IEEE IPCCC

2001

ADVANCE PROGRAM

2001 IEEE
20TH INTERNATIONAL
PERFORMANCE, COMPUTING, AND
COMMUNICATIONS CONFERENCE

EMBASSY SUITES PHOENIX NORTH
PHOENIX, ARIZONA, U.S.A.
APRIL 4-6, 2001

IEEE
COMPUTER
SOCIETY

IEEE
COMMUNICATIONS
SOCIETY

IEEE COMPUTER SOCEITY
TECHNICAL COMMITTEE
ON THE INTERNET

IPCCC 2001
GENERAL CHAIRS' MESSAGE

Welcome to the 2001 International Performance Conference on Computers and Communications. For the last two decades, IPCCC has provided a forum for academia and industry to share ideas and gain synergy in the areas of performance, computing and communication systems. Having been involved with the conference since 1992, we are delighted to play a role in being able to continue the tradition again this year. We are also pleased with the continued sponsorship by both the IEEE Communications Society and the IEEE Computer Society of our conference.

The IPCCC 2001 executive committee makeup differs from that of previous years in that we have chairpersons from both industry and academia for the General Chair, Vice-Chair and Program Chair positions. Such a makeup has ensured that we have representation from and facilitate more easily the interchange of ideas between industry and academia.

In keeping with the IPCCC philosophy, this year's program, consisting of sixteen sessions and fifty-two papers is filled with excellent papers that span the various areas of computing and communications. Furthermore, we have invited several academia and industry practitioners to organize a series of invited focus sessions on several communication technology areas.

This year we have a day of tutorials devoted to a specific subject in computing and communications. We have selected a set of diverse half-day tutorials that provides both an introduction and an in-depth view into the world of Mobile computing.

Setting up a conference of this type requires many volunteer hours of work by the executive and program committees. We would like to thank the program committee members and all the referees whose due diligence in the selection of papers makes this conference a success. We would also like to thank the various executive committee members for spending countless hours to ensure that we had a full high quality program for our attendees. It was our pleasure and privilege to work with such dedicated individuals.

We hope you enjoy the conference program and the beautiful Phoenix area. For your added pleasure we have arranged two fantastic tours of the Grand Canyon and the Apache trail with Southwest custom tours. Thank you for your continued support of IPCCC as it progresses through the 21st century.

Nasr Ullah and Horst Clausen
General chairs, IPCCC 2001

IPCCC 2001 KEYNOTE SPEAKER

Rick Simonian

"Pervasive Computing: Finding Value in the Emerging Infrastructure"

Thursday, April 5, 8:00 A.M. - 9:00 A.M.

WE ARE EXPERIENCING a worldwide proliferation of mobile computing devices, a convergence of voice and data networks, an explosion of accessible information, and a growing expectation from users to be able to access this information securely anytime, anywhere. And yet they have an expectation that their communication costs will continue to decline, while the value they get goes up. In this talk we will look at some of the forces driving this change, examine the convergence trends, and consider where the users will find value in the era of pervasive computing and pervasive information.

RICK SIMONIAN is Vice President of Engineering with Harris Corporation in Melbourne, Florida. Harris is a $2 Billion high-tech communications and information processing company, providing products and services to customers around the world. Rick's group within Harris primarily provides U.S. Government agencies with large, complex communication and information processing systems for various uses, such as weather data management and processing, satellite image processing, wide-band high speed communications, voice switching, air to ground communication, tactical communications, large scale archival and dissemination systems, and information assurance. Rick has extensive background in software project management and software processes, application of object-oriented analysis and design techniques, research and development planning, and management of information technology advances. He has been with Harris Corporation in various engineering roles since 1985. Rick has a BS in Computer Science from the College of Engineering at Ohio State University, and an MS in Computer Science from the University of Florida. He is a long time member of the ACM, Chair for the University of Florida Engineering Advisory Council, and Vice-Chair for the University of Central Florida Industry Advisory Board.

PANEL SESSION

"Research Challenges in Embedded Systems Technologies and Applications to Communications Systems Research"

Thursday, April 5, 4:30 P.M. - 6:00 P.M.
IPCCC Conference Reception Following, 6:00 P.M. - 8:00 P.M.

Dr. Jeffery M. Harris
Director of Research and Systems
Architecture
Motorola Computer Group

David Dannenburg
Director
Intel Network Processing Group
Intel Corporation

Slomo Pri-Tal
Director, International Business
Motorola Computer Group
Dr. Ben Huey
Associate Dean for Administration
Faculty, Computer Science and Engineering,
College of Engineering and Applied Sciences
Arizona State University

Moderator:
Dr. Peter Crouch
Dean, College of Engineering and Applied
Sciences, Arizona State University

Ericsson and Phillips will also be sending panelist to particiapte in the panel sessions.

IPCCC 2001 TUTORIALS SESSION

Four Half-day Tutorials

Wednesday, April 4th, 8:A.M. - 5:00 P.M.
IPCCC Conference Reception following, 6:00 P.M. - 8:00 P.M.

Morning 8:00 A.M. - 12:00 Noon   Afternoon 1:00 P.M. - 5:00 P.M.

Tutorial 1: Introduction to Mobile Computing I   Tutorial 3: Introduction to Mobile Computing II
Tutorial 2: Mobile Security   Tutorial 4: Location Management for Mobile Computing

IPCCC 2001 Executive Committee

General Chairs
Nasr Ullah
Motorola
7700 West Parmer Lane
Austin, TX 78729
Office: (512) 996-4982
Fax: (512) 996-7439
nasr.ullah@motorola.com

Horst Clausen
Institute for Computing Sciences
University of Salzburg
Salzburg, Austria
Office: 43-662-8044-6307
Home: 43-7723-43834
clausen@cosy.sbg.ac.at

Vice Chairs
Abdelsalam (Sumi) Helal
CISE Department
University of Florida
Gainesville, FL 32611
Office: (352) 392-6845
Fax: (352) 392-3238
helal@cise.ufl.edu

Mathew A. Diethelm
Computer and Communications
Consultant
Phoenix, AZ 85014
Office: (602) 265-1941
Fax: (602) 265-2567
drmad@primenet.com

Program Chair
Nadeem Malik
IBM
Mail Stop: 9224
11400 Burnet Road
Austin, TX 78758
Office: (512) 838 5106
Fax: (512) 823 9478
malik@austin.ibm.com

Associate Program Chair
Linda F. Wilson
Thayer School of Engineering
Dartmouth College
Hanover, NH 03755
Office: (603) 646-3694
Fax: (603) 646-3856
Linda.F.Wilson@dartmouth.edu

Publications Chair
Guoliang Xue
Department of Computer Science
University of Vermont
Burlington, VT 05405
Office: (802) 656-8688
Fax: (802) 656-0696
xue@cs.uvm.edu

Panel Chair
Otto F. Koudelka
Department of Communications
and Wave Propagation
Technical University Graz
Graz, Austria
Office: 011-43-316-465746
Fax: 011-43-316-463697
okoudelka@compuserve.com

Registration Chair
Brian Grayson
Motorola
7700 West Parmer Lane
Austin, TX 78729
Office: (512) 996-4956
Fax: (512) 996-7439
brian.grayson@motorola.com

Tutorial Chair
Golden G. Richard III
Department of Computer Science
Lakefront Campus
University of New Orleans
New Orleans, LA 70148
Office: (504) 280-6594
Fax: (504) 280-7228
golden@cs.uno.edu

Finance Chair
Jack Chen
Motorola
7700 West Parmer Lane
Austin, TX 78729
Office: (512) 996-4954
Fax: (512) 996-7439
jack.chen@motorola.com

Web Master
Ken Logan
Motorola
7700 West Parmer Lane
Austin, TX 78729
Office: (512) 996-4946
klogan@ibmoto.com

Past General Chair
Jagan Agrawal
University of Missouri-Kansas City
5100 Rockhill Rd.
Kansas City, MO 64110-2499
Office: (816) 235-2360
Fax: (816) 235-5159

Advisory Committee
Jagan Agrawal
Jo Dale Carothers
Roy Jenevein

IPCCC 2001 Program Committee

Jagan Agrawal
University of Missouri-Kansas City

Hesham Ali
University of Nebraska - Omaha

Horst Clausen
University of Salzburg

Ajoy K. Datta
University of Nevada - Las Vegas

Matt Diethelm
Computer and Communications Consultant

Brett D. Fleisch
University of California

Brian Grayson
Motorola

Abdelsalam (Sumi) Helal
University of Florida

Ravi Jain
Telcordia

Eric Johnson
New Mexico State University

Walid Kobrosly
IBM

Otto F. Koudelka
Technical University Graz

Ken Logan
Motorola

Darrell Long
University of California

Nadeem Malik
IBM

Murali Medidi
North Arizona University

Ramakrishna Nunna
California State University at Fresno

Jehan-Francois Paris
University of Houston

Kihong Park
Purdue

Franck Petit
Universite de Picardie Jules Verne

Michael Rabinovich
AT&T Labs

Ram Raghavan
IBM

Golden G. Richard III
University of New Orleans

Patricia J. Teller
Univ. of Texas at El Paso

Shiby Thoms
Oracle Corp

Ishaq Unwala
Intel

Linda F. Wilson
Dartmouth College

Guoliang Xue
University of Vermont

Yongguang Zhang
HRL Labs

Group Tours for IPCCC by Southwest Custom Tours

Tours are conducted by Southwest Custom Tours on Saturday, April 7. The first is a Superstition Mountains, Apache Trail, Canyon Lake day for $59 per person. The second is a Grand Canyon excursion for $81 per person. These prices reflect a discount for IPCCC registrants. We can have a private tour (with only IPCCC people in the vehicle) if at least 8 IPCCC people sign up.

To sign up for a tour, contact Southwest Tours at (800) 513-1381 or go to: *http://www.southwesttours.com*

You must mention IPCCC to get the discount; if registering online just add "/IPCCC" to the last name. Tours do not include food but do include any/all park entrance fees and water or soda.

Apache Trail/Dolly's Steamboat Tour
Departs Approx. 8:30-9:30am
Returns Approx. 4:30-5:30pm
Southwest Custom Tours will pick you up at your hotel approximately 8:30-9:30am. We will call you the night before your tour to give you the exact time to meet us in the lobby.

Our tours are conducted in deluxe, stretch, 15 passenger vans with no more than 12 total passengers. Complimentary soft drinks and water will be provided by your guide while you relax and learn about our beautiful state, as well as get to know your fellow travelers.

This tour will be a delight, taking in the rugged beauty of the Superstition Mountains, home of the Lost Dutchman's Gold Mine. Once out near the Superstitions, there will be a short Desert Walk. Your guide will point out the different plant and animal life native to this area.

Dolly's Steamboat
Your narrated cruise on Dolly's Steamboat lasts 1.5 hours and will be one to remember. The Canyon Lake area is one of the largest producers of amethyst in the world. Lunch will be at the locally famous Tortilla Flat, with a population of 6, or perhaps at the Lakeside Marina.

We will then make our way back to your hotel arriving approximately 4:30-5:30pm. Meals are not included in tour pricing.

Navajo Indian Reservation/ Grand Canyon Tour
Departs Approx. 7:00-8:00am
Returns Approx. 8:00-9:00pm
Southwest Custom Tours will pick you up at your hotel approximately 7:00-8:00am. We will call you the night before your tour to give you the exact time to meet us in the lobby.

Our route will take us north to the first rest stop, where you can purchase a cup of hot coffee and a snack before continuing north through the pine forests of Flagstaff and the Navajo Indian Reservation. Here there will be time for shopping and an early lunch at the historic Cameron Trading Post. This post is filled with fascinating art, crafts and historical pieces and will be a highlight of this tour.

Grand Canyon
Next stop, Grand Canyon National Park. From Desert View, home of the famous Watchtower, we will spend approximately 3 hours touring along the 22 mile drive of the South Rim, including a stop at Grand Canyon Village. There will be time for picture taking at several viewpoints and for some shopping.

There will be a stop for dinner on our return to the Valley. We will make our way back to your hotel returning approximately 8:00-9:00pm.

If you have any questions, please contact Southwest Custom Tours.
Toll-Free, 24 hour reservation and information line: (800) 513-1381
Fax: (602) 992-5596
E-mail info@southwesttours.com
http://www.southwesttours.com/

TECHNICAL PROGRAM SCHEDULE
THURSDAY, APRIL 5, 2001

KEYNOTE SPEAKER: 8:00 A.M. - 9:00 A.M. Rick Simonian,"Pervasive Computing: Finding Value in the Emerging Infrastructure"
BREAK: 9:00 A.M. - 9:15 A.M.

TRACK 1	SESSION 1: 9:15 A.M. - 10:30 A.M.	TRACK 2

SESSION 1.1: NETWORKING I

1.1.1 Reducing Contention in Multiple Multicasts
Zhiyu Zhou and Zhimin Tang, Institute of Computing Technology, Chinese Academy of Sciences
1.1.2 QoS-Aware Hierarchical Multicast Routing on Next Generation Internetworks
Satyabrata Pradhan, Yi Li, and Muthucumaru Maheswaran, University of Manitoba
1.1.3 Packet Marking Strategies for Explicit Congestion Notification (ECN)
Ivan Kai-Kin Leung and Jogesh Muppala, Hong Kong University of Science and Technology

SESSION 1.2: DISTRIBUTED FILE AND STORAGE SYSTEMS

1.2.1 Noah: Low-cost File Access Prediction Through Pairs
Ahmed Amer and Darrell Long, University of California, Santa Cruz
1.2.2 Strong Security for Distributed File Systems
Ethan Miller and Darrell Long, University of California, Santa Cruz
William Freeman, TRW
Benjamin Reed, IBM Research
1.2.3 Performance and Locking Issues in a Cluster File System
Jon Brassow, Mike Declerck, Matt O'Keefe, David Teigland, and Mike Tilstra, Sistina Software

BREAK: 10:30 A.M. - 10:45 A.M.

SESSION 2: 10:45 A.M. - 12:00 P.M.

SESSION 2.1: NETWORKING II

2.1.1 Adaptive Bandwidth Allocation Scheme for WDM Star with Asymetric Traffic
G. I. Papadimitriou and A. S. Pomportsis, Department of Informatics, Aristotle University, Greece
M.S. Obaidat, Monmouth University
2.1.2 Communication Delay in Circuit-Switched Interconnection Networks
Geyong Min, Mohamed Ould-Khaoua, and Hamid Sarbazi-Azad
University of Glasgow
2.1.3 Configuration of Distributed Message Converter Systems Using Performance Modeling
Karl Aberer, LSIR - Distributed Information Systems Laboratory, Switzerland
Thomas Risse and Andreas Wormbacher, GMD-IPSI, Integrated Publication and Information Systems Institute, Germany

SESSION 2.2: VIDEO ON DEMAND

2.2.1 Towards Scalable VoD Distribution on the Internet
Ioanis Nikolaidis, University of Alberta

2.2.2 Frame-Based Periodic Broadcast and Fundamental Resource Tradeoffs
Subhabrata Sen, Lixin Gao, and D. Towsley,
University of Massachusetts, Amherst

2.2.3 A Better Dynamic Broadcasting Protocol for Video-on-Demand
Pei-Fen You and Jehan-Francois Paris, University of Houston

LUNCH: 12:00 P.M. - 1:30 P.M.

SESSION 3: 1:30 P.M. - 2:45 P.M.

SESSION 3.1: HIGH SPEED NETWORKING
3.1.1 Evaluating STREAMS-based Protocol Stacks over High-Performance Networks
Sherali Zeadally and D. Ford, Department of Computer Science, Wayne State University
3.1.2 Traffic Characteristics of Bulk Data Transfer using TCP/IP over Gigabit Ethernet
Aamir Shaikh and Kenneth Christensen
Department of Computer Science and Engineering, University of South Florida
3.1.3 Real Time TCP QoS Monitoring in Wireless ATM CDMA Networks Using Aggregative Large Deviation Principle
C. Ben Ahmed, N. Boudriga, and M.S. Obaidat, Monmouth University and University of Tunis
3.1.4 Improving Call Admission Control in ATM Networks Using Case-Based Reasoning
Hossam Hassanein, Department. of Computing & Information Science, Queen's University
Ahmed Al-Monayyes and Moudhi Al-Zubi, Department of Mathematics & Computer Science, Kuwait University

SESSION 3.2: EMBEDDED AND INTERNETWORKING TECHNOLOGIES

3.2.1 An Arizona Ecosystem for Embedded Systems
S. Pri-Tal, Motorola Incorporated
J. Robertson, Arizona State University and Motorola Incorporated
B. Huey, Arizona State University

3.2.2 Cache Design and Exploration for Low Power Embedded Systems
C. Chakrabarti, Arizona State University

3.2.3 Wireless Optical Ad-Hoc Networks for Embedded Systems
Joseph Hui, Arizona State University

3.2.4 Embedded Software for a Space Interferometry System: Automated Analysis of a Software Product-Line Architecture
Gerald Gannod, Arizona State University
Robyn R. Lutz, Jet Propulsion Lab, CA
Marian Cantu, Arizona State University

BREAK: 2:45 P.M. - 3:00 P.M.

SESSION 4: 3:00 P.M. - 4:15 P.M.

SESSION 4.1 NETWORK ROUTING

4.1.1 Coded Path Routing: A New Approach to Broadcasting in 3D Meshes
A.Y. Al-Dubai and Mohamed Ould-Khaoua, Deparment of Computing Science, University of Glasgow

4.1.2 Performance of Adaptive Routing Strategies in Wavelength-Routed Networks
Ching-Fang Hsu, Te-Lung Liu, and Nen-Fu Huang
National Tsing-Hua University

4.1.3 Performance Comparison and Analysis of Ad Hoc Routing Algorithms
Azzedine Boukerche, University of North Texas

SESSION 4.2: MODELING ALGORITHMS AND TECHNIQUES

4.2.1 Fair, Efficient, and Scalable Scheduling Without Per-Flow State
Salil Kanhere and Harish Sethu, Department of ECE, Drexel University
4.2.2 Efficient Comparison-Based Fault Diagnosis of Multiprocessor Systems Using Genetic Algorithms
Mourad El Hadef and Bechir Ayeb, Department of Mathematics and Computer Science, University of Sherbrooke
4.2.3 TCP Reno with Random losses: Latency, Throughput and Sensitivity Analysis
Biplab Sikdar, S. Kalyanaraman, and K.S. Vastola, Rensselaer Polytechnic Institute
4.2.4 Increasing the Accuracy of Statistical Simulation for Modeling Superscalar Processors
Lieven Eeckhout, Koen De Bosschere,
Department of Electronics and Information Systems, Ghent University

BREAK: 4:15 P.M. - 4:30 P.M.

PANEL SESSION 4:30 P.M. - 6:00 P.M.
"RESEARCH CHALLENGES IN EMBEDDED SYSTEMS TECHNOLOGIES AND APPLICATIONS TO COMMUNICATIONS SYSTEMS RESEARCH "
PANEL MEMBERS WILL BE TECHNICAL EXECUTIVES FROM ARIZONA HIGH TECH COMPANIES INCLUDING INTEL, MOTOROLA, ERICSSON, AND PHILIPS.

RECEPTION 6:30 P.M. - 8:00 P.M.

Technical Program Schedule
Friday, April 6th, 2001

Panel Session: Bluetooth: From Cable Replacement to Pervasive Computing, Panelists TBD: 8:00 A.M. - 9:00 A.M.
Break: 9:00 A.M. - 9:15 A.M.

TRACK 1	SESSION 5: 9:15 A.M. - 10:30 A.M.	TRACK 2

SESSION 5.1: DISTRIBUTED SYSTEMS

5.1.1 Client-Transparent Fault-Tolerant Web Service
Navid Aghdaie and Yuval Tamir, UCLA
5.1.2 TaBLA: A Client-Based Scheduling Algorithm for Web Proxy Clusters
Girija Narlikar, Lakshman Y.N, and Tin Kam Ho
Lucent Technologies
5.1.3 Universal Self-stabilizing Phase Clock Protocol with Bounded Memory
Florent Nolot and Vincent Villain, University of Picardie Jules Verne
5.1.4 An Analysis of a CORBA-Based Approach to Accessing Geospatial Information via the Internet
Don Needham, US Naval Academy
Ruth Wilson and Kevin Shaw, Mapping Charting and Geodesy Naval Research Laboratory

SESSION 5.2: SHORT PAPER SESSION

5.2.1 Trusted Objects
Philip L. Campbell, Lyndon G. Pierson, Edward L. Witzke
Sandia National Laboratories

5.2.2 Optimising Thin Clients for Wireless Computing via Localization of Keyboard Activity
Siva Ramamurthy and Sumi Helal, University of Florida

5.2.3 Comparison of Some Numerical Methods for QBD-M Processes via Analysis of an ATM Concentrator
Hung T. Tran and Tien V. Do, Budapest University of Technology and Economics

Break: 10:30 A.M. - 10:45 A.M.

Session 6: 10:45 A.M. - 12:00 P.M.

SESSION 6.1: LARGE SCALE DISTRIBUTED STORAGE SYSTEMS

6.1.1 An Evaluation of Three Gigabit Storage Area Network Protocols
Kaladhar Voruganti, IBM Almaden Research Center

6.1.2 When Local Becomes Global: An Application Study of Data Consistency in a Networked World
Erik Riedel and Alistair Veitch, Hewlett Packard Labs

6.1.3 A Technique for Managing Mirrored Disks
Darrell D. E. Long, University of California, Santa Cruz

SESSION 6.2: HOME AND MULTIMEDIA NETWORKING I

6.2.1 Mamba - a Programmable Broadband Multimedia Interface Board
Klaus Wuerflinger, GCS GmbH

6.2.2 Set-Top Box Software Architectures for Digital Video Broadcast and Interactive Services
Rudolf Jaeger, BetaResearch

6.2.3 Reconfigurable Embedded Media Processors
S. Panchanathan, Arizona State University

Lunch: 12:00 P.M. - 1:30 P.M.

Session 7: 1:30 P.M. - 2:45 P.M.

SESSION 7.1: HIGH PERFORMANCE COMPUTING

7.1.1 Just How Accurate Are Performance Counters?
Wendy Korn and Patricia Teller, University of Texas at El Paso
Gilbert Castillo, IBM Corporation , Austin, TX
7.1.2 Temporal Analysis of Cache Prefetching Strategies for Multimedia Applications
Rita Cucchiara, University of Modena and Reggio Emilia
Massimo Piccardi, University of Ferrara
Andrea Prati, University of Modena and Reggio Emilia
7.1.3 Inexpensive Throughput Enhancement in Small-Scale Embedded Microprocessors with Block Multithreading: Extensions, Characterization, and Tradeoffs
John W. Haskins Jr, Kevin Skadron, and Kevin R. Hirst, University of Virginia
7.1.4 An Efficient Instruction Cache Scheme for Object-Oriented Languages
Yul Chu and M.R. Ito, University of British Columbia

SESSION 7.2: MULTIMEDIA NETWORKING

7.2.1 Cluster-Based Smoothing for MPEG-based Video-on-Demand Systems
Rajesh Sabat and Carey Williamson, University of Saskatchewan

7.2.2 An Interactive Broadcasting Protocol for Video-on-Demand
Jehan-Francois Paris, University of Houston

7.2.3 Impact of CPU Reservation on End-to-End Media Data Transmission
Arun Viswanathan, Klara Nahrstedt, Dongyan Xu, Duangdao Wichadakul
University of Illinois, Urbana-Champaign

Break: 2:45 P.M. - 3:00 P.M.

Session 8: 3:00 P.M. - 4:15 P.M.

SESSION 8.1: REAL-TIME SYSTEMS

8.1.1 Message Passing Architectures for Stochastic and Dynamic Distributed Real Time Systems
David Andrews, University of Kansas
Amy Apon, University of Arkansas
Lonnie Welch, The Ohio University

8.1.2 Adaptive Scheduling via Feedback Control for Dynamic Real-Time Systems
Douglas Lawrence, Jianwei Guan, Shruti Mehta, and Lonnie Welch
The Ohio University

8.1.3 Performance Analysis of Dynamic Soft Real-Time Systems
Scott Brandt, University of California Santa Cruz

SESSION 8.2: HOME AND MULTIMEDIA NETWORKING II

8.2.1 IP Appliances and Home Networks
Marie-José Montpetit, Nokia Home Communications

8.2.2 Delivery of Interactive Content to Broadband Devices
Jurij R. Paraszczak, IBM T.J. Watson Research Center

8.2.3 Gateways and Advanced Set-top Units
Mike Mercurio, Nokia Home Communications

TUTORIAL 1
INTRODUCTION TO MOBILE COMPUTING I

INSTRUCTORS

Dr. Loren Schwiebert
Wayne State University

Dr. Golden G. Richard III
University of New Orleans

This tutorial provides a gentle introduction to the important issues in mobile computing, addressing both advantages and challenges of this hot research area.

Abstract: The widespread use of mobile computing devices has changed the way people compute and has vastly expanded research areas in distributed computing and networking. In fact, traditional distributed computing is actually a subset of the broad area of mobile computing. Many topics in "mature" areas like distributed databases, distributed fault tolerance, and resource management now require much additional study, because many traditional assumptions are challenged. Mobile computers operate in more hostile environments, are resource-constrained (limited power, frequent disconnection), and are peripheral-poor. This tutorial provides an introduction to mobile computing, including a survey of representative technologies, the promises and challenges, and research areas. It will also briefly cover several interesting mobile computing topics, including Mobile-IP, data dissemination, and resource management. The goal is that a participant in the tutorial will leave with a conversational level of knowledge about mobile computing, be aware of the important issues, and know where to find further information about topics of interest. The Mobile Computing II tutorial will examine two important areas, sensor networks and service discovery, in greater detail.

Outline:
1. Introduction to mobile computing
   - Mobile, nomadic, ubiquitous computing
   - Technology
   - Promises
   - Headaches
   - Fundamental research areas
2. Enabling mobility: An introduction to Mobile-IP
3. Data dissemination for mobile hosts
4. Application adaptation and resource management

Intended audience: This tutorial will appeal to anyone interested in a gentle introduction to mobile computing. No significant background in mobile computing is assumed. A basic background in computer science, especially distributed systems and networking, is recommended.

Biographies of speakers:
Loren Schwiebert received the B.S. degree in Computer Science and Mathematics from Heidelberg College, Tiffin, OH, and the M.S. and Ph.D. degrees in Computer and Information Science from The Ohio State University, Columbus, OH. Since 1995 he has been a faculty member at Wayne State University, Detroit, MI, where he is currently an Assistant Professor in the Computer Science Department. His research interests include interconnection networks, computer networking, and wireless communication. He is a member of the ACM, IEEE, and IEEE Computer Society.

Golden G. Richard III has been a faculty member in the Department of Computer Science at the University of New Orleans in Louisiana since 1994. His research interests include mobile computing, wireless networking, operating systems, and fault tolerance. Golden is on the Executive Committee of the IEEE Technical Committee on the Internet, is a member of the ACM and IEEE, and serves as USENIX's Educational Outreach Liaison for the University of New Orleans. He lectures frequently on networking and mobile computing issues, concentrating on service discovery technologies. When he's not hacking, he can be found consuming New Orleans jazz.

TUTORIAL 2
MOBILE SECURITY

INSTRUCTOR:

Dr. Frank Adelstein
Odyssey Research Associates

This tutorial provides an overview of the state of the art in computer security and then examines the specific problems introduced by mobile devices and wireless network access. No experience in computer security is assumed.

Abstract: The growth in the popularity of laptop and handheld devices, coupled with the increase in use of wireless technologies, is driving mobile computing closer to the ubiquitous presence predicted by early visionaries. The downside to the readily available technology is that it is equally accessible to adversaries for use against us.
Thus there is a growing need for better security for mobile computing. This tutorial surveys some of the general issues in computer security, then focuses on the security mechanisms available for several popular mobile technologies.

Intended Audience: This tutorial will appeal to a broad audience, including students, developers, and researchers interested in mobile security. An introduction to security issues (applicable to both wire-based and wireless systems), as well as the wireless technologies and protocols will be provided, so anyone with a basic computer science background should find this tutorial approachable.

Broad Overview of the Tutorial: Introduction to Computer Security, including broad areas of vulnerabilities and classes of attacks. Vulnerabilities (and protections) introduced by wireless systems. Detailed study of several current mobile computing systems and the security available in the protocols, such as 802.11b, WAP, Bluetooth, and CDMA.

Biography of speaker:
Dr. Frank Adelstein is currently employed by Odyssey Research Associates (ORA) in Ithaca, NY. Since joining ORA at the beginning of 1999, Dr. Adelstein has been involved in many computer security projects, including intrusion detection with computational immunology and computer forensics using automated reasoning. He has participated in Red Team exercises, as well as the penetration testing of the security of a Fortune 500 company. He has also conducted research in wireless security on a project to provide multipolicy information assurance for microsensor, autonomous wireless local area networks. His current research in computer security involves increasing the effectiveness of techniques to correlate reconnaissance probes and attacks.

Prior to joining ORA, Dr. Adelstein was a postdoctoral associate with the Cornell Computer Science Department, working for the Xerox Design Research Institute (DRI). At DRI, he was the primary contributor for projects involving the integration of heterogeneous database resources and the creation of a web-based metadata repository. His PhD work involved protocols for real-time data, as well as formulating metrics for describing multicast efficiency.

For questions about the tutorials, please contact:
Tutorial Chair
Golden G. Richard III, Ph.D.
Assistant Professor of Computer Science
Department of Computer Science
Lakefront Campus
University of New Orleans
New Orleans, LA 70148
golden@cs.uno.edu

Tutorial 3
Introduction to Mobile Computing II

Instructors:

Dr. Loren Schwiebert
Wayne State University

Dr. Golden G. Richard III
University of New Orleans

Abstract: This tutorial is a continuation of Introduction to Mobile Computing I, and examines two important areas in greater detail: service discovery technologies (Jini, Bluetooth, Service Location Protocol, Salutation, and Microsoft's Universal Plug and Play) and sensor networks.

The broad goals of service discovery technologies are to enable device cooperation, reduce configuration hassles, and provide services for peripheral-poor devices. The service discovery portion of the tutorial will survey several competing approaches to service discovery, including Bluetooth SDP, Salutation, Jini, and Microsoft's Universal Plug and Play. You'll emerge with a good understanding of service discovery, without having to read the 1500 page Bluetooth specification!

The other half of the tutorial will examine sensor networks. The recent development of high-performance microprocessors, novel sensing materials, and low-power communications has stimulated great interest in the development of smart sensors -- physical, chemical, or biological sensors combined with integrated circuits. These smart sensors can be relatively inexpensive to build, allowing for the large-scale deployment of networks of smart sensors. The applications of smart sensors are extensive. Sensor networks have been proposed for application areas including industrial, biomedical, environmental, and military, to name just a few. Many applications can benefit from a wireless interface to sensor networks. Interaction between sensor nodes and conventional computing devices will allow users of mobile computing devices to interact with their environment as they travel.

Intended audience: This tutorial will appeal to anyone interested in a deeper study of several important topics in mobile computing.

Biographies of speakers:
Loren Schwiebert received the B.S. degree in Computer Science and Mathematics from Heidelberg College, Tiffin, OH, and the M.S. and Ph.D. degrees in Computer and Information Science from The Ohio State University, Columbus, OH. Since 1995 he has been a faculty member at Wayne State University, Detroit, MI, where he is currently an Assistant Professor in the Computer Science Department. His research interests include interconnection networks, computer networking, and wireless communication. He is a member of the ACM, IEEE, and IEEE Computer Society.

Golden G. Richard III has been a faculty member in the Department of Computer Science at the University of New Orleans in Louisiana since 1994. His research interests include mobile computing, wireless networking, operating systems, and fault tolerance. Golden is on the Executive Committee of the IEEE Technical Committee on the Internet, is a member of the ACM and IEEE, and serves as USENIX's Educational Outreach Liaison for the University of New Orleans. He lectures frequently on networking and mobile computing issues, concentrating on service discovery technologies. When he's not hacking, he can be found consuming New Orleans jazz.

Tutorial 4
Location Management for Mobile Computing

Instructor:

Dr. Sandeep K. S. Gupta
Arizona State University

Abstract: The need for "information anywhere anytime" has been a driving force for the increasing growth in Web and Internet technology, wireless communication, and portable computing devices. The field of mobile computing is the merger of these advances in computing and communication with the aim of providing seamless and ubiquitous computing environment for mobile users. These environments are enriched by new applications which are context-aware and location-dependent. Such applications require support from underlying system to provide them information about the location and context of the mobile users.

In this tutorial we will cover how location information can be provided to applications and how it can be efficiently managed by a mobile system. An application of location information service is location-based querying. The tutorial will demonstrate how applications can benefit from location based services by using the example of location-based querying.

Intended audience: Engineers, scientists, software developers, system analysts, network users and designers, project managers, faculty members, graduate and undergraduate students, who are interested in knowing the fundamentals of location information management and the recent advances and practices in the field.

Outline:
1. Introduction to Mobile Computing and Location Services
   - Applications
   - Challenges
2. Location Information Services
   - Type of Location Services
   - Architecture of LIS
3. Location Management
   - Issues
   - Scheme (Flat, Hierarchical, Mobile IP etc.)
   - Optimization methods (replication, caching)
4. Location Based Queries
   - Modeling
   - Query processing
5. Summary

Biography of speaker:
Sandeep Kumar S. Gupta received the B.Tech degree in computer science and engineering from Institute of Technology, Banaras Hindu University, Varanasi, India, the M.Tech. degree in computer science and engineering from Indian Institute of Technology, Kanpur, and the M.S. and Ph.D. degree in computer and information science from The Ohio State University, Columbus, Ohio. He is currently an Associate Professor in Department of Computer Science and Engineering at Arizona State University, Tempe, AZ. He has previously served as faculty at Duke University, Ohio University, and Colorado State University. His research interests include mobile and pervasive computing, compilers, wireless and embedded sensor networks.

Dr. Gupta has given tutorials on Mobile IP (IPCCC'99 and MASCOTS'99), Mobile ATM (IPCCC'99), and Mobile Databases (MobiCom'00). He was program chair for Int'l workshop on Group Communication and program co-chair for Int'l Workshop on Wireless Networks and Mobile Computing, and Int'l Workshop on Pervasive Computing. He was a program committee member for Mobile Data Access (MDA'99) and 1999 Int'l Conference on Parallel Processing (ICPP'99). He is a co-guest editor for special issue of IEEE Personal Communication Magazine (on Pervasive Computing), IEEE Transactions on Computer (Mobile Computing and Databases) and ACM/Baltzer Monet (on Pervasive Computing). Dr. Gupta is a member of the Association of Computing Machinery and a senior member of the IEEE.

IPCCC 2001 Registration Form
Register on the Web at http://www.ipccc.org/cgi-bin/register2001/reg.cgi

Last Name   First Name   Middle Initial

Job Title   Organization or Affiliation (University and Student ID)

Address

City   State (Province, Country)   Zip Code

Phone   Fax Number

Title and Name for Badge

E-mail Address   IEEE Member Number

Mail completed form with check or fax with complete credit card information to:

Dr. Brian Grayson
7700 West Parmer Lane
MD: PL30
Austin, TX 78729
Tel: (512) 996-4956
Fax: (512) 996-7439

Email: Brian.Grayson@motorola.com

Group Discount: Discounts are available for group registration. To be eligible, all registrations for the group must be included at the same time with the fax being sent for all in the group at once (or sent in one envelope by mail). Groups of 5 to 9 receive a 5% discount; groups of 10 or more receive a 10% discount. See the payment information below.

Fees (U.S. Dollars)	Advance Registration (Please fax by March 15, 2001, 5:00 PM MST)		Registration (after March 15)		Student Registration
	IEEE Mbr.	Other	IEEE Mbr.	Other	
Technical sessions and a full-day of tutorials*	$525	$575	$625	$675	$150
Technical sessions only	$400	$500	$480	$600	$100
Full-day of tutorials only*	$200	$250	$300	$350	$100

*A full-day of tutorials is composed of two half-day tutorials, breakfast, lunch and copy of handouts.
• Technical registration includes 2 breakfasts, 2 lunches, 1 proceedings and reception.
• Tutorial registration includes 1 breakfast, 1 lunch and 1 copy of handouts.
• Student registration does not include the proceedings. An extra set of proceedings is $25.00.

Tutorial Choices
If you are registering for tutorials, please indicate your morning and afternoon choices here.
For descriptions of the tutorials, you may consult the IPCCC web page at:
http://www.ipccc.org/ipccc2001/ipccc_tutorials.html.

Morning half-day
Tutorial choices

_____

Afternoon half-day
Tutorial choices

_____

Payment Information

Conference Fee $_____

Less Group Discount _____

Total Due $_____

___ Check or Money Order
payable to IPCCC 2001 Registration

___ American Express

___ Mastercard

___ VISA

Card Number _____

Expiration Date _____

Cardholder's Name_____

Signature _____

Date _____

Please fax your payment authorization, along with the credit card information form. No wire transfers or invoices will be accepted. Each attendee must use a separate registration form. Registrants not using a credit card must include a check or money order payable to IPCCC 2001 and drawn on a U.S. bank, or a U.S. branch of a foreign bank for the total amount in US$. Registration cancellations must be received no later than March 12, 2001 and are subject to a cancellation fee. Registrants who cancel beyond this date, or fail to attend, forfeit the registration fee. Group discounts: Discounts are available for group registration. To be eligible, all registration forms for the group must be received in the same fax or same envelope by mail. Groups of 5 to 9 receive a 5% discount; groups of 10 or more receive a 10% discount.

Conference Site

The conference site will be:

Embassy Suites Phoenix North
2577 West Greenway Rd
Phoenix, AZ 85023-4222
Telephone for reservations: (800) 527-7715
Other phone: (602) 375-1777

To guarantee these rates, reservations must be made by March 15, 2001, 5:00 PM MST and you must request "IEEE IPCCC" reservation rates when making your reservation.
Free cooked breakfast is included for each occupant. More details about the hotel can be found at the IPCCC web site:
http://www.ipccc.org/ipccc2001/hotel_info.html
Embassy Suites Rates are:
• Single/Double occupancy (King bed or two double beds)
- $129+12.07% tax per night

• Triple/Quad occupancy
- $139+12.07% tax per night