of Tampere, Finland; and T. Systä, Tampere, University of Technology, Finland
- Analysis and Testing of Web Applications  
F. Ricca and P. Tonella, ITC-irst (Centro per la Ricerca Scientifica e Tecnologica), Italy

## S5 TP @Queen's Quay

### Static Analysis

Session chair: Joanne M. Atlee,  
University of Waterloo, Canada

- The Right Algorithm at the Right Time: Comparing Data Flow Analysis Algorithms for Finite State Verification  
J. M. Cobleigh, L. A. Clarke, and L. J. Osterweil, University of Massachusetts, Amherst, USA
- Static Checking of Interrupt-Driven Software  
D. Brylow, N. Damgaard, and J. Palsberg, Purdue University, USA
- Lightweight Analysis of Operational Specifications Using Inference Graphs  
L. K. Dillon and R. E. K. Stirewalt, Michigan State University, USA

## S6 Education Papers @Pier 7 & 8

### Practical Software Engineering Education

Session chair: Hossein Saiedian,  
University of Kansas, USA

- Educating Software Engineering Students to Manage Risk  
B. Boehm and D. Port, University of Southern California, USA
- A Formal Approach to Component-Based Software Engineering: Education and Evaluation  
M. Sitaraman, Clemson University, USA; T. J. Long, B. W. Weide, Ohio State University, USA; and E. J. Harner and L. Wing, West Virginia University, USA
- Corrective Maintenance Maturity Model (CM<sup>3</sup>): Maintainer's Education and Training  
M. Kajko-Mattsson, S. Forssander and U. Olsson, Stockholm University and Royal Institute of Technology, Sweden

## S7 IIP @Frontenac

### Challenges in Software Development Practice

Session chair: Dewayne E. Perry,  
University of Texas at Austin, USA

- Global Software Development: The Bell Labs Collaboratory  
D. Atkins, Bell Laboratories Lucent Technologies, USA; M. Handel, University of Michigan, USA; J. D. Herbsleb, Bell Laboratories Lucent Technologies; A. Mockus, Bell Laboratories Lucent Technologies; D. E. Perry, University of Texas at Austin, USA; and G. Wills, Bell Laboratories Lucent Technologies, USA
- Does More Necessarily Mean Better? The Software Performance and Reliability Bottleneck  
M. Cheng, ACD Systems Canada
- Software Engineering in a Startup  
A. Ricciardi, Valaran Corporation, USA



1:10 pm–1:50 pm

## S8 FoSP @Pier 4 & 5

### Enabling Technologies for the Future of Voice-Based Web Access

Steve Woods, Quack.com, USA

Session chair: Scott R. Tilley,  
University of California at Riverside, USA

Voice offers the ultimate in wireless access, providing information on existing data pathways and using existing technology but in a new way. Several companies have recently begun offering platforms, tools, and processes for developing and delivering voice-based information applications as part of a SpeechWeb. These companies have been riding on the heels of a revolution in speaker-independent speech recognition that is fueled largely by consistent gains in processor power and memory availability as well as fundamental algorithmic improvements. This talk describes the enabling technologies behind the Quack/AOL Voice Services Platform (VSP), which is comprised of novel approaches to delivering information, to creating applications, and to publishing processes. The VSP not only duplicates the well-known models offered by web servers and feature-rich browsers in the web space, but extends this model to enable new kinds of application publishing paradigms that rely upon semantic models of information navigation rather than visual presentation models.

## S9 FoSP @Queen's Quay

### Jini™ Network Technology: Devices, Desires, and Designs

Aleta Ricciardi, Valaran Corp., USA

Session chair: Gail Kaiser,  
Columbia University, USA

This talk will examine the way in which Jini™ Network Technology facilitates both software development for distributed applications, and software integration. The connection between device integration and large, heterogeneous software systems will be examined. The technology itself will be presented and compared with other middleware, both distributed object and message-oriented, in the context of designing coherent, complex, scalable systems. I'll close with a use case showing that the technology enables rapid, clean software practices, and how these in turn lead to a simplified, yet more powerful, notion of "work flow".

1:10 pm–1:50 pm

**S10 FoSP @Frontenac**

**Simple Object Access Protocol (SOAP) and Web Services**

Arthur Ryman, IBM Canada Ltd. Canada  
Session chair: Ric Holt, University of Waterloo, Canada

Simple Object Access Protocol (SOAP) is an exciting new technology for developing Web Services. A Web Service is a set of related application functions that can be programmatically invoked over the Internet. In contrast to traditional Web applications, Web Services are application building blocks that use Extensible Markup Language (XML) for information interchange. In this session you will learn about SOAP, Web Services, and related standards including Web Services Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI). These technologies will be demonstrated using the IBM XML and Web Services Development Environment which is available for free download from the alphaWorks Web site at <http://www.ibm.com/alphaWorks/tech/WSDE>.

**S11 FoSP @Pier 7 & 8**

**Auditing Legacy Systems for Security and Survivability**

Tom Longstaff, Carnegie Mellon Software Engineering Institute, USA  
Session chair: Prem Devanbu, University of California, Davis, USA

In our rapidly changing IT environment, it is essential that the security posture of all systems and networks are understood. This is extremely difficult when most of the systems that make up our infrastructures are legacy systems. Current state of the art techniques for auditing systems assume that expertise exists in all of the systems and platforms that make up the environment, when in fact many systems that are essential in the infrastructure predate any member of the auditing team. In this case, we show how use cases and intruder scenarios can be used to determine which systems are important from a security perspective and which services and properties of these systems must be verified. These techniques are part of the Survivable Network Analysis method, developed at the Software Engineering Institute to provide a measure of survivability for complex system architectures.

2:00 pm–3:30 pm

**S12 TP @Pier 4 & 5**

**Process Improvement for Multi-Site Environments**

Session chair: Daniel M. Berry, University of Waterloo, Canada

- Commitment Development in Software Process Improvement: Critical Misconceptions  
P. Abrahamsson, University of Oulu, Finland
- An Empirical Study of Global Software Development: Distance and Speed  
J. D. Herbsleb, A. Mockus, Bell Laboratories, USA; T. A. Finholt, University of Michigan, USA; and R. E. Grinter, Xerox PARC, USA
- Software Product Lines: Organizational Alternatives  
J. Bosch, University of Groningen, The Netherlands

**S13 TP @Queen's Quay**

**Design Recovery and Program Understanding**

Session chair: Gregor Snelting, University of Passau, Germany

- Supporting Program Comprehension Using Semantic and Structural Information  
J. I. Maletic and A. Marcus, University of Memphis, USA
- On the Syllogistic Structure of Object-Oriented Programming  
D. Rayside and K. Kontogiannis, University of Waterloo, Canada
- A Scenario-Driven Approach to Traceability  
A. Egyed, Teknowledge Corporation, USA

**S14 EDU @Pier 7 & 8**

**Degree Programs for Software Engineering Education**

Session chair: Anthony Finkelstein, University College London, UK

- An Efficient Set of Degree Programs for One Domain  
T. Shepard, Royal Military College of Canada
- The Software Factory: Combining Undergraduate Computer Science and Software Engineering Education  
J. D. Tvedt, R. Tesoriero, University of Maryland, USA; and K. A. Gary, UNICON Inc., USA
- Academic Software Engineering: What is and What Could Be? Results of the First Annual Survey for International SE Programs  
K. L. Modesitt, University of Michigan, USA; D. J. Bagert, Texas Tech University, USA; and L. Werth, University of Texas at Austin, USA

**S15 IIP @Frontenac**

**Technology Drivers for Web and Mobile Phone Services**

Session chair: Mikio Aoyama, Niigata Institute of Technology (NIIT), Japan

- Technology Drivers and Research Challenges of Future e-Business  
S. Feldman, IBM T. J. Watson Research Center, USA
- Challenge of Keitai Software: Software Engineering for Next Generation Mobile Phone Systems  
Y. Hanai, Fujitsu Limited, Japan; and M. Aoyama, Niigata Institute of Technology, Japan
- Web Services and Software Engineering: Challenges and Opportunities  
S. Weerawarana, IBM T. J. Watson Research Center, USA



The Fans at Skydome

4:00 pm–5:30 pm

## S16 TP @Pier 4 & 5

### Effective Uses of Inspections

Session chair: Lionel Briand,  
Carleton University, Canada

- Systematic Object-Oriented Inspection: An Empirical Study  
A. Dunsmore, M. Roper, and M. Wood, University of Strathclyde, UK
- Evaluating the Accuracy of Defect Estimation Models Based on Inspection Data From Two Inspection Cycles  
S. Biffl and W. Grossmann, Technical University of Vienna, Austria
- Investigating the Cost-Effectiveness of Reinspections in Software Development  
S. Biffl, Technical University of Vienna, Austria; and B. Freimut and O. Laitenberger, Fraunhofer IESE, Germany

## S17 TP @Queen's Quay

### Building Formal Analysis Tools

Session chair: Thomas Ball,  
Microsoft Research, USA

- A Component-Based Approach to Building Formal Analysis Tools  
R. E. K. Stirewalt and L. K. Dillon, Michigan State University, USA
- Tool-Supported Program Abstraction for Finite-State Verification  
M. B. Dwyer, J. Hatcliff, R. Joehanes, S. Laubach, Robby, Kansas State University, USA; C. Pasareanu, W. Visser, Research Institute for Advanced Computer Science, USA; and H. Zheng, Kansas State University, USA
- A Workbench for Synthesising Behaviour Models from Scenarios  
S. Uchitel and J. Kramer, Imperial College, UK

## S18 EDU @Pier 7 & 8

### Software Engineering Body of Knowledge (SWEBOK) Panel

Panel chair: Peter Freeman,  
Georgia Institute of Technology, USA

#### Panelists

- Don J. Bagert, Texas Tech University, USA
- Robert Dupuis, Université du Québec, Montréal, Canada
- Dennis J. Frailey, Raytheon Company, USA
- Hossein Saiedian, University of Kansas, USA
- Mary Shaw, Carnegie Mellon University, USA
- J. Barrie Thompson, University of Sunderland, UK

The goals of the SWEBOK project have been to develop a topical guide to the body of knowledge (BoK) supporting the discipline of software engineering. The project, sponsored by IEEE Computer Society, is over three years old and is nearing completion of its third and final stage. However, there has been some disagreement as to whether there is currently a common core software engineering body of knowledge at its current stage of evolution, and if so, what is size and contents of that BoK. This panel will present the current status of the SWEBOK and discuss its strengths and weakness, as well as address the more general question of a software engineering body of knowledge. The panel discussion will have two parts. The first part will be an informative session. A short history will be presented and issues related to the curriculum, accreditation, and the maturity of the field to warrant a defined BoK will be discussed. In the second part, the panel members will discuss and debate the planned experimentation of the guide, its shortcomings, and how various computing societies may and should cooperate to improve the guide.

## S19 IIP @Frontenac

### Frontiers of Component Technologies

Session chair: Gene F. Hoffnagle,  
IBM Corporation, USA

- Enterprise Methodology  $\neq$  Software Development Methodology  
J. Q. Ning, Accenture, USA
- Mining Selected Components: The Options Analysis for Reengineering (OAR)  
D. Smith, L. O'Brien, and J. Bergey, Carnegie Mellon Software Engineering Institute, USA
- Achieving Usability through Software Architecture  
L. Bass, Carnegie Mellon Software Engineering Institute, USA; and B. E. John, Carnegie Mellon University, USA





## At a Glance

7:30	<b>Breakfast</b> @Harbour and @Frontenac Foyers <b>Speaker's Breakfast</b> @Pier 6
8:30–10:00	<b>S21 TP</b> @Pier 4 <b>S22 TP</b> @Pier 5 <b>S23 CSR</b> @Frontenac <b>S24 CHASE</b> @Queen's Quay <b>S25 FD</b> @Pier 7 & 8
	<b>Nutrition Break</b> @Frontenac Foyer
10:30–11:30	<b>S26 Keynote</b> M. Shaw @Frontenac
11:30–12:00	<b>S27 Award Presentation</b> @Frontenac <b>Lunch</b> @Metro East
1:10–1:50	<b>S28 Awards Presentations</b> @Frontenac <b>Break</b> @Harbour and Frontenac Foyers
2:00–3:30	<b>S29 TP</b> @Pier 4 <b>S30 TP</b> @Pier 5 <b>S31 CSR</b> @Frontenac <b>S32 CHASE</b> @Queen's Quay <b>S33 FD</b> @Pier 7 & 8
	<b>Nutrition Break</b> @Harbour and @Frontenac Foyers
4:00–5:30	<b>S34 TP</b> @Pier 4 <b>S35 TP</b> @Pier 5 <b>S36 CSR</b> @Frontenac <b>S37 CHASE</b> @Queen's Quay <b>S38 FD</b> @Pier 7 & 8
7:00–10:00	<b>S39 Reception</b> @Harbour Ballroom

Internet Café  
@Bay, 7:30 am–7:00 pm

EPIC  
@Pier 2 & 3, 7:30 am–7:00 pm

**TP** Technical Papers  
**CSR** Case Study Reports  
**CHASE** Challenges and Achievements in SE  
**FD** Formal Demos

## 8:30 am–10:00 am

### S21 TP @Pier 4

#### Dynamic Analysis and Testing

Session chair: David S. Rosenblum, University of California, Irvine, USA

- The Specification and Testing of Quantified Progress Properties in Distributed Systems  
P. Krishnamurthy and P. A. G. Sivilotti, Ohio State University, USA
- An Explorative Journey from Architectural Tests Definition down to Code Tests Execution  
A. Bertolino, IEI-CNR, Italy; and P. Inverardi and H. Muccini, University of L'Aquila, Italy
- Encoding Program Executions  
S. P. Reiss and M. Renieris, Brown University, USA

### S22 TP @Pier 5

#### Construction of Component-Based Systems

Session chair: Don Batory, University of Texas at Austin, USA

- Dynamic and Selective Combination of Extensions in Component-Based Applications  
E. Truyen, B. Vanhaute, W. Joosen, P. Verbaeten, Katholieke Universiteit Leuven, Belgium; and B. Nørregaard Jørgensen, Southern University of Denmark, Denmark
- Generating Wrappers for Command-Line Legacy Systems—The Cal-Aggie Wrap-O-Matic Project  
E. Wohlstadter, S. Jackson and P. Devanbu, University of California, Davis, USA
- Designing Components versus Objects: A Transformational Approach  
D. H. Lorenz, Northeastern University, USA; and J. Vlissides, IBM T. J. Watson Research Center, USA

### S23 CSR @Frontenac

#### Infrastructure Support

Session chair: Jeff Kramer, Imperial College, UK

- Using the Web for Document Versioning: An Implementation Report for Delta-V,  
J. J. Hunt and J. Reuter, University of Karlsruhe, Germany
- Evaluating the Reverse Engineering Capabilities of Web Tools for Understanding Site Content and Structure: A Case Study  
S. R. Tilley and S. Huang, University of California, Riverside, USA
- A Case Study of the Evolution of Jun: An Object-Oriented Open-Source 3D Multimedia Library  
A. Aoki, K. Hayashi, K. Kishida, K. Nakakoji, Y. Nishinaka, Software Research Associates, Inc., Japan; B. Reeves, TwinBear Research, USA; and A. Takashima and Y. Yamamoto, Nara Institute of Science and Technology, Japan

### S24 CHASE @Queen's Quay

#### Process-Centered Software Engineering Environments: Academic and Industrial Perspectives

Session chair: Wilhelm Schäfer, University of Paderborn, Germany

- Process-Centered Software Engineering Environments: Academic and Industrial Perspectives  
R. Balzer, Teknowledge Corporation, USA; and V. Gruhn, University of Dortmund, Germany

### S25 FD @Pier 7 & 8

#### Software Architecture

Session chair: Rudolf K. Keller, University of Montréal, Canada

- Model Processing Tools in UML  
J. Koskinen, J. Peltonen, P. Selonen, T. Systä, and K. Koskimies, Tampere University of Technology, Finland
- Hyper/J™: Multi-Dimensional Separation of Concerns for Java™  
H. Ossher and P. Tarr, IBM T.J. Watson Research Center, USA
- Architecture-Oriented Programming Using FRED  
M. Hakala, J. Hautamäki, K. Koskimies, Tampere University of Technology, Finland; and J. Paakki, A. Viljamaa, J. Viljamaa, University of Helsinki, Finland



10:30 am–11:30 am

## Keynote @Frontenac

### The Coming-of-Age of Software Architecture Research

Mary Shaw, Alan J. Perlis Professor of Computer Science, Carnegie Mellon University, USA

Session chair: Mary Jean Harrold, Georgia Institute of Technology, USA

Over the past decade, software architecture research has emerged as the principled study of the overall structure of software systems, especially the relations among subsystems and components. From its roots in qualitative descriptions of useful system organizations, software architecture has matured to encompass broad explorations of notations, tools, and analysis techniques. Whereas initially the research area interpreted software practice, it now offers concrete guidance for complex software design and development. We can understand the evolution and prospects of software architecture research by examining the research paradigms used to establish its results. These are, for the most part, the paradigms of software engineering. We advance our fundamental understanding by posing research questions of several kinds and applying appropriate research techniques, which differ from one type of problem to another, yield correspondingly different kinds of results, and require different methods of validation. Unfortunately, these paradigms are not recognized explicitly and are often not carried out correctly; indeed not all are consistently accepted as valid. This retrospective on a decade-plus of software architecture research examines the maturation of the software architecture research area by tracing the types of research questions and techniques used at various stages. We will see how early qualitative results set the stage for later precision, formality, and automation and how results build up over time. This generates advice to the field and projections about future impact.

11:30 am–12:00 pm

## S27 Award Presentation @Frontenac ACM SIGSOFT and IEEE TCSE Award: Most Influential Paper from ICSE 13

Session chairs: Mary Jean Harrold, Georgia Institute of Technology, USA; and Wilhelm Schäfer, University of Paderborn, Germany

### "Tolerating Inconsistency" Revisited

Robert Balzer, Chief Technical Officer and Director of Distributed Systems Unit, Teknowledge Corporation, USA

We're surrounded by inconsistency: in our requirements, in the data that our software processes, and in those software systems themselves. Yet our formal systems can't handle such inconsistency. Most of them lose the ability to form any valid conclusions or analyses in the presence of even a single inconsistency. This forces our programs to operate in terms of an idealized model rather than the real world with the attendant requirement to either maintain a mapping between the two or force human operators to resolve the inconsistencies before the data is processed by the idealized system. My Tolerating Inconsistency paper introduced a simple way to scope formal constraint systems so that they applied only to the consistent data. Data inconsistent with these rules could then be represented and processed by giving them special marks to place them outside the rules' scope. My talk will review the influence this idea had on the field and my subsequent work.



1:10 pm–1:50 pm

## S28 Award Presentation @Frontenac ACM Service, ACM Research, and IEEE Computer Society Harlan D. Mills Award

Session Chairs:  
ACM SIGSOFT and IEEE TCSE Chairs

2:00 pm–3:30 pm

## S29 TP @Pier 4

### Reengineering and Software Evolution

Session chair: Jens H. Jahnke, University of Victoria, Canada

- Exploiting the Map Metaphor in a Tool for Software Evolution  
W. G. Griswold and J. J. Yuan, University of California, San Diego, USA; and Y. Kato, University of Tokyo, Japan
- Separating Features in Source Code: An Exploratory Study  
G. C. Murphy, A. Lai, R. J. Walker, and M. P. Robillard, University of British Columbia, Canada
- Comparing Frameworks and Layered Refinement  
R. Cardone and C. Lin, University of Texas, Austin, USA

## S30 TP @Pier 5

### Analysis of Architectures

Session chair: Nenad Medvidovic, University of Southern California, USA

- Quantifying the Costs and Benefits of Architectural Decisions  
R. Kazman, Carnegie Mellon Software Engineering Institute, USA; J. Asundi, Carnegie Mellon University, USA; and M. Klein, Carnegie Mellon Software Engineering Institute, USA
- Survivability Analysis of Networked Systems  
S. Jha, University of Wisconsin, USA; and J. M. Wing, Carnegie Mellon University, USA
- Adaptive Feedback Scheduling of Incremental and Design-To-Time Tasks  
P. H. Feiler and J. J. Walker, Carnegie Mellon Software Engineering Institute, USA

## S31 CSR @Frontenac

### Applications of New Paradigms in Software Development

Session chair: Dennis Smith, Software Engineering Institute, USA

- Case Study: Extreme Programming in a University Environment  
M. M. Müller and W. F. Tichy, University of Karlsruhe, Germany
- Improving Validation Activities in a Global Software Development Environment  
C. Ebert, C. H. Parro, R. Suttels, and H. Kolarczyk, Alcatel, France
- Applying WinWin to Quality Requirements: A Case Study  
H. In, B. Boehm, T. Rodgers, and M. Deutsch, Texas A&M University, University of Southern California, USA

2:00 pm–3:30 pm

## S32 CHASE @Queen's Quay Specification and Modeling

Session chair: Gregor Engels,  
University of Paderborn, Germany

- Specification and Modeling: An Academic Perspective  
M. Broy, University of Munich, Germany
- Specification and Modeling: An Industrial Perspective  
B. Selic, Rational, Inc., Canada

## S33 FD @Pier 7 & 8

### Reuse and Integration

Session chair: George T. Heinmann,  
Worcester Polytechnic Institute, USA

- CodeWeb: Data Mining Library Reuse Patterns  
A. Michail, University of New South Wales, Australia
- Holmes: An Intelligent System to Support Software Product Line Development  
G. Succi, J. Yip, and W. Pedrycz, University of Alberta, Canada
- Babel: Representing Business Rules in XML for Application Integration  
H. Zhang and E. Stroulia, University of Alberta, Canada



4:00 pm–5:30 pm

## S34 TP @Pier 4 Improving the Testing Process

Session chair: Katsuro Inoue,  
Osaka University, Japan

- Incorporating Varying Test Costs and Fault Severities into Test Case Prioritization  
S. Elbaum, University of Nebraska, Lincoln, USA; A. Malishevsky, Oregon State University, USA; and G. Rothermel, Oregon State University, USA
- Finding Failures by Cluster Analysis of Execution Profiles  
W. Dickinson, D. Leon, and A. Podgurski, Case Western Reserve University, USA
- Understanding IV & V in a Safety Critical and Complex Evolutionary Environment: The NASA Space Shuttle Program  
M. V. Zelkowitz and I. Rus, University of Maryland, USA

## S35 TP @Pier 5 Mobile Agents

Session chair: Israel Ben-Shaul,  
Technion-Israel Institute of Technology,  
VersEdge Technologies, Israel

- Theory of Software Reliability Based on Components  
D. Hamlet, Portland State University, USA; and D. Mason and D. Woit, Ryerson Polytechnic University, Canada
- Engineering Mobile-Agent Applications via Context-Dependent Coordination  
G. Cabri, L. Leonardi, and F. Zambonelli, University of Modena, Italy
- Consistent Group Membership in Ad Hoc Networks  
G.-C. Roman, Q. Huang, and A. Hazemi, Washington University, Saint Louis, USA

## S36 CSR @Frontenac Software Evolution

Session chair: Timothy C. Lethbridge,  
University of Ottawa, Canada

- TICRA—An Architectural Style for Enterprise Application Integration  
W. Emmerich, University College London, UK; E. Ellmer, Zuhlke Engineering GmbH, Germany; and H. Fieglein, DG Bank, Germany
- Reengineering Analysis of Object-Oriented Systems via Duplication Analysis  
F. Fioravanti, G. Migliarese, and P. Nesi, University of Florence, Italy

## S37 CHASE @Queen's Quay Impact Project Panel

Panel chair: Leon J. Osterweil,  
University of Massachusetts, Amherst, USA

### Panelists:

- Dieter Rombach, Fraunhofer IESE, Germany
- Jacky Estublier, French National Research Organisation (CNRS), France
- Mary Lou Soffa, University of Pittsburgh, USA

### “Determining the Impact of Software Engineering Research Upon Practice”

The goal of the Impact project is to study the impact that software engineering research has had upon software development practice. The reasons for doing this include: identifying the sorts of contributions that have had substantial impact, determining the research modalities that have been relatively more successful, and anticipating the directions that software engineering research might most effectively pursue, based upon its history and positioning. Impact project research will be held to the highest standards of scrupulous scholarship. It is expected to be useful to the software engineering research and development communities, as

well as to other academic disciplines, government funding agencies and the public at large in helping with the objective assessment of the software engineering community's record of achievement. The output of the project will be series of documents and briefings targeted to different audiences. At the base of the documentation will be a series of articulate, objective, and complete scholarly papers, each tracing the way in which software technology that is in common use has drawn upon software engineering research. Each of these papers is expected to be of journal quality and size, and is expected to be published eventually in a high quality journal. It is expected that each such paper will be the product of the joint efforts of a team of perhaps 8–10 experts in the particular area. It is anticipated that as many as 20 such papers will be produced, each studying the genesis of a different area of important contemporary software engineering practice. It is also expected that a compendium of the papers will be published as a separate volume, perhaps as part of the ICSE 2002 proceedings.

## S38 FD @Pier 7 & 8

### Verification and Maintenance

Session chair: Eleni Stroulia,  
University of Alberta, Canada

- jMOCHA: A Model Checking Tool that Exploits Design Structure  
R. Alur, University of Pennsylvania, USA; L. de Alfaro, University of California, Berkeley, USA; R. Grosu, SUNY, Stony Brook, USA; T. A. Henzinger, University of California, Berkeley, USA; M. Kang, University of Pennsylvania, USA; C. M. Kirsch, R. Majumdar, F. Mang, University of California, Berkeley, USA; and B. Y. Wang, University of Pennsylvania, USA
- Maintenance Support Tools for Java Programs: CCFinder and JAAT  
T. Kamiya, F. Ohata, K. Kondou, S. Kusumoto, K. Inoue, Osaka University, Japan
- Using OCL-Queries for Debugging C++  
C. Hobatr and B. A. Malloy, Clemson University, USA

## At a Glance

7:30	<b>Breakfast</b> @Harbour and @Dockside Foyers <b>Speaker's Breakfast</b> @Pier 6	<b>Internet Café</b> @Bay, 7:30 am - 2:00 pm	
8:30-10:30	<b>S40 TP</b> @Pier 4 & 5 <b>S41 TP</b> @Queen's Quay <b>S42 POSE</b> @Frontenac		
	<b>Nutrition Break</b> @Frontenac Foyer		
11:00-12:00	<b>S43 Keynote</b> B. Voigt @Frontenac		
	<b>Lunch</b> on your own		
1:10-1:50	<b>S44 FoSP</b> @Pier 4 & 5 <b>S45 FoSP</b> @Queen's Quay <b>S46 FoSP</b> @Frontenac <b>S47 FoSP</b> @Pier 7 & 8		
	<b>Break</b> @Harbour and @Frontenac Foyers		
2:00-3:00	<b>S48 Keynote</b> L. M. Northrop @Frontenac <b>Nutrition Break</b> @Frontenac Foyer		<b>EPIC</b> @Pier 2 & 3, 7:30 am - 2:00 pm
3:15-4:45	<b>S49 TP</b> @Queen's Quay <b>S50 SERA</b> @Frontenac		
4:45-5:00	<b>S51 Closing</b> @Frontenac		

**TP** Technical Papers  
**PoSE** Perspectives on SE Panel  
**FoSP** Frontiers of Software Practice  
**SERA** SE Research Agendas Panel



## 8:30 am-10:00 am

### S40 TP @Pier 4 & 5

#### Analysis of Requirements

Session chair: Peri Tarr,  
IBM T.J. Watson Reserach Center, USA

- Fast Formal Analysis of Requirements via "Topoi Diagrams"  
T. Menzies, University of British Columbia, Canada; J. Powell, Averstar Inc., USA; and M. E. Houle, University of Sydney, Australia
- Conceptual Modeling through Linguistic Analysis Using LIDA  
S. P. Overmyer, Drexel University, USA, B. Lavoie, CoGenTex, Inc., USA; and O. Rambow, ATT Research, USA
- A Framework for Multi-Valued Reasoning Over Inconsistent Viewpoints  
S. Easterbrook and M. Chechik, University of Toronto, Canada
- Functional Palaeontology: System Evolution as the User Sees It  
A. I. Antón, North Carolina State University, USA; and C. Potts, Georgia Institute of Technology, USA

### S41 TP @Queen's Quay

#### Formal Frameworks

Session chair: Kokichi Futatsugi,  
JAIST, Japan

- A General Framework for Formalizing UML with Formal Languages  
W. E. McUumber and B.H. C. Cheng, Michigan State University, USA
- Efficient Filtering in Publish Subscribe Systems Using Binary Decision Diagrams  
A. Campialla, Microsoft, USA; S. Chaki, Carnegie Mellon University, USA; E. Clarke, Carnegie Mellon University, USA; S. Jha, University of Wisconsin, USA; and H. Veith, Vienna University of Technology, Austria
- A Scalable Formal Method for Design and Automatic Checking of User Interfaces  
J. Berstel, Université de Marne-la-Vallée, France, S. Crespi Reghizzi, Politecnico di Milano, Italy; G. Rousset, Université de Marne-la-Vallée, France; and P. San Pietro, Politecnico di Milano, Italy
- Scientific Rigour, an Answer to a Pragmatic Question: A Liguistic Framework for Software Engineering  
A. M. Haeberer, ATX SA, UK; and T. S. E. Maibaum, King's College London, UK

### S42 Panel @Frontenac

#### Perspectives on Software Engineering Panel (PoSE)

Panel chair: David Notkin,  
University of Washington, USA

#### Panelists:

- Marc Donner, Morgan Stanley, USA
- Michael D. Ernst, Massachusetts Institute of Technology, USA
- Michael Gorlick, Endeavors Technology, Inc.
- Margaret-Anne Storey, University of Victoria, Canada
- E. James Whitehead, University of California, Santa Cruz, USA

#### "The Future of Software Engineering"

This panel gives a non-standard view of the future of software engineering. Two of the speakers are recent Ph.D. graduates in computer science, with expertise in software engineering, who have taken academic positions; as people who will educate the next generation of software engineering practitioners and researchers, they provide a key vision of the future. The other two speakers are senior, having moved from the research community into a world in which they face the problems of engineering software on a daily basis. Collectively, along with interactions from the audience, these two often underrepresented perspectives provide a sense of the key directions in which software engineering— practice, research, and education — should and must go.



11:00 am–12:00 pm

**S43 Keynote @Frontenac****Software Engineering Challenges: A CIO's Perspective**

Bernd Voigt, Senior Vice President and Chief Information Officer, Lufthansa, Germany

Session chair: Wilhelm Schäfer, University of Paderborn, Germany

To be competitive in today's market, businesses face many challenges in the development and maintenance of information systems. These systems are usually widely distributed. They incorporate highly critical corporate knowledge, which has to be easily accessible and maintainable. Engineering these large systems efficiently requires making decisions about a number of issues. Decisions about whether to build or buy software affect qualities of the software such as customization and reusability, and decisions about mobility of services affect qualities of the software such as maintainability. Moreover, for improved reliability, techniques that can provide seamless but secure and reliable information flow and transaction processing, although expensive, must be integrated into the development process. Finally, systems must be adaptable to new technologies such as wireless computing. Old existing legacy software has to be integrated with new web-based applications such as portals or the whole world of "e". In this talk, I will consider software engineering from the point of view of a concerned layman, and discuss software development and systems at Lufthansa. I will discuss the underlying architecture of the Lufthansa systems, which consist of a variety of systems and interfaces. I will also discuss the role of the Y2K problem as a germ for renewed life. Finally, I will discuss Lufthansa's view of the client-server architecture as an intermediate stage towards building advanced information systems, which meet the above mentioned challenges.

1:10 pm–1:50 pm

**S44 FoSP @Pier 4 & 5****AntiPatterns in Software Architecture**

Tom Mobray, World Wide Institute of Software Architects (WWISA), USA

Session chair: Margaret-Anne Storey, University of Victoria, Canada

This presentation will provide an introduction to common AntiPatterns in Software Architecture, and their resolution through reference models. AntiPatterns are an intriguing variation of design patterns. AntiPatterns clarify ineffective software practices, as well as raise awareness of alternative solutions. In the context of software architecture, AntiPatterns can clarify the necessity of problem-solving skills revealed in software engineering reference models, such as, the Software Design Level Model (SDLM) and the Reference Model for Open Distributed Processing (RM-ODP). In particular, this presentation will discuss how traditional software engineering assumptions become serious AntiPatterns, when applied to distributed software architectures.

**S45 FoSP @Queen's Quay****Dependability of Embedded Systems**

John Knight, University of Virginia, USA

Session chair: Anatol W. Kark, National Research Council, Canada

Embedded systems present especially difficult challenges in software engineering because they usually operate in real time on machines with modest resources and can cause extensive damage if they fail. In practice the interplay between systems and software plays a significant role in dependability and must be considered in embedded software development. In this presentation the basic issues of dependability as they apply to embedded systems will be discussed, and several systems-engineering and software-engineering techniques for improving dependability will be reviewed. Topics to be covered include hazard analysis, fault-tree analysis, formal specification, design for safety, and verification.

**S46 FoSP @Frontenac****Inter-Language Object Sharing with the Common Language Runtime: Infrastructure for MS .NET**

Jennifer Hamilton, Microsoft Corp., USA

Session chair: Hausi A. Müller, University of Victoria, Canada

The Common Language Runtime (CLR) is language and platform-neutral, and provides the underlying infrastructure for the Microsoft .NET Framework. It consists of several components, including a garbage collector, class loader, metadata engine, just-in-time compiler, and debugging and security services. This talk will introduce the CLR, describe its design, and demonstrate how it enables inter-language object sharing.

**S47 FoSP @Pier 7 & 8****Collaborative Software Engineering**

Alan Brown, Catapult Inc., USA

Session chair: P. Sorenson, University of Alberta, Canada

Software development is a collaborative activity involving the sharing of ideas, artifacts, and knowledge among teams of engineers. Many elements are emerging to enhance the importance of collaboration in software development geographically dispersed teams, more partnering within and across organizations, and leveraging of the Internet as a coordination infrastructure. In particular, the future of software development will be through leveraging the Internet as the base on which collaborative development services will be offered. To be successful requires that the next generation of software development environments be based on the "Three C's"—community, collaboration, and coordination. This presentation examines the requirements for future software development environments, illustrates the kinds of services that must be offered, and examines the challenges that must be overcome in collaborative environments for building the next generation of enterprise scale software solutions. As a result, the presentation explores the current state of collaborative software engineering, analyses the currently available collaborative technologies, and establishes the current state-of-the-practice in collaborative software engineering.

2:00 pm–3:00 pm

## S48 Keynote @Frontenac

### Reuse That Pays

Linda M. Northrop, Director, Product Line Systems Program, Software Engineering Institute, USA

Session chair: Hausi A. Müller, University of Victoria, Canada

A company builds a software system capable of running a diesel engine in a week, and in one case over a weekend, as opposed to the full year that it used to take. Another company builds one of its typical systems with 13 software engineers instead of the more than 100 it once required, and at the same time decreases the system's defect rate tenfold. Still another increases its software-intensive product offerings from four per year to 50 per year. Imagine being able to use one person to integrate and test 1.5 million source lines of Ada for a real-time command-and-control system onboard a ship, with safety-critical requirements? Or increasing software productivity fourfold over three years, as another company has done? These organizations all achieved their results through strategic software reuse. We software people have been promising the benefits of reuse for decades. Are we finally achieving a reuse strategy that lives up to its hype?



3:15 pm–4:45 pm

## S49 TP @Queen's Quay

### Architecture for Emerging Applications

Session chair: Elisabetta Di Nitto, Politecnico di Milano, Italy

- An Architecture for Heterogeneous Groupware Applications  
I. Marsic, Rutgers University, USA
- A Web-Oriented Architectural Aspect for the Emerging Computational Tapestry  
K. J. Sullivan and A. Saxena, University of Virginia, USA
- XAS: A System for Accessing Componentized, Virtual XML Documents  
M.-L. Lo, S.-K. Chen, S. Padmanabhan and J.-Y. Chung, IBM T. J. Watson Research Center, USA

## S50 Panel @Frontenac

### Software Engineering Research Agendas Panel (SERA)

Panel chair: Dieter Rombach, Fraunhofer IESE, Germany

#### Panelists:

- Ross Jeffery, University of New South Wales, Australia
- Ali Mili, West Virginia University, USA
- Leon J. Osterweil, University of Massachusetts, Amherst, USA
- David L. Parnas, McMaster University, Canada
- Tetsuo Tamai, University of Tokyo, Japan

#### "What can't we do, but need to learn how to do?"

The software challenges of the new millennium include more mature users expecting functioning software, more critical technical and business applications requiring dependable software, globalization requiring distributed development teams, and paradigm clashes between new and old economy firms. Software engineering has to be evaluated anew in terms of "what can't we do today, and what do we have to learn how to do in order to meet those challenges." This panel discusses and proposes urgent research topics as well as research programs to address those topics. Although, such discussions are going on in all different countries (e.g., PITAC in the US, similar activities in Germany), this international panel will add new perspectives thought inter-cultural cross-fertilization. The panel will consist of three parts: position statements and brief discussions among panelists, questions/answers from the audience, and summary.

4:45 pm–5:00 pm

## S51 @Frontenac

### ICSE 2001 Closing

Session chair: Will Tracz, Lockheed Martin Federal Systems, USA



Toronto City Hall

## Exhibits, Posters and Informal Demos (EPIC)

ICSE 2001 exhibits feature publishers and leading companies offering software engineering capabilities and tools, education and training, books and journals, and consulting services. Formal research demos, posters and informal research demonstrations are displayed in the exhibits area and provide the opportunity to exhibit late-breaking results and to discuss these results with conference participants.

Schedule for Exhibits		
<b>Tuesday, May 15</b>	<b>5:45 pm–9:00 pm</b>	<b>@Pier 2 &amp; 3</b>
<b>Wednesday, May 16</b>	<b>8:30 am–9:00 pm</b>	<b>@Pier 2 &amp; 3</b>
<b>Thursday, May 17</b>	<b>8:30 am–7:00 pm</b>	<b>@Pier 2 &amp; 3</b>
<b>Friday, May 18</b>	<b>8:30 am–2:00 pm</b>	<b>@Pier 2 &amp; 3</b>
Set Up		
<b>Tuesday, May 15</b>	<b>2:00 pm–5:45 pm</b>	<b>@Pier 2 &amp; 3</b>
Tear Down		
<b>Friday, May 18</b>	<b>2:00 pm–5:00 pm</b>	<b>@Pier 2 &amp; 3</b>
Formal Demos Presentations (see Thursday schedule for details)		
<b>Thursday, May 17</b>	<b>10:30 am–5:30 pm</b>	<b>@Pier 2 &amp; 3</b>

## Posters

Session chair: Rudolf K. Keller, University of Montréal, Canada

- A DSSA Simulator Presentation  
Robert M. Klashner, University of California, Irvine, USA
- A Syntax Directed Environment for Tabular Form Designing  
Shun-ichi Nakagawa, Tomokazu Arita, Youzou Miyadera, Kensei Tsuchida, Kiyonobu Tomiyama, and Takeo Yaku, Nihon University, Japan
- A Comparison of Method Refactoring Transformations in Smalltalk and Java  
Christopher Seguin, Consultant, USA
- A Web-Based European Software Process Benchmarking Server  
Yingxu Wang, IVF, Sweden

## Informal Demos

Session chair: Rudolf K. Keller, University of Montréal, Canada

- An Integrated Complex Real-Time System Design Method  
Jing Wang, Shantou University, China; and Peijiang Yuan, University of Western Ontario, Canada
- Capturing and Exploring High-Level Requirements and Designs with the Use Case Maps Navigator  
Murray Woodside and Andrew Miga, Carleton University, Canada; and Daniel Amyot and Gunter Mussbacher, Mitel Corporation, Canada

## Exhibits

Session Chairs: Homy Dayani-Fard, IBM Toronto Laboratory, Canada; homy@ca.ibm.com; and Kostas Kontogiannis, University of Waterloo, Canada; kostas@swen.uwaterloo.ca

## Commercial Demos

ACD Systems ■ IBM (VA)java ■ IBM (MQSeries) ■ IBM (OLT) ■ KLOCWORK ■ Neuma ■ Semantic Designs ■ Rational

## Publishers

Artech House Publishers ■ Cambridge University Press ■ Elsevier Science ■ John Wiley ■ Kluwer ■ Pearson PTR Canada

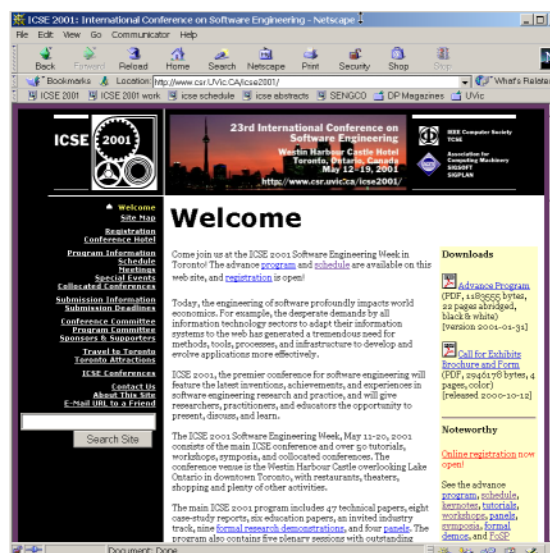
## Internet Cafés

You are welcome to visit the two ICSE 2001 Internet Cafés, which provide central zones for meetings, discussions, and collaboration of researchers and developers from around the world. Read your email, and visit all the interesting URLs you will notice during the conference and the exhibits at once. And don't forget the ICSE 2001 web page with the latest announcements and up-to-date information. Come and meet your colleagues!

Schedule for Internet Cafés		
<b>Monday, May 14</b>	<b>12:00 pm–9:00 pm</b>	<b>@Bay</b>
<b>Tuesday, May 15</b>	<b>7:30 am–9:00 pm</b> <b>5:45 pm–9:00 pm</b>	<b>@Bay</b> <b>@Pier 2 &amp; 3</b>
<b>Wednesday, May 16</b>	<b>7:30 am–9:00 pm</b>	<b>@Bay</b> <b>@Pier 2 &amp; 3</b>
<b>Thursday, May 17</b>	<b>7:30 am–7:00 pm</b>	<b>@Bay</b> <b>@Pier 2 &amp; 3</b>
<b>Friday, May 18</b>	<b>7:30 am–2:00 pm</b>	<b>@Bay</b> <b>@Pier 2 &amp; 3</b>
Set Up		
<b>Monday, May 14</b>	<b>8:30 am–12:00 pm</b>	<b>@Bay</b>
<b>Tuesday, May 15</b>	<b>2:00 pm–5:45 pm</b>	<b>@Pier 2 &amp; 3</b>
Tear Down		
<b>Friday, May 18</b>	<b>2:00 pm–5:00 pm</b>	<b>@Bay</b> <b>@Pier 2 &amp; 3</b>

Don't forget to visit the ICSE 2001 Web Site at

<http://www.csr.uvic.ca/icse2001/>



# COLLOCATED EVENTS AND MEETINGS

## At a Glance

	Fri May, 11	Sat May, 12	Sun May, 13	Mon May, 14	Tue. May, 15	Wed May, 16	Thu May, 17	Fri May, 18	Sat May, 19	Sun May, 20	
<b>Conferences</b>											
<b>ICSE 2001</b> Intl. Software Engineering Conference 2001			see schedule								
<b>EHCI 2001</b> Engineering for Human-Computer Interaction 2001	@Pier 5	@Pier 5	@Pier 5 (am) @Pier 9 (pm)	General Chair: <b>Rick Kazmann</b> , Carnegie Mellon Software Engineering Institute, USA							
<b>IWPC 2001</b> Intl. Workshop on Program Comprehension 2001		@Pier 7 & 8 and @Pier 6		General Chair: <b>Ric Holt</b> , University of Waterloo, Canada							
<b>SSR 2001</b> Symposium on Software Reusability 2001								@Dock-- side I-IV	@Harbour C and @Pier 4	@Harbour C	
<b>SPIN 2001</b> Spin Workshop on Model Checking of Software 2001									@Pier 9		
<b>ICSE Meetings</b>											
ICSE 2002 Org. Meeting											
ICSE 2002 PC Meeting											
ICSE 2003 Org. Meeting											
ICSE St. Committee Meeting											
ICSE 2001 Post Mortem Meeting											
<b>Birds of a Feather Sessions</b>											
CeBASE Collaborators Meeting											
<b>Other Meetings</b>											
CSER Meeting											
ACM SIGSOFT General Meeting											
IEEE TCSE General Meeting											
IEEE TSE Edit. Board Meeting											
ICSM 2001 PC Meeting											
ESEC/FSE PC Meeting											





**ICSE Meetings**

- ICSE 2002 Organizational Meeting
- ICSE 2002 Program Committee Meeting
- ICSE 2003 Organizational Meeting
- ICSE Steering Committee Meeting
- ICSE 2001 Post Mortem Meeting

Monday, May 14, 6:00 pm–7:30 pm, @Pier 4  
 Thursday, May 17, 5:30 pm–7:00 pm, @Pier 7 & 8  
 Thursday, May 17, 5:30 pm–7:00 pm, @Pier 5  
 Tuesday, May 15, 8:30 pm–11:00 pm, @Pier 4  
 Saturday, May 19, 8:00 am–10:00 am, @Wellington

**Birds of a Feather Sessions**

- CeBASE Collaborators Meeting

Chairs: Victor R. Basili and Barry Boehm

CeBASE, the NSF sponsored Center for Empirically-Based Software Engineering aimed at strengthening and propagating the results of empirical research is having a meeting of current and perspective CeBASE collaborators. The goal is to provide an update on activities for collaborators, discuss potential directions and future opportunities, and provide a forum for interaction.

Thursday, May 17, 5:30 pm–7:00 pm, @Pier 4

**Other Conference and Organizational Meetings**

- CSER Meeting
- ACM SIGSOFT General Meeting
- IEEE TCSE General Meeting
- IEEE TSE Editorial Board Meeting
- ICSM 2001 Program Committee Meeting
- ESEC/FSE Program Committee Meeting

Friday, May 11, 4:00 pm–8:00 pm, @Pier 7 & 8

Chair: Anatol W. Kark, National Research Council of Canada

Wednesday, May 16, 8:00 pm–9:00 pm, @Pier 4 & 5

Wednesday, May 16, 9:00 pm–10:00 pm, @Pier 7 & 8

Thursday, May 17, 12:00 pm–1:30 pm, @Dockside IV

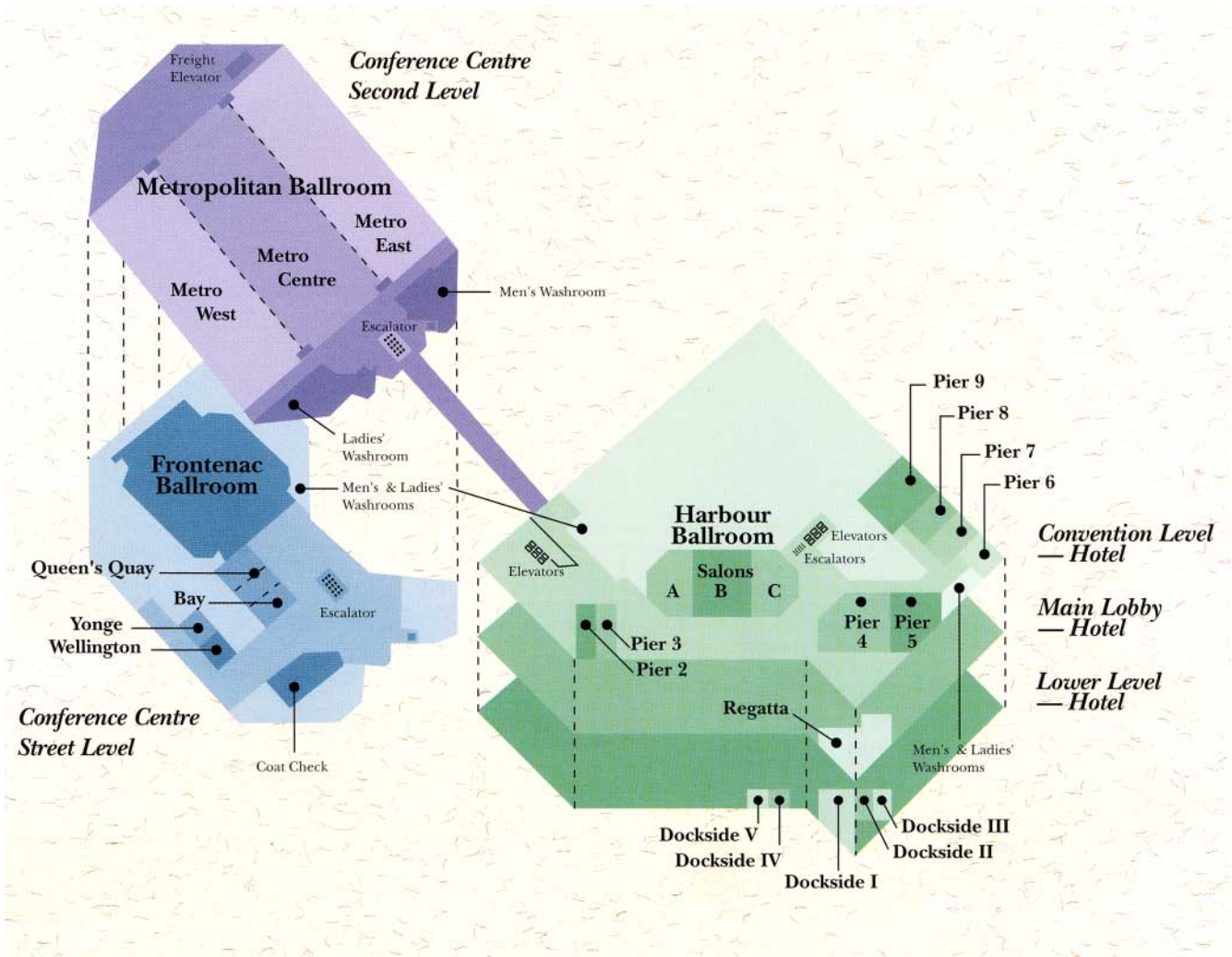
Saturday, May 19–Sunday, May 20, @Dockside I

Saturday, May 19–Sunday, May 20, @Dockside II



Toronto on Lake Ontario by Nighth

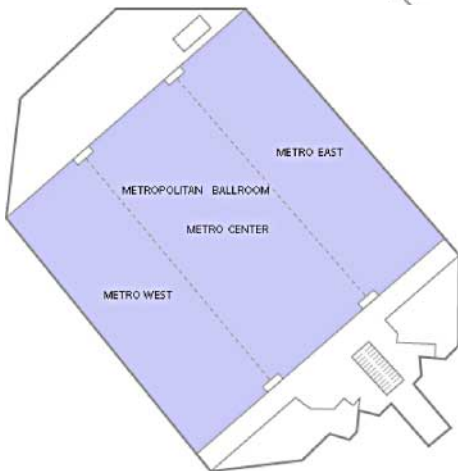
# HOTEL FLOORPLAN



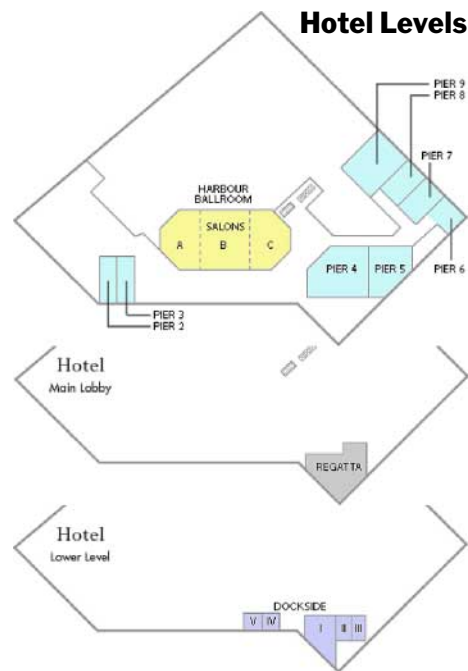
**Conference Center Second Level**



**Conference Center Street Level**



**Hotel Levels**



## ICSE 2001 . May 12 - 19, 2001 . Advance Registration Form

The ICSE 2001 conference fee includes the keynote by **Professor Frederick Brooks** on Tuesday evening.

First name \_\_\_\_\_ Last name \_\_\_\_\_  
 Name as preferred on badge \_\_\_\_\_ Title \_\_\_\_\_  
 Company/Institution \_\_\_\_\_  
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I am a member of:  IEEE  IEEE CS  ACM  ACM SIGSoft  ACM SIGPlan  
 IEEE Member Nr.: \_\_\_\_\_ ACM Member Nr.: \_\_\_\_\_

- I am a full-time student and am including proof of current student status with my registration.  
 I have special needs and access: \_\_\_\_\_  
 I do NOT want my address distributed.

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<http://www.csr.uvic.ca/icse2001/>

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### Mail form to:

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 Maitland, FL 32794-1156 USA

### For express mail only:

ICSE 2001  
 c/o Registration Systems Lab  
 2060 Goldwater Court  
 Maitland, FL 32751 USA

### TUTORIALS (Please circle tutorial numbers)

Sunday Full Day T1 T2  
 Sunday Morning T3  
 Sunday Afternoon T4  
 Monday Full Day T5 T6 T7  
 Monday Morning T8 T9 T10 T11  
 Monday Afternoon T12 T13 T14 T15  
 Tuesday Full Day T16 T17 T18 T19 T20  
 Tuesday Morning T21  
 Tuesday Afternoon T22

### WORKSHOPS & COLLOCATED EVENTS (Please circle number or name)

Friday - Saturday - Sunday EHCI  
 Saturday - Sunday (5/12 - 5/13) IWPC  
 Sunday W1 W2 W3 W4  
 Sunday-Monday W5 W6  
 Monday W7 W8 W9 W10 W11  
 Monday-Tuesday W12 W13 W14  
 Tuesday W15 W16 W17 W18  
 Tuesday Morning New SE Faculty Symposium (no registration fee)  
 Tuesday David Lorge Parnas Symposium  
 Saturday - Sunday (5/19 - 5/20) SPIN SSR

(Please circle the appropriate fees)

### FEES in U.S. DOLLARS:

	On or Before April 12, 2001			After April 12, 2001			
	Member	Non-Member	Student	Member	Non-Member	Student	
ICSE 2001 Full Conference (Wed, Thu, Fri)	430	550	175	530	680	250	\$ _____
One Day Conference: <input type="checkbox"/> Wed <input type="checkbox"/> Thu <input type="checkbox"/> Fri	250	250	250	250	250	250	\$ _____
Tutorial: Full Day or 2 Half Days	350	450	200	450	550	225	\$ _____
Tutorial: Half Day	200	275	125	250	300	150	\$ _____
Workshop: 2-Day	250	350	125	385	475	235	\$ _____
Workshop: 1-Day	150	200	75	275	345	150	\$ _____
David Lorge Parnas Symposium	250	320	175	320	400	250	\$ _____
IWPC	IEEE 310	390	120	IEEE 375	470	145	\$ _____
EHCI	ACM 400	425	125	ACM 500	525	150	\$ _____
SPIN	ACM 175	225	125	ACM 205	255	155	\$ _____
SSR	ACM 300	325	125	ACM 330	365	155	\$ _____
SSR Tutorial*	ACM 130	150	100	ACM 150	180	130	\$ _____
Exhibit Hall Only (One Day)	20	20	20	20	20	20	\$ _____
Additional Reception Ticket	50	50	50	50	50	50	\$ _____
Additional Proceedings	30	30	30	30	30	30	\$ _____
							TOTAL ENCLOSED: \$ _____

\* You will choose your tutorial onsite. Please see <http://www.abitmore.be/ssr2001/>

**ICSE 2001 Conference** fee includes entry to all technical sessions, exhibits, receptions, nutrition breaks, and one copy of conference proceedings.

**One Day Conference** fee includes entry to one day of technical sessions, exhibits, reception if applicable, nutrition breaks for one day, and one copy of conference proceedings.

**Tutorial** fee includes entry to chosen tutorial(s), luncheon(s), nutrition break(s), and applicable tutorial notes.

**Workshop** fee includes entry to chosen workshop(s), luncheon(s), nutrition break(s), and preprints of workshop position papers.

**Collocated Conference(s)** (IWPC, EHCI, SPIN, SSR) fee(s) include entry to the chosen conference(s), luncheon(s) (if provided), nutrition breaks(s) and conference proceedings.

**Cancellations** made in writing and faxed or postmarked by April 12, 2001 will be accepted subject to a \$50 cancellation fee. Refunds will be made within four weeks of the end of the conference. Cancellations will not be accepted after April 12, 2001. "No shows" are not refundable and are liable for the full registration fee. Instead of canceling, your registration may be transferred by giving a colleague a written authorization.

Forms without payment will NOT be processed.

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**Wilhelm Schäfer (co-chair)**, University of Paderborn, Germany; wilhelm@uni-paderborn.de

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**Hausi A. Müller (co-chair)**, University of Victoria, Canada; haus@csr.uvic.ca

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## SE Research Agendas Panel

**Dieter Rombach (chair)**, Fraunhofer IESE, Germany; rombach@iese.fhg.de

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**Gabriel Silberman (co-chair)**, IBM Toronto Laboratory, Canada; gabbys@ca.ibm.com  
**Kenny Wong (co-chair)**, University of Alberta, Canada; kenw@cs.ualberta.ca

## David Lee Parnas Symposium

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**David M. Weiss (co-chair)**, Avaya Communication, USA; weiss@avaya.com

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**Spencer Rugaber**, Georgia Institute of Technology, USA  
**Eleni Stroulia**, University of Alberta, Canada  
**Steve Woods**, Quack.com, USA

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May 19-25, 2002  
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May 3-10, 2003  
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