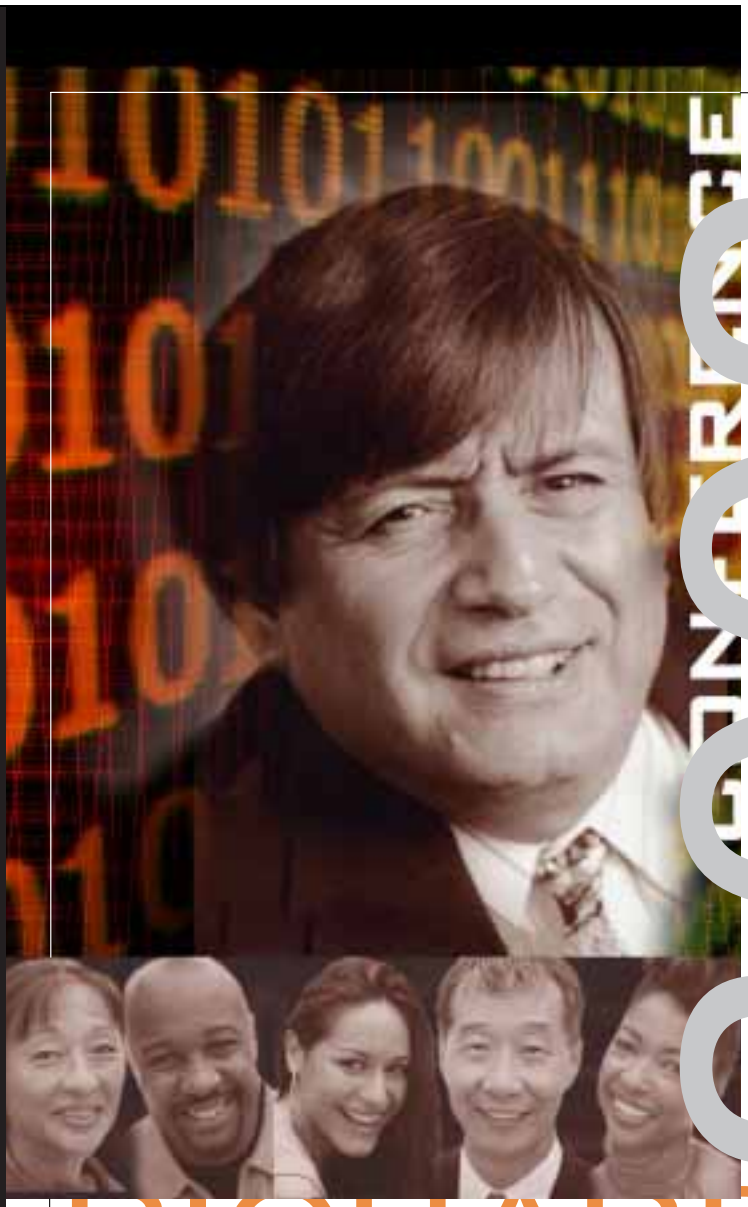

2003

RICHARD TAPIA
CELEBRATION OF DIVERSITY IN COMPUTING

Celebrating the technical contributions and career interests of diverse people in computing fields

October 15-18, 2003
Atlanta Airport Marriott Hotel
Atlanta, GA

In cooperation with,

acm

Computing Research Association · CRA ·

IEEE Computer Society

2003

RICHARD TAPIA

Celebration of Diversity in Computing Conference

October 15-18, 2003
Atlanta, Georgia

The **Richard Tapia Celebration of Diversity in Computing Conference,** sponsored by **ACM** and **CRA,** will celebrate the technical contributions and career interests of diverse people in computing fields. The conference is held in-cooperation with **IEEE-CS**. The theme of this year's conference is **"Building Diverse Leadership in Computing."** In honor of Richard A. Tapia, this conference, the first event in a biennial conference series and following the 2001 Richard Tapia Symposium, will highlight innovative and original research and applications in computing sciences. The conference presenters are leaders in their respective fields, representing academic, industrial, and government communities. Current research on leading-edge topics will be presented by invited speakers, during technical talks and during the poster session.

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Welcome to the Tapia Conference 2003!

Juan Meza

Bryant York

It is with great pleasure that we welcome you to the First Richard Tapia Celebration of Diversity in Computing Conference 2003. This is the first event in a biennial conference series and it follows the very successful 2001 Richard Tapia Symposium celebrating diversity in computing. The conference honors the many contributions of Richard Tapia, a leader in the field of computational mathematics as well as a strong and outspoken advocate for diversity.

This year's theme of **"Building Diverse Leadership in Computing"** highlights the leadership that Richard Tapia has not only exhibited throughout his career, but also the role that he has played in developing that leadership in so many others. The overall program reflects this theme in its selection of keynote and plenary speakers, who are all recognized leaders in their respective fields. In addition, the technical program co-chairs, Monica Martinez-Canales and Pamela Williams, have developed a strong program consisting of contributed papers from leading-edge researchers, mini-symposia on state-of-the-art technologies, and panels on various technical issues as well as diversity and outreach activities, posters, Birds-of-a-Feather sessions, and a doctoral consortium.

We hope that the conference is not only an opportunity to see, hear, and talk with these leaders, but also a chance for all participants to develop their own leadership skills!

Juan Meza, Lawrence Berkeley National Laboratory
Bryant York, Portland State University
Tapia Conference 2003 Co-chairs

Honoring the contributions of Richard Tapia and celebrating the technical contributions and career interests of diverse people in computing fields.

Richard A. Tapia

Noah Harding Professor of Computational and Applied Mathematics, Rice University

The conference honors the significant contributions of **Richard A. Tapia,** a mathematician and professor in the Department of Computation and Applied Mathematics at Rice University in Houston, Texas. He is internationally known for his research in computational and mathematical sciences and is a national leader in education and outreach programs. Tapia has authored or co-authored two books and more than 80 mathematical research papers. His current positions at Rice are Noah Harding Professor of Computational and Applied Mathematics; Associate Director of Graduate Studies, Office of Graduate Studies; and Director of the Center for Excellence and Equity in Education.

Richard Tapia was born in Los Angeles to parents who separately emigrated from Mexico as young teenagers in search of educational opportunities for themselves and for future generations. Richard was the first in his family to attend college, earning his B.A., M.A., and Ph.D. degrees in mathematics from the University of California, Los Angeles. Due to his efforts, Rice University has received national recognition for its educational outreach programs and the Rice Computational and Applied Mathematics Department has become a national leader in producing women and underrepresented minority Ph.D.s in the mathematical sciences. Some of Tapia's honors include: election to the National Academy of Engineering (1992) for his seminal work in interior point methods; the first recipient of the A. Nico Habermann Award from the Computing Research Association (1994) for outstanding contribution to aiding members of underrepresented groups within the computing community; the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring from President Clinton (1996); appointment by President Clinton to the National Science Board (1996), the governing body of the National Science Foundation; and the establishment of a lecture series to honor Tapia and African American mathematician David Black at Cornell University (2000). Tapia also received the Hispanic Engineer of the Year Award from Hispanic Engineer Magazine (1996), and was inducted into the Hispanic Engineer National Achievement Awards Conference Hall of Fame (1997). In 2002, Tapia was inducted into the Texas Science Hall of Fame.

Schedule at a Glance

	Wednesday, October 15	Thursday, October 16		
8:00am		Breakfast		
8:45am		Opening Remarks		
9:00am		**Plenary Session: Salon ABCD** **Computational Grids: Analyzing the Performance,** **Valerie E. Taylor**, Texas A&M University		
10:00am		Coffee Break		
10:30am		**MS1: Salon ABCD** **Wireless Communications, Part 1** *Organizer:* **Demetrios Kazakos,** University of Toledo	**T1: Salon E** **Large Scale Data and Knowledge Management/ Ubiquitous Computing**	**P1: Salon FGH** **High Performance Grid Computing,** *Organizer:* **Radha Nandkumar,** National Center for Supercomputing Applications
11:15am				
12:00 Noon		Lunch		
1:30pm		**Plenary Session: Salon ABCD** **Seeking, and Sometimes Finding, the Best Work in Life,** **Margaret Wright**, Courant Institute, New York University		
2:00pm				
2:30pm		Coffee Break & Poster Set-up		
3:00pm	**Doctoral Consortium** **Florida Room**	**MS2: Salon ABCD** **Wireless Communications, Part 2** *Organizer:* **Demetrios Kazakos,** University of Toledo	**T2: Salon E** **Optimization**	**P2: Salon FGH** **Defining and Sustaining Quality Mentoring,** *Organizer:* **Sheila Humphreys,** UC Berkeley
3:45pm				**P3: Salon FGH** **Advice to Early Career Professionals from the Trenches** *Organizers:* **Monica Martinez-Canales** and **Pamela Williams,** Sandia National Laboratories
4:30pm		**BOF: Salon ABCD** **Developing Outreach Programs through Student Run Presentations: Carnegie Mellon's @SCS "Outreach Roadshow,"** *Organizers:* **Lenore Blum** and **Carol Frieze**, Carnegie Mellon University		
5:30pm		Coffee Break		
6:00pm				
6:30pm		**Posters and Reception** **Grand Ballroom Foyer**		
8:00 pm	**Conference Welcome Reception** **Grand Ballroom Foyer**			
9:00 pm				
10:00 pm				

Friday, October 17

Breakfast

Announcements

Keynote Address: Salon ABCD
Issues and Problems with Diversity, Warren M. Washington,
National Center for Atmospheric Research and National Science Board

Coffee Break

T3: Salon FGH
Augmenting Human Cognition

T4: Salon E
CFD and Modeling

P4: Salon ABCD
Where are all the Leaders? Closing the Minority Leadership Gap,
Organizer:
Juan Meza, Lawrence Berkeley National Laboratory

P5: Salon ABCD
Politically Incorrect, Fast Pitch, Hardball Questions about Diversity in Computing,
Organizer:
Bryant York, Portland State University

Lunch

Plenary Session: Salon ABCD
Revolutionizing Science and Engineering with Cyberinfrastructure,
Peter Freeman, National Science Foundation

Coffee Break

T5: Salon E
Optimization

P6: Salon ABCD
Navigating the Tenure Process: A Diverse Prospective
Organizer:
Valerie E. Taylor,
Texas A&M University

P7: Salon ABCD Grant Proposal Development Tips from the Experts,
Organizers:
Monica Martinez-Canales and **Pamela Williams,**
Sandia National Laboratories

BOF: Salon ABCD
Coalition to Diversify Computing: Distributed Rap Session,
Organizers:
Allison Clark and **Phoebe E. Lenear,** National Center for Supercomputing Applications

Coffee Break

Break

Awards Ceremony and Banquet
Salon EFGH
Banquet Speaker:
Eloy Rodriguez, Cornell University

Saturday, October 18

Breakfast

Announcements

Plenary Session: Salon ABCD
Technology Challenges in High End Computing,
Jose Munoz, National Nuclear Security Administration

Coffee Break

T6: Salon E
Virtual Environments and Visualization

P8: Southern Ballroom
Equal-Opportunity Disenfranchisement: Who Gets to Count Your Vote?,
Organizer:
Barbara Simon, IBM Research (retired)

P9: Salon ABCD
The Hows and Whys of Graduate School: A Graduate Education,
Organizer:
Andrea Lawrence,
Spelman College

P10: Salon ABCD
Diversifying the Computing Pipeline,
Organizers:
Raquel Hill, UIUC;
Tiffani Williams,UNM,
Tiki Suarez, Florida A&M University; **Juan Gilbert,** Auburn University

Lunch and Town Hall Meeting (Salon ABCD)

Conference Adjourns

Conference Legend

P = Panel

T = Technical Talk

MS = Minisymposium

BOF = Birds-Of-A Feather

Special Sessions:

- Doctoral Consortium
- Welcome Reception
- Birds-of-a-Feather
- Poster Session and Reception
- Awards Ceremony and Banquet
- Town Hall Meeting

Wednesday, October 15

Doctoral Consortium
8:45am - 8:00pm
Florida Room
The Doctoral Consortium provides an opportunity for Ph.D. students to discuss and explore their research interests and career objectives with a panel of established researchers in computing and in computational mathematics, science, and engineering.

Conference Welcome Reception
8:00pm - 10:00pm
Grand Ballroom Foyer - Assembly Area
At the Conference Welcome Reception, conference participants will have an excellent opportunity to meet honoree Richard Tapia, a host of speakers and panelists, representatives from our sponsors and supporters, and other conference participants. The Career Information Center will also be open during the reception. Don't miss this chance to network with your colleagues, leaders in the field, and potential future collaborators.

Thursday, October 16

Birds-of-a-Feather Session: Developing Outreach Programs through Student-run Presentations: Carnegie Mellon's Women @ SCS "Outreach Roadshow"
4:30pm - 5:30pm
Grand Ballroom, Salon ABCD
This BoF will serve a variety of interests but will be especially attractive to those looking for ideas on computer science outreach, mentoring, and role modeling. Students, teachers, and parents should find this discussion useful, as will members of student organizations looking to produce outreach programs of their own.
Organizers: Lenore Blum and Carol Frieze, Carnegie Mellon University

Poster Session and Reception
6:00pm - 9:00pm
Grand Ballroom Foyer - Assembly Area
Take this opportunity to learn about the research featured on more than 20 posters authored by undergraduate and graduate students, post-docs, and faculty. The topics include mathematics, computational biology, human computer interfaces, physics, networking, and societal and educational applications of technology. Poster judges will talk to presenters at their poster during the course of the session and present a $1000 prize for the best student poster at the awards ceremony Friday evening.

Friday, October 17

Birds-of-a-Feather Session: Coalition to Diversify Computing: Distributed Rap Session
4:30pm - 5:30pm
Grand Ballroom, Salon ABCD
In this BoF session, students will present their research and share their experiences—pros and cons—in participating in virtual communities and distance mentoring relationships. Organizers: Allison Clark and Phoebe E. Lenear, National Center for Supercomputing Applications

Conference Awards Ceremony and Banquet
6:30pm - 9:00pm
Grand Ballroom, Salon EFGH

Awards Ceremony: Poster Award and the Richard A. Tapia Achievement Award for Scientific Scholarship, Civic Science, and Diversifying Computing

The Tapia Conference 2003 features many outstanding posters that describe research results and experiences related to computational science, computer engineering, and computer science. They offer students and researchers an opportunity to present their results informally and to interact with symposium attendees. An award of $1000 will be given for the best student poster.

A highlight of the evening will be the presentation of the semi-annual "Richard A. Tapia Achievement Award for Scientific Scholarship, Civic Science, and Diversifying Computing." The award honors Tapia's lifetime work as a "civic scientist"—a scientist who recognizes that at the very center of our highly complex technological and scientific world are people. Recipients are distinguished computational or computer scientists or computer engineers who are also making significant contributions to quality of life matters such as teaching, mentoring, advising, building and serving communities, or affecting local or national policy on human resource issues. Awardees will be recognized as those who demonstrate extraordinary leadership in increasing the participation of those groups who are underrepresented in the sciences.

Banquet
At the celebratory banquet, good food, music, dancing, and an awards ceremony will be accompanied by a talk from Eloy Rodriguez, a James A. Perkins Endowed Chair in Environmental Biology and Studies at Cornell University. Rodriguez, a renowned chemical biologist, will speak on, "Computers! I Don't Need No Stinking Computers!" In addition to networking with a diverse group of students, faculty, and researchers from many areas, you will be able to socialize with a number of leaders in the field of computing in an informal setting. Don't miss this special evening event!

Social and Dance

Finish the evening with great conversation and a wide variety of music for everyone. Join the Tapia Conference 2003 attendees for a social and dance as you meet new friends and renew old friendships.

Saturday, October 18

Town Hall Meeting
12:00pm - 1:30pm
Grand Ballroom, Salon ABCD
Your help is needed with the planning of future events and programs related to increasing diversity in the field of computing! Voice your ideas or suggestions at the Town Hall Meeting, which will provide an open forum for discussions about future Tapia events as well as possible programs that can be undertaken by the Coalition to Diversify Computing, a joint organization of the ACM, CRA, and IEEE-CS, which is open to ideas for new projects that aid in increasing the diversity in the field of computing, especially within graduate programs in computing.

Your feedback is important!
Please fill out the survey!
During the conference, we will be surveying the participants to get your feedback on the appropriateness of the sessions, what you found most useful, and your suggestions for future Tapia Conferences. In addition, we would like to find out how the conference impacts you, and whether you intend to follow up with any of the speakers, panelists, committee members, or others you have met while you were here. We cannot stress enough how important your feedback is—we want to be sure we continue to offer quality sessions that entice you to return again and again, to participate fully in future events, as well as proudly encourage your colleagues to attend in 2005 and beyond.

Full Schedule
Wednesday, October 15

DOCTORAL CONSORTIUM
8:45am - 8:00pm
Florida Room

Chair: Nina Berry, Sandia National Laboratories
The Doctoral Consortium provides an opportunity for Ph.D. students to discuss and explore their research interests and career objectives with a panel of established researchers in computing and in computational mathematics, science and engineering. The doctoral consortium has the following objectives:

- To provide a setting for feedback on participants' current research and guidance on future research directions.
- To develop a supportive community of scholars and a spirit of collaborative research.
- To provide a new generation of researchers and scientific leaders with advice and insight into academic, research, industrial, and non-traditional career opportunities.
- To contribute to the conference goals through interaction with other researchers and participation in conference events.

The Doctoral Consortium is supported by the National Science Foundation.

Doctoral Consortium Presenters

Adriane B. Davis, Georgia State University, adavis@cis.gsu.edu
Thesis Advisor: Melody M. Moore, Georgia State University BrainLab

M. Noelle Lee, West Virginia University, gazelleleap@hotmail.com
Thesis Advisor: Jeffrey Worsham, Department of Political Science

Srikanth Vadde, Northeastern University, srikant@coe.neu.edu
Thesis Advisor: Sagar V. Kamarthi, Laboratory for Responsible Manufacturing

Powtache Williams, Rice University, powwow@rice.edu
Thesis Advisor: Angelo Miele, Department of Mechanical Engineering

Jianghui Ying, Virginia Polytechnic Institute & State University, jying@vt.edu
Thesis Advisor: Denis Gracanin, Department of Computer Science

Yunxian Zhou, Virginia Polytechnic Institute & State University, yxzhou@vt.edu
Thesis Advisor: Denis Gracanin, Department of Computer Science

Doctoral Consortium Awardees

Alan Aspuru-Guzik, University of California, Berkeley
Azzari Caillier, Northwestern University
Shaun Gittens, University of Maryland
R. Michelle Green, Northwestern University
Lerpong Jarupan, Northeastern University
Gregory Lawrence, University of California, Berkeley
Victor Udoewa, Rice University
Hakim Weatherspoon, University of California, Berkeley
Donald C. Williams, Rice University

CONFERENCE WELCOME RECEPTION
8:00pm - 10:00pm
Grand Ballroom Foyer - Assembly Area

Full Schedule
Bios, and Abstracts
Thursday, October 16

OPENING REMARKS
8:45am - 9:00am
Grand Ballroom, Salon ABCD

Juan Meza, Lawrence Berkeley National Laboratory, and
Bryant York, Portland State University

Juan Meza, Lawrence Berkeley National Laboratory, JCMeza@lbl.gov
Juan Meza is the head of the High Performance Computing Research Department and Senior Scientist at Lawrence Berkeley National Laboratory (LBNL). Meza oversees work in scientific data management, visualization, imaging, scientific computing, numerical algorithms, and future technologies. He is responsible for developing short- and long-term research and development plans and proposing new technology directions. Prior to joining LBNL, Meza held the position of Distinguished Member of the Technical Staff at Sandia National Laboratories and served as the manager of the Computational Sciences and Mathematics Research department. In this capacity, he acted as the Research Foundation Network Research program manager, the ASCI Problem Solving Environment Advanced Software Development Environment program manager and served as a member of the Sandia California site Research Council. Meza has served on numerous external committees including, the Department of Energy's Advanced Scientific Computing Advisory Committee, NPACI's External Advisory Committee, MSRI's Human Resources Advisory Committee (chair), the Institute for Pure and Applied Mathematics, and the Institute for Mathematics and its Applications' Board of Governors. Meza is also currently a member of the Coalition to Diversify Computing. Meza holds Ph.D. and M.S. degrees in Mathematical Sciences from Rice University. He also holds M.S. and B.S. degrees in Electrical Engineering (cum laude) from Rice University. His current research interests include parallel nonlinear optimization and computational methods for nanoscience.

Bryant York, Portland State University, york@cs.pdx.edu

Bryant York's educational background includes the A.B. in mathematics from Brandeis University, the M.S. in management from MIT, and the M.S. and Ph.D. in computer science from the University of Massachusetts - Amherst. He is currently professor and research director for the Computer Science Department of Portland State University and formerly associate professor of computer science in the College of Computer Science at Northeastern University. York's primary research interest is in the development of parallel algorithms for advanced scientific computations. He is currently working on parallel algorithms for data mining and machine learning applied to atmospheric modeling in conjunction with atmospheric scientists at the National Center for Supercomputing Applications. In related work, he is applying machine learning and data mining techniques to computer games for studying the cognitive development of African American children. During 1990-91 York spent a one-year rotation as a program director in the Computer Information Sciences and Engineering (CISE) directorate of the National Science Foundation. He funded special projects relating to women, minorities, and persons with disabilities and conducted a computer-programming contest at Benjamin Banneker High School in Washington, DC. For his efforts, York was awarded the NSF's Equal Opportunity Prize in 1991. York was a member of the Advisory Committee for the CISE Directorate of the NSF. He was a member of the Advisory Panel for the Ethics, Values, and Society program within the Social Behavioral and Economic Sciences directorate of the NSF. He was also a member of the ACM Education Board, a member of the ACM U. S. Public Policy Committee, and a member of the CRA Board. In 1998, York won the A. Nico Habermann Award for service to underrepresented minorities in computing and in 2001, he won the First Richard A. Tapia Achievement Award for Scientific Scholarship, Civic Science and Diversifying Science. He is currently a member of the Coalition to Diversify Computing. York is co-founder and research director of the Institute for African American E-Culture.

PLENARY SESSION

9:00am - 10:00am

Grand Ballroom, Salon ABCD

Session Chair: Bryant York, Portland State University

Computational Grids: Analyzing the Performance

Valerie E. Taylor, Texas A&M University, taylor@cs.tamu.edu

Currently, distributed systems, especially grid systems, are becoming available through programs and projects such as the TeraGrid, the NASA Information Power Grid, the Alliance, the National Partnership for Advanced Computational Infrastructure, GriPhyN, and the European Grid Effort. Grids, in contrast to conventional parallel systems, have some unique features that pose significant challenges in terms of performance modeling and analysis. Performance is an important issue with any application, especially grid applications. Efficient execution of applications requires insight into how the system features impact the performance of the applications. This insight generally results from significant experimental analysis and possibly the development of performance models. This talk will focus on the current techniques used to analyze the performance of grid applications and present some examples.

Valerie E. Taylor earned her Ph.D. in Electrical Engineering and Computer Science from the University of California, Berkeley, in 1991. From 1991-2002, Taylor was a member of the faculty of Northwestern University. Taylor has since joined the faculty of Texas A&M University as Head of the Dwight Look College of Engineering's Department of Computer Science and holder of the Stewart & Stevenson Professorship II. Her research interests are in the areas of computer architecture and high-performance computing, with particular emphasis on mesh partitioning for distributed systems and the performance of parallel and distributed applications. She has authored or co-authored more than 70 publications in these areas. Taylor has received numerous awards for distinguished leadership and research.

Break 10:00am - 10:30am

Grand Ballroom Foyer - Assembly Area

PARALLEL SESSIONS

10:30am - Noon

MS1 - Minisymposium: Wireless Communications, Part I

Grand Ballroom, Salon ABCD

Minisymposium Organizer: Demetrios Kazakos, University of Toledo

Demetrios Kazakos received his Ph.D. from the University of Southern California in 1973. Currently, he is the Chairperson of the Electrical Engineering and Computer Science department at the University of Toledo, as well as a professor in the EECS department. His research has been in the area of Statistical Communication Theory, Wireless Communications, and Statistical Pattern Recognition. He was appointed to the University's Diversity Commission by the President of the University of Toledo.

Dynamic and Robust Capacity Allocation in Wireless Networks Carrying Heterogeneous Traffics

Anthony T. Burrell, Oklahoma State University;
Titsa Papantoni, University of Colorado at Denver,
tpapanto@carbon.cudenver.edu

We consider wireless networks carrying heterogeneous traffics. We assume that the characteristics of the traffic classes are time varying: at each point in time, a traffic class is described by a process randomly selected from within a set of non parametrically defined stochastic processes. For the wireless environment described above, we compare two multiplexing transmission techniques: a dynamic Time-Division-Based and a dynamic CDMA-Based techniques, in terms of a number of pertinent performance metrics. The dynamics of both techniques manifest themselves as dynamic capacity allocations to the various traffic classes and are implemented via the deployment of a Robust Traffic Monitoring Algorithm (RTMA). The performance metrics studied include delays, traffic rejection rates and wasted capacity rates. Qualitatively speaking, a major controlling factor in the choice among the Time-Division-Based and the CDMA-Based techniques is the speed of the transmission channel: high speeds favor CDMA-Based transmissions.

The Comparison of Two Signaling Protocols for the Wireless Environment

Anthony T. Burrell, Oklahoma State University;
Titsa Papantoni, University of Colorado at Denver,
tpapanto@carbon.cudenver.edu

In the wireless environment, the two major stages in the communication between any two users are signaling and transmission. At the signaling stage, the users are not well known to the system, a fact that necessitates the deployment of a Random Access Protocol. The signaling protocol deployed by current wireless systems is ALOHA based and is similar to the currently deployed Ethernet Protocol. We will compare the performance of the Ethernet Protocol with that of the 2-Cell Limited Sensing Algorithm, when both are deployed as the signaling protocol in the wireless environment. In contrast to the Ethernet Protocol, the 2-Cell Algorithm is stable. The superiority of the later algorithm is clearly shown, in terms of induced delays as well as in terms of rejection rates in the presence of admission delay constraints.

Traffic Modeling for Communication Networks and its Significance for Network Management

Demetrios Kazakos, University of Toledo,
dimitri@eecs.utoledo.edu

No abstract available at press time.

T1 - Technical Talks: Large Scale Data and Knowledge Management/ Ubiquitous Computing

Grand Ballroom, Salon E

Session Chair: Alok N. Choudhary, Northwestern University

Large Scale Data and Knowledge Management

Alok N. Choudhary, Northwestern University,
choudhar@ece.northwestern.edu

No abstract available at press time.

Enterprise Data Management in Research Organizations: Data the Way You Want It

M. Brian Blake, Georgetown University,
blakeb@cs.georgetown.edu

Raw data and processed information are essential to organizations that perform operational analysis and build simulation systems. In such domains, the dissemination and management of this information is a daunting task. Not only must this data support a heterogeneous array of researchers, but also the requirements on this data are constantly changing. To achieve maximum utility, data of this sort must be made available in distributed locations and offered in various custom formats. Such approaches as relational-to-XML, XML-XSL-based custom formats, and web-accessible database reporting tools offer some solutions for this domain. However, there are some requirements that the current state of the art do not fulfill. In this paper, there is a characterization of the state of the art for this distributed data management domain and a discussion of the current shortcomings.

User Modeling for Personalized Universal Appliance Interaction

Charles Lee Isbell, Jr.,
Georgia Institute of Technology;
Olufisayo Omojokun, University of North Carolina,
omojokun@cs.unc.edu

One of the driving applications of ubiquitous computing is universal appliance interaction. It is the ability to use arbitrary mobile devices-some of which we traditionally think of as computers (e.g. handhelds and wearables), and some of which we do not (e.g. cell phones)-to interact with arbitrary appliances such as TVs, printers, and lights. We believe that universal appliance interaction is best supported through the deployment of appliance user-interfaces (UIs) that are personalized to a user's habits and information needs. We are building a UI deployment system for universal appliance interaction to support various personalization features based on predicting a user's behavior. It is our belief that we can achieve these features in our system by modeling user actions using machine-learning (ML) algorithms. The initial step in building such a system that relies on ML for prediction is to show that there are patterns in user appliance interaction.

P1 - Panel: High Performance Grid Computing
Grand Ballroom, Salon FGH

Panel Organizer: Radha Nandkumar, National Center for Supercomputing Applications

This panel will provide a glimpse of high performance grid computing environment and applications that are made possible by decades of research, development, deployment and investment in the national computational hardware and software infrastructure. Three panelists, luminaries in the world of high performance computing, will highlight current accomplishments, advances in science and engineering that it has enabled, the opportunities and challenges in using this infrastructure to understand and solve large scale problems, efforts in education and outreach, and some of the lessons learned, especially in broadening participation.

Radha Nandkumar, National Center for Supercomputing Applications (NCSA), radha@ncsa.uiuc.edu

Radha Nandkumar obtained her Ph. D. in physics from the University of Illinois at Urbana-Champaign. Her research interests in the areas of condensed matter physics, extrapolated to astrophysical systems, have extended to observational astronomy, theoretical modeling and computational science. She joined the staff of NCSA in Illinois at the center's inception in 1985. She has held various responsibilities at NCSA for enabling computational science research and has an in-depth knowledge of current trends in technology and advances in computational science. She has participated in NCSA's strategic planning, management, customer relationships, peer review processes and resource allocations. Most recently, she also completed an Executive M.B.A. at the University of Illinois and is in charge of NCSA's Campus Faculty Relations and International Affiliations Program. As a speaker and a panelist, she has made numerous invited presentations globally in the area of high performance computing and computational science. She serves on several committees that promote diversity, women in computing and information technology, and computational science. Her current research interests are related to grid computing.

Panelists

Dan Reed, NCSA/UIUC, reed@ncsa.uiuc.edu

Dan Reed holds the Edward William and Jane Marr Gutgsell Professorship at the University of Illinois, where he serves as director of the National Computational Science Alliance (Alliance) and the National Center for Supercomputing Applications (NCSA). In this dual directorship role, Reed provides strategic direction and leadership to the roughly 50 Alliance partners and NCSA. He is also one of two principal investigators and the Chief Architect for the NSF TeraGrid project to create a U.S. national infrastructure for Grid computing. The TeraGrid is a multiyear effort to build and deploy the world's largest, fastest, distributed computing infrastructure for open scientific research. Reed is a member of the NSF Center for Grid Application Development Software, the Department of Energy (DOE) Scientific Discovery through Advanced Computing program, and the Los Alamos Computer Science Institute. He is chair of the NERSC Policy Board for Lawrence Berkeley National Laboratory, is co-chair of the Grid Physics Network Advisory Committee, and is a member of the board of directors of the Computing Research Association. He is an incoming member of the President's Information Technology Advisory Committee (PITAC). Before becoming NCSA director, Reed was head of the University of Illinois computer science department from 1996 to 2001.

Osni Marques, Lawrence Berkeley National Laboratory, osni@nsun4.lbl.gov

Osni Marques is a member of the Scientific Computing Group of the High Performance Computing Research Department at the Lawrence Berkeley National Laboratory (LBNL). Currently, he is the PI for the project Advanced CompuTational Software (ACTS) Collection, funded by the Mathematical, Information, and Computational Sciences (MICS) Division of the US Department of Energy (DOE). The ACTS Collection (http://acts.nersc.gov) comprises a set of software tools developed mostly at DOE Laboratories and universities that can simplify the solution of common and important computational problems. Marques' research interests include the study, implementation and testing of algorithms for the solution of problems in numerical linear algebra, in particular eigenvalue problems, and high-end scientific computing. He has worked in applications related to protein motions, acoustics problems in automobile design, structural analyses, geophysics, and more recently in material sciences calculations. Marques also holds a research position at the UC Berkeley Computer Sciences Department, where he works in the framework of the LAPACK, ScaLAPACK and NSF NPACI projects.

Roscoe Giles, Boston University, roscoe@bu.edu

Roscoe Giles is a professor in the Department of Electrical and Computer Engineering (ECE) at the College of Engineering, Boston University. He does computational science research, education, and outreach. His research in computational science focuses on applications of parallel supercomputers to physics and materials problems. He is a team leader for the Education, Outreach, and Training Partnership for Advanced Computational Infrastructure (EOT-PACI), and Deputy Director of the Boston University Center for Computational Science. He is the Executive Director of the new Institute for African-American eCulture (iAAEC) and was General Chair of the SC2002 Conference.

Lunch Noon - 1:30pm
Bentley's Rest/Lounge

PLENARY SESSION

1:30pm - 2:30pm
Grand Ballroom, Salon ABCD

Session Chair:
Juan Meza, Lawrence Berkeley National Laboratory

Seeking, and Sometimes Finding, the Best in Work and in Life

Margaret H. Wright, Courant Institute, New York University, mhw@cs.nyu.edu

The term "optimization" means, speaking broadly, finding, or creating the best. In computer science and mathematics, optimization is a research area in which we try to understand what characterizes the best as well as how to compute an optimal solution. In life, of course, determining what each of us wants and how to achieve it is much more complicated. This talk will begin with an overview of recent developments in computational optimization (in some of which Richard Tapia has been involved) and then consider a few frequently asked questions about optimizing in life.

Margaret H. Wright is Silver Professor of Computer Science and chair of the Computer Science Department in the Courant Institute, New York University. From 1988-2001, she was with the Computing Sciences Research Center at Bell Laboratories, Lucent Technologies (formerly AT&T Bell Laboratories), where she became a Distinguished Member of Technical Staff in 1993 and a Bell Labs Fellow in 1999. She served as head of the Scientific Computing Research Department from 1997-2000. She received her B.S. in mathematics, and her M.S. and Ph.D. in computer science, from Stanford University. Her research interests include optimization, linear algebra, numerical and scientific computing, and scientific and engineering applications. She is the co-author of "Practical Optimization" (with Philip Gill and Walter Murray). In recent years, she has worked on interior-point methods for nonlinear optimization and on direct search methods for unconstrained optimization. She was elected to the U.S. National Academy of Engineering in 1997 and to the American Academy of Arts and Sciences in 2001. During 1995-1996, she served as president of the Society for Industrial and Applied Mathematics (SIAM). She chairs the Advisory Committee on Advanced Scientific Computing for the U.S. Department of Energy's Office of Science, and was a member of the U.S. National Science Foundation Blue Ribbon Panel on Cyberinfrastructure.

Break 2:30pm - 3:00pm
Grand Ballroom Foyer - Assembly Area

PARALLEL SESSIONS

3:00pm - 4:30pm

MS2 - Minisymposium: Wireless Communications, Part 2
Grand Ballroom, Salon ABCD

Minisymposium Organizer:
Demetrios Kazakos, University of Toledo

Iterative Detection of a CFSK System

Lance C. Perez, University of Nebraska, Lincoln, lperez@unl.edu

In a Collision Frequency Shift Keying (CFSK) system, all users use the same set of subbands that span the whole spectrum. However, at any particular moment a user can only transmit over a single subband. Users are uncoordinated and thus it is possible (even likely) that two users will transmit simultaneously in the same subband. When this occurs, a collision is said to have occurred. Analysis shows that collisions can actually improve the performance of a multiuser CFSK system. In this work, the performance of the CFSK system is investigated using consensus decoders, which utilizes a symbol based maximum a posteriori (MAP) method. This receiver requires a metric, which becomes prohibitively complex as the number of users increases. To reduce the complexity a suboptimal simplified metric is introduced. Using the suboptimal metric, we construct a MAP consensus decoder and a turbo consensus decoder that operate in an iterative manner. Simulation results show that both of these decoders offer excellent performance.

A Generalized Model for Network Survivability

John Koroma, **Wei Li,** University of Toledo, wli@eecs.utoledo.edu

The high expectation of a network to be available and perform at all times has created growing concerns between network operators and engineers all over the globe. A network should be available to users whenever they want to use them. In the wake of an attack, a network should also be able to recover as soon as possible. A survivable network is one that can provide services in the presence of an attack or failure and be able to recover fully in a timely manner. Designing a model for network survivability basically involves the understanding of three key issues, i.e., how the system will function in the wake of failures, what will be the impact of failures on the user, and how to overcome these failures. To achieve these goals, this paper proposes a quantitative approach to evaluate the network survivability in terms of using a generalized model. In this model, we consider a more complex system with several faults to study the survivability of a network. This survivable network model assumed both steady state and transient state conditions in determining the excess packet loss due to failures. In this model, we determine the steady state availability, reliability and failure frequency for a generalized number of faults in the system and then used a transient approach to determine the

expected excess loss in overload and the expected excess delay in overload. We then combined system availability and transient response under failure condition to determine the excess loss due to failure, which is our survivability measure. In presenting a better survivability performance, some numerical comparisons are also developed. In the numerical analysis, we limit our fault to the three major faults that are likely to occur in a real network system.

T2 - Technical Talks: Optimization
Grand Ballroom, Salon E

Session Chair: Glen Fung, University of Wisconsin

The Disputed Federalist Papers: SVM and Feature Selection via Concave Minization

Glenn Fung, Olvi Mangasarian**,** University of Wisconsin, gfung@cs.wisc.edu

In this talk, we present a method proposed by Bradley and Mangasarian,"Feature Selection via Concave Minimization and Support Vector Machines" to solve the well-known disputed federalist papers classification problem. First, we find a separating plane that classifies correctly all the "training set" papers of known authorship, based on the relative frequencies of only three words. Using the obtained separating hyperplane in three dimensions, all the 12 of the disputed papers ended up on the Madison side of the separating plane. This result coincides with previous work on this problem using different techniques.

A Constraint-stabilized Time-stepping Approach for Rigid Multibody Dynamics with Joints, Contact and Friction

Mihai Anitesc, Argonne National Laboratory; **Gary D. Hart,** University of Pittsburgh, gdhart@pitt.edu

We present a method for achieving geometrical constraint stabilization for a linear-complementarity-based time-stepping scheme for rigid multibody dynamics with joints, contact, and friction. The method requires the solution of only one linear complementarity problem per step. Several examples are used to demonstrate the constraint stabilization effect.

Statistical Application of Karush Kuhn Tucker: REL

Nancy Glenn, University of South Carolina, nglenn@stat.sc.edu

This research introduces the new nonparametric statistical technique: robust empirical likelihood. Robust empirical likelihood employs the empirical likelihood method to compute robust parameter estimates and confidence intervals. The technique uses the Karush Kuhn Tucker Theorem to solve a robust version of the empirical likelihood function, thus allowing data analysts to estimate parameters accurately despite any potential contamination. Robust empirical likelihood's applications included hypothesis testing, regression models, and all areas that use likelihood methods.

3:00pm - 3:45pm
P2 - Panel: Defining and Sustaining Quality Mentoring
Grand Ballroom, Salon FGH

Panel Organizer: Sheila Humphreys, University of California, Berkeley

The topic is the crucial concept and practice of varied forms of mentoring, from undergraduate research, to graduate research, and beyond the university. Speakers will include both experienced faculty from the university, an industry researcher, and a senior graduate student in computer science. The difference between mentoring and supervision will be explored. We will examine the mentoring needs of undergraduate researchers, using our National Science Foundation (NSF) Research Experience for Undergraduates SUPERB project as a model. At the undergraduate level, we will analyze the components of successful undergraduate research mentoring as a conduit to graduate school. At the graduate level, panelists will address the mentoring needs of graduate students, sensitivity to issues faced by underrepresented students in majority universities, challenges in finding a good mentor, defining a good research problem, determining the level of guidance, mentoring for the job search, and sustaining mentoring relationships beyond the university. Panelists will discuss the critical role of peer mentoring provided through active minority student organizations, using Berkeley's BGESS (Black Graduate Engineering and Science Students Association) as a model.

Sheila Humphreys, University of California, Berkeley, humphrys@eecs.berkeley.edu

Sheila Humphreys brings 20 years of experience in fostering science intervention and the diversity programs at the pre-college, undergraduate and graduate levels to promote diversity. Humphreys received the A. Nico Habermann Award from the Computer Research Association in 1999, for her contributions on behalf of minority groups in computer science. She is knowledgeable about issues of access to information technology, computer science and engineering and was an invited member of the Computer Research Association Working Group that produced the report "Recruitment and Retention of Underrepresented Minority Graduate Students in Computer Science." (CRA, August, 2000). She is an active member of the Berkeley Coalition for Excellence in Mathematics, Science, and Engineering. She has initiated many intervention programs at Berkeley to increase the participation of under-represented students in engineering and computer science, including the computer science Reentry Program. As director of the EECS Center for Undergraduate Matters, she oversees academic and preprofessional support and programs for undergraduate students. Humphreys has been active in equity issues nationally and has strong ties to national organizations.

Panelists

John Davis II, IBM T.J. Watson Research Center, davisjs@us.ibm.com

John S. Davis II is a researcher at the IBM T.J. Watson Research Center, where his research interests include pervasive and context-aware computing, privacy, and concurrent systems. Prior to beginning his career with IBM, John earned his Ph.D. in electrical engineering and computer science at the University of California at Berkeley and his Bachelor of Science degree in electrical engineering at Howard University. While a graduate student, John co-founded Yellow Brick WebWorks, an Internet website design firm. Now and throughout his years as an undergraduate and graduate student, John has actively participated in his community as a mathematics tutor to middle school and high school students.

Gregory D. Lawrence, University of California, Berkeley, gregl@eecs.berkeley.edu

Gregory D. Lawrence is a Ph.D. student at the University of California, Berkeley. His research interests include reinforcement learning and its application to motor control problems. He received his B.S. in electrical engineering and computer sciences from Berkeley in 1998.

Gary S. May, School of Electrical Engineering, Georgia Institute of Technology, gary.may@ece.gatech.edu

Gary S. May received the B.E.E. degree in electrical engineering from the Georgia Institute of Technology in 1985 and the M.S. and Ph.D. degrees in electrical engineering and computer science from the University of California at Berkeley in 1987 and 1991, respectively. May was appointed as executive assistant to Georgia Tech President G. Wayne Clough in June 2002. In this capacity, May acts as Clough's chief liaison to a variety of Georgia Tech constituencies and carries out actions on behalf of the president. May also continues to coordinate the SURE program, a 10-week summer research experience designed to attract qualified minority students into graduate school in the fields of engineering and science. He is chairperson of the National Advisory Board of the National Society of Black Engineers (NBSE). May's research is in the field of computer-aided manufacturing of integrated circuits. He was a National Science Foundation "National Young Investigator" (1993-1998) and is Editor-in-Chief of IEEE Transactions on Semiconductor Manufacturing. He has published over 120 articles and given nearly 80 technical presentations in the area of IC computer-aided manufacturing.

Hakim Weatherspoon, University of California, Berkeley, hweather@cs.berkeley.edu

Hakim Weatherspoon is a second-year graduate student in the Computer Science Ph.D. program at University of California at Berkeley. His projects include archival storage for high availability and disaster recovery, wireless sensor network regime and introspective replica management

3:45pm - 4:30pm
P3 - Panel:
Advice to Early Career Professionals from the Trenches
Grand Ballroom, Salon FGH

Panel Organizers: Monica Martinez-Canales, Pamela Williams, Sandia National Laboratories

In graduate school, the rules for advancement are usually well documented. You took the required classes, passed qualifying exams, found a research topic and advisor, proposed your thesis topic, engaged in research at the frontiers of science, defended your world-changing ideas, and were deemed Ph.D. worthy. As professionals beginning careers in academia, industry, or a national laboratory, we find ourselves wading through systems with numerous unwritten rules, mechanisms for promotion, and social as well as professional networks. Which meetings are required and which are highly encouraged? Is asking for a mentor a sign of maturity or weakness? Will giving my employer exposure through outreach involvement benefit me or diminish my professional credibility? How do I achieve balance in my family and work life? How do I know I am making the right career decisions? Because oftentimes the questions we ask and the decisions we face are similar, three experienced panelists from academia, industry, and a national laboratory will discuss the most important issues faced by young professionals in their arena, interwoven with advice on handling those issues. These panelists will give advice from the trenches—they've lived it, experienced it, and overcome it.

Monica Martinez-Canales, Sandia National Laboratories, mmarti7@sandia.gov

Monica Martinez-Canales is a senior member of the technical staff at Sandia National Laboratories where she engages in research on error estimation of numerical solutions of partial differential equations, design of experiments, Bayesian statistics, and uncertainty quantification. Martinez-Canales holds a B.S. in Mathematics from Stanford University, an M.A. and a Ph.D. in Computational Applied Mathematics from Rice University. She completed an NSF Postdoctoral Fellowship in the Dept. of Geological and Environmental Sciences at Stanford University prior to joining Sandia National Laboratories.

Pamela Williams, Sandia National Laboratories, pwillia@sandia.gov

Pamela J. Williams is a senior member of the technical staff in the Computational Sciences and Mathematics Research Department at Sandia National Laboratories. Her research interests include large-scale constrained optimization and mathematical software design. Williams earned a B.S. in mathematics from the University of Kentucky, and then in 1998 she received her Ph.D. in computational and applied mathematics from Rice University, studying under Richard Tapia and Amr El-Bakry. Her outreach activities include the Go Figure Mathematical Challenge, Expanding Your Horizons in Sciences and Mathematics, and Santa Clara University's Mentoring Underrepresented Students in Engineering (MUSE) Program. Williams' honors and awards include an Otis A. Singletary Scholarship (1987-1991), National Society of Black Engineers Fellow (1990 and 1991), AT&T Cooperative Research Fellowship (1991-1998), and Lawrence Livermore National Laboratory Education Outreach Award (2001).

Panelists

Ken Washington, Sandia National Laboratories, kewashi@sandia.gov

Kenneth E. Washington has a B.S., M.S., and Ph.D. in Nuclear Engineering from Texas A&M University. Currently, Washington is the Director of Sandia's Distributed Information Systems Center. Since joining Sandia in 1986, Washington has held numerous technical, management, and program leadership positions in the computer modeling and information systems areas. He has developed computer models of complex physical phenomena as applied to national security issues and complex decision support systems for government customers and industry partners. In his current position, he leads the computing center at Sandia's California site, which includes a broad information science and technology research and development portfolio as well as responsibility for the telecommunications, information infrastructure services, cyber security, and related support functions.

Armando Rodriguez, Arizona State University, aar@asu.edu

Armando Antonio Rodriguez joined the Electrical Engineering Department at Arizona State University after receiving a Ph.D. from the Massachusetts Institute of Technology in 1990. His research interests include: control of sampled data distributed parameter systems; approximation theory, modeling, simulation, animation, and real-time control of dynamical systems; and robust control of flexible autonomous machines operating in uncertain environments. He is an AT&T Bell Laboratories Fellow and Boeing A.D. Welliver Fellow. In 1998, Rodriguez received a White House Presidential Excellence Award for Mentoring of SME students. He leads a NSF-funded effort to increase the number of underrepresented STEM Ph.D. graduates in the southwest.

4:30pm - 5:30pm
Birds-of-a-Feather:
Developing Outreach Programs through Student Run Presentations:
Carnegie Mellon's Women @ SCS "Outreach Roadshow"
Grand Ballroom, Salon ABCD

Birds-of-a-Feather Organizers: Lenore Blum, Carol Frieze, Carnegie Mellon University

This session will be based on the Women@SCS Roadshow, which is an outreach presentation run by a group of women faculty, graduates, and undergraduates from Carnegie Mellon's School of Computer Science. We will demonstrate how the Outreach Roadshow can be used with students and school children to challenge some of the stereotypes that still exist in the field. In particular, we will look at changing images of computer scientists and the changing image of the field.

We encourage discussion on how this type of outreach program can be adapted to different age ranges, venues, and how it can become a tool for both computer science students (in particular women and other underrepresented groups) and classroom teachers. The discussion will focus on what works and what doesn't work, adapting the presentation to meet the needs of teachers, adapting the program for online use, and on how such a presentation can provide opportunities for computer science students to act as role models and leaders thus increasing the visibility of women (and other underrepresented groups) in the field. In addition, we will discuss how to evaluate such programs for their value and effectiveness. For information about Women@SCS, please visit: www.cs.cmu.edu/~women. For information about the Outreach Roadshow, please visit: http//wascs.sp.cs.cmu.edu/What/Outreach/Roadshow/.

Lenore Blum, Carnegie Mellon University, lblum@cs.cmu.edu

Lenore Blum is Distinguished Career Professor of Computer Science at Carnegie Mellon University where she is co-director of the NSF-ITR funded ALADDIN Center (for ALgorithm ADaptation, Dissemination and IntegratioN) and faculty advisor to the student organization, Women@SCS. She received her Ph.D. from M.I.T. in 1968 (the same year Princeton first allowed women to enter their graduate program). For more than 30 years, she has created programs to increase the participation of girls and women in scientific and technical fields and co-founded many pro-active organizations such as the Math/Science Network and its Expanding Your Horizons conferences.

Carol Frieze, Carnegie Mellon University, cfrieze@cs.cmu.edu

Carol Frieze has been the associate director for Women@SCS for the past 3 years. She helped design and implement the Women@SCS Roadshow. She taught Cultural Studies in the CMU English department for four years while she was enrolled as a Ph.D. candidate, and worked as a student academic advisor in the College of Humanities and Social Sciences. Frieze has a background in inner-city high school teaching and in hospital teaching. Frieze also maintains the School of Computer Science web site at Carnegie Mellon University. She holds an M.A. in literary and cultural studies from Carnegie Mellon University.

Break 5:30pm - 6:00 pm
Grand Ballroom Foyer - Assembly Area

PLENARY SESSION

6:00pm - 9:00pm

Poster Session and Reception
Grand Ballroom Foyer - Assembly Area

The posters at Tapia Conference 2003 represent the work of a diverse group of researchers in fields covering computational and computer science, societal and educational issues, and several traditional scientific fields. While some of the posters will be up for viewing during the breaks, this plenary poster session is the best time to insure attendees can meet with the poster authors. Posters will also be judged during this time for the poster awards, which will be given out during the Friday evening awards session and banquet. Don't miss this chance to meet the poster authors and network with your colleagues.

KEYNOTE ADDRESS 9:00am - 10:00am
Grand Ballroom, Salon ABCD

Introduction of Keynote Speaker:
Juan Meza, Lawrence Berkeley National Laboratory

Issues and Problems with Diversity

Keynote Speaker -
Warren M. Washington
National Center for Atmospheric Research, wmw@ucar.edu

Increasing the participation of underrepresented groups in the science and engineering (S&E) workforce is widely recognized as key to maintaining U.S. world leadership in S&E. Much effort and rhetoric has been expended to achieve this critical objective. Although some success stories exist, as this symposium illustrates, critical issues continue to face the S&E community, including the computer and information technology professions: rapid growth in demand for S&E workers, increasing global competition for promising S&E students and skilled workers, insufficient number of domestic students in the S&E educational pipeline, and high attrition rates among S&E students and degree holders from S&E studies and careers. The desired diversity in S&E will not just happen. It will take coordinated and sustained action by academe, industry, government, and the broader public. The National Science Board has proposed a plan of action for the Federal Government in cooperation with other stakeholders. The plan addresses S&E education issues from precollege through graduate studies, with particular attention to developing domestic talent; the global nature of the S&E workforce; and the need to understand S&E workforce dynamics and develop strategies for ensuring the diverse, highly skilled workforce needed in the 21st century.

Warren M. Washington was born in Portland, Oregon, and earned a bachelor's degree in physics and a master's degree in meteorology from Oregon State University. After completing his doctorate in meteorology at Pennsylvania State University, he joined the National Center for Atmospheric Research (NCAR) in 1963 as a research scientist. In 1975, he was named senior scientist, and he currently is head of the Climate Change Research Section in the Climate and Global Dynamics Division. His areas of expertise are atmospheric science and climate research, and he specializes in computer modeling of the earth's climate. Since 1990, Washington has served on the Secretary of Energy's Biological and Environmental Research Advisory Committee (BERAC). Since 1996, he has been the chair of the Subcommittee on Global Change for BERAC. He served on the Modernization Transition Committee and the National Centers for Environment Prediction Advisory

Committee of the U. S. National Weather Service. From 1978 to 1984, he served on the President's National Advisory Committee on Oceans and Atmosphere. In 1998, he was appointed to the National Oceanic and Atmospheric Agency Science Advisory Board. In April 2000 he was appointed a member of Advanced Scientific Computing Advisory Committee by the U.S. Secretary of Energy. Washington is a fellow of the American Meteorological Society (AMS) and the American Association for the Advancement of Science (AAAS), a Distinguished Alumnus and an Alumni Fellow of Pennsylvania State University and Oregon State University, a fellow of the African Scientific Institute, and a member of the American Geophysical Union. From 1991 to 1995, he was a member of the AAAS Board of Directors, and he served as president of AMS in 1994. Washington received the Le Verrier Medal of the Societe Meteorologique de France in 1995. The U.S. Department of Energy awarded him the Biological and Environmental Research Program Exceptional Service Award for Atmospheric Science in 1997, for the development and application of advanced coupled atmospheric-ocean general circulation models to study the impacts of human activities on future climate. Also, in 1997 he was inducted into the National Academy of Sciences Portrait Collection of African Americans in Science, Engineering, and Medicine. In 1999, Washington received the National Weather Service Modernization Award. In January 2000, Washington was awarded the Dr. Charles Anderson Award from the American Meteorological Society for pioneering efforts as a mentor and passionate supporter of individuals, educational programs, and outreach initiatives designed to foster a diverse population of atmospheric scientists. In March 2000, Washington received the Celebrating 20th Century Pioneers in Atmospheric Sciences Award at Howard University and in April 2000 the Bonfils-Stanton Foundation Award in recognition of significant and unique contributions in the field of science. Washington was appointed to the National Science Board in 1994, reappointed in 2000, and elected Chair in May 2002.

Break 10:00am - 10:30am
Grand Ballroom Foyer - Assembly Area

PARALLEL SESSIONS
10:30am - Noon

T3 - Technical Talks: Augmenting Human Cognition
Grand Ballroom, Salon FGH

Session Chair: Brian Dennis, Northwestern University

BuzzMaps: Designing a Social Proxy for Predictive Utility
Brian Dennis, Northwestern University, bmd@cs.northwestern.edu

BuzzMaps direct users to news items of greater relevance to them. A BuzzMap does so by serving as a social proxy, a minimalist graphical representation of crucial social activity. BuzzMaps are designed to increase predictive utility, the ability of the user to predict the relevance of an item before consumption. The design and implementation issues of BuzzMaps are presented, including the selection of salient social activities to support predictive utility, the conceptual design of a social proxy to present these activities, and the visual design of BuzzMaps. This work is novel in specifically targeting predictive utility through a social proxy.

The Neem Dream
Clarence (Skip) Ellis, University of Colorado, Skip@colorado.edu

Imagine an environment in which computerized agents assist in human-to-human interaction via voice, video, and other multi-media / multi-modal mechanisms. The Project Neem work introduces agents Kwaku, Kwabena, and Kwesi - virtual participants who endeavor to make distributed meetings more effective, more efficient, and more pleasant. Neem is a research project at the University of Colorado concerned with understanding, enhancing and augmenting highly interactive distributed collaborations through advanced technology. A major novel aspect of this research is the use of intelligent artificial agents as full-fledged meeting participants. Goals of this interdisciplinary project include the enhancement of distributed group interaction understanding, and the creation and testing of prototype distributed meeting environments. With the encouragement and partnership of iAAEC (the Institute for African American Electronic Community), we have built and are testing a prototype distributed meeting system. Research methods include theoretical modeling, meetings analyses, prototype implementation and testing in real world environments, and meeting metrics development and application. Tools for understanding the social and organizational context of these meetings include the SYMLOG methodology applied by social agents, and the IBIS methodology applied by organizational agents. A new model enabling these agent analyses is the GraspIce model, explained in this talk. The work described is part of a larger ongoing effort within the Collaboration Technology Research Group at the University of Colorado to understand human collaboration, and to assist and enhance that collaboration via technology.

T4 - Technical Talks: CFD and Modeling
Grand Ballroom, Salon E

Session Chair: Antonio A. Garcia, Arizona State University

Modeling Flow Around a Microrotor in Creeping Flow Using a Quasi-Steady-State Analysis
Antonio A. Garcia, Arizona State University, tony.garcia@asu.edu

Paramagnetic microsphere suspensions placed in a rotating magnetic field aggregate to form rotating magnetic chains that are in the size range of tens to hundreds of micrometers in

length depending on the rotational speed. The rotating chains act similar to microrotors and produce a flow field around them thereby causing fluid flow and micromixing. Experimental study of the flow and mixing properties around the chains is very difficult due to the very small length scales encountered. The presence of a moving boundary, which periodically disturbs the flow, makes it difficult to use analytical techniques as well as off-the-shelf fluid simulation software. In this study, the flow field around the chain is developed by using numerical techniques with quasi-steady state assumption for the flow. The very low Reynolds number encountered due to the creeping flow around the microrotor allows for such an assumption, where time appears only as a parameter rather than as a truly independent variable. The flow field is hence derived at every instant from the case of a steady motion of a cylinder moving horizontally under creeping flow conditions. Numerical calculations at all time increments allow the development of the flow field, and the study of fluid element trajectories and streak lines allow for understanding the mixing behavior around the microrotors.

Rotational Dynamics of Magnetorheological Fluids in Microwells

Antonio A. Garcia, Arizona State University, tony.garcia@asu.edu

Magnetorheological (MR) fluids consist of particles suspended in liquid where the particles interact through dipole moments induced by the external magnetic field. To study field induced rheology we have extended an existing model to formulate a non-thermal 3D molecular dynamics simulations of hard spheres with boundary effects. Brownian forces, multipolar magnetic interaction, hydrodynamic interaction forces are neglected in the simulation. Computer simulations reveal that magnetic dipolar interaction between the paramagnetic particles induces the formation of chain-like structures that rotate with the same frequency as the magnetic field. Particle chain length decreases with increasing rotational frequency of the magnetic field and decreases with increasing viscosity. Moreover, the formation of chain is restricted by the cell confinement. These results are consistent with experimental observations. Experimental results verify the computer simulations of target particle movement.

Classification of the Long Time Evolution of Vortex Patches Using Direct Numerical Methods

Nathaniel Whitaker, University of Massachusetts, whitaker@math.umass.edu

We investigate coherent structures for the Euler equations. We solve the Navier-Stokes equations for a range of the energies using a pseudospectral method. We show that the solution for high energies is a shear structure and for low energies is a dipolar structure. We compare the predictions using regular viscosity with hyperviscosity.

10:30am - 11:15am
P4 - Panel: Where are all the Leaders? Closing the Minority Leadership Gap
Grand Ballroom, Salon ABCD

Panel Organizer: Juan Meza, Lawrence Berkeley National Laboratory

What does it take to be a leader? Are leaders born or can leadership be taught? While we have made great strides in terms of diversity in the computing sciences there are still too few leaders from underrepresented groups. This is particularly troubling at the national level where many strategic technical decisions are made. Richard Tapia has stated, "Despite a generation of intense efforts, the nation continues to face the dilemma of perilously low minority representation in science and engineering. Even more troubling and threatening to future success is the lack of the next generation's minority national leadership." This panel has convened several of the most respected leaders in their fields to share their thoughts on what is required to become a leader. Speaking from their own experiences, the panelists will discuss the qualities that they consider important to developing good leadership skills. Following this discussion, the audience will be invited to suggest and discuss strategies for developing the next generation's leaders.

Juan Meza's *bio appears on page 08.*

Panelists

Peter A. Freeman's *bio appears on page 19.*
José Muñoz's *bio appears on page 22.*
Warren Washington's *bio appears on page 16.*
Margaret H. Wright's *bio appears on page 12.*

11:15am - Noon
P5 - Panel: Politically Incorrect, Fast Pitch, Hardball Questions about Diversity in Computing (An Inquisition of Richard Tapia)
Grand Ballroom, Salon ABCD

Panel Organizer: Bryant York, Portland State University

Richard Tapia has given a number of presentations in various forms on a variety of topics related to diversity in computing. Some of these presentations have been followed by a question-and-answer session during which members of the audience have been allowed to directly question Tapia on points that he has made during the talk. Subsequent to some of these talks some have heard the following characterizations voiced: 1) Few questions were asked because Tapia is "preaching to the choir" —that is, people who already believe strongly in his point of view, or the questions that were asked were of such a nature as to allow further elaboration of his view. 2) Few questions were asked because some potential questioners felt intimidated by

fear of public opinion-that is, afraid that by asking a tough question they would be branded as “insensitive” or “racist.” In the true spirit of science, we propose a full and open inquiry into the myriad questions surrounding diversity in computing.

Bryant York’s *bio appears on page 09.*

Panelist

Richard Tapia’s *bio appears on page 03.*

Lunch Noon - 1:30pm
Bentley’s Rest/Lounge

PLENARY SESSION

1:30pm - 2:30pm
Grand Ballroom, Salon ABCD

Session chair: Bryant York, Portland State University

Revolutionizing Science and Engineering with Cyberinfrastructure

Peter A. Freeman, National Science Foundation, pfreeman@nsf.gov

Computing and communications coupled with computational techniques are revolutionizing all areas of science and engineering. Computer scientists and engineers are at the forefront of many of these revolutions and should be involved in all for the benefit of CS&E as well as the other disciplines. Cyberinfrastructure is the integration of hardware, software, communications, and services, and is envisioned as a cross-discipline, cross-agency effort. The role individual researchers can play will be discussed in the context of major funding initiatives.

Peter Freeman was founding Dean of the College of Computing at Georgia Tech in 1990. Since May 2002, he has been on leave to be an Assistant Director of the National Science Foundation, heading the Computer and Information Science and Engineering (CISE) Directorate. As an Assistant Director, he is part of the senior management team that helps formulate national science policy and that operates the NSF. As AD/CISE, he oversees a staff of approximately 90 and a funding budget of approximately $600M/year. Freeman received his Ph.D. in computer science from Carnegie-Mellon University in 1970.

Break 2:30pm - 3:00pm
Grand Ballroom Foyer - Assembly Area

PARALLEL SESSIONS

3:00pm - 4:30pm

T5 - Technical Talks: Optimization
Grand Ballroom, Salon E

Session Char: Miguel Argaez, University of Texas at El Paso

A New Infeasible Primal-Dual Interior-Point Algorithm for Linear Programming

Miguel Argaez, Leticia Velazquez**,** University of Texas at El Paso, mar@math.utep.edu

We present an infeasible path-following interior-point algorithm for solving linear programs using a relaxed notion of the central path, called quasicentral path, as a central region. The algorithm starts from an infeasible point, which satisfies that the norm of the dual condition is less than the norm of the primal condition. We use weighted sets as proximity measures of the quasicentral path, and we present a new merit function for making progress toward this central region. We test the algorithm on a set of NETLIB problems obtaining promising numerical results

A C++ Class for Managing Schittkowski’s Collection of Nonlinear Optimization Test Problems

Juan Meza**, Ricardo Oliva,** Lawrence Berkeley National Laboratory, raoliva@lbl.gov

We describe a C++ class for handling Schittkowski’s collection of nonlinear optimization test problems in an object-oriented manner without replacing the original Fortran code. The class includes wrappers for evaluating the functions defining each problem, in addition to methods that allow the user to query whether certain features are present in a given test problem. This makes it possible to classify and select subsets of the problems according to criteria specific for the code being tested.

On the Development of a Trust Region Interior-Point Method for Large Scale Nonlinear Programs

Miguel Argaez, **Leticia Velazquez,** University of Texas at El Paso; Cristina Villalobos**,** University of Texas - Pan American, leti@math.utep.edu

The focus of this talk is to present a new methodology for solving general nonlinear programs. We propose the use of interior-point methodology and trust-region globalization strategies to find a solution to large scale problems.

3:00pm - 3:45pm
P6 - Panel: Navigating the Tenure Process: A Diverse Prospective
Grand Ballroom, Salon ABCD

Panel Organizer: Valerie E. Taylor, Texas A&M University

The goal of this panel is to highlight the requirements for successfully navigating the tenure process from diverse perspectives, with a special focus on minorities. At this time, we are starting to see an increase in the number of minority doctoral graduates entering academia. This is motivated by the current economic climate of a decrease in research positions at major companies and the increase of intellectual freedom in the academic environment. It is critical that minorities who have successfully navigated the tenure and promotion process to the level of full professor make known the strategies used to achieve a positive outcome.

Valerie Taylor's *bio appears on page 09.*

Panelists

Janice E. Cuny, University of Oregon, cuny@cs.uoregon.edu

Janice Cuny is a Professor of Computer and Information Science at the University of Oregon. She received the Ph.D. from the University of Michigan. Her research interests are computational science, parallel processing, and programming environments. Cuny has a history of involvement with women's' issues in computing and is currently Vice Chair of the Computing Research Association (CRA).

Clarence "Skip" Ellis, University of Colorado at Boulder, skip@Colorado.edu

Clarence "Skip" Ellis is a Professor of Computer Science, and Director of the Collaboration Technology Research Group at the University of Colorado at Boulder. His interests include groupware, coordination theory, object oriented systems, CSCW, office systems, databases, distributed systems, software engineering, world-wide-web (internetworking), systems design and modeling, workflow systems, and humane interfaces to computers. He has published over 100 technical papers and reports, and was an invited speaker at the most recent IFIP World Computer Conference.

John Hurley, Ph.D., Boeing Company, jhurley66@earthlink.com

John Hurley is Senior Manager of Distributed System Integration at Boeing Company in Seattle, Oregon. His areas of interest are Grid computing, distributed systems, information security, simulation and modeling of microelectronic circuits and systems. He is formerly an Associate Professor in the Department of Engineering at Clark Atlanta University and received the Ph.D. from Howard University.

Roscoe Giles' *bio appears on page 11.*
Andrea W. Lawrence's *bio appears on page 24.*

3:45pm - 4:30pm
P7 - Panel: Grant Proposal Development Tips from the Experts
Grand Ballroom, Salon ABCD

Panel Organizers: Monica Martinez-Canales, Pamela Williams, Sandia National Laboratories

Why is a particular grant proposal funded? Is it the exceptional content? Is it the dazzling presentation? Or is it based on who you have as friends or ... enemies? Is it the people, place, or thing - or one too many nouns? Three panelists from DOE, NASA, and NSF will present the "Dos" and "Don'ts" of developing and writing grant proposals based on their experience as program managers. In addition, each panelist will provide a "top ten" list of the characteristics of outstanding proposals. What separates the top scores from the rest of the group? This panel will help participants improve their chances of developing a successful grant proposal.

Monica Martinez-Canales' *bio appears on page 14.*
Pamela Williams' *bio appears on page 15.*

Panelists

Fred Johnson, Department of Energy, fjohnson@er.doe.gov

Frederick C. Johnson, Senior Technical Manager for Computer Science, DOE Office of Science. Support computer science research and high performance system software/tools including: programming models, scalable system software for high end computers, debugging and performance evaluation tools, software component architectures for high performance systems, and next generation operating systems. Johnson joined MICS in 1999 after twenty-four years at the National Institute for Standards and Technology where he was the Associate Director for Computing in the Information Technology Laboratory. Johnson holds a Ph.D. in Applied Mathematics from the University of Washington.

Nitin Naik, NASA, Nitin.naik@nasa.gov

Nitin Naik is a NASA Space Science Education and Public Outreach Broker/Facilitator with specific responsibilities for assisting people interested in preparing proposals to NASA Space Science. He is also the Director of the NASA supported Center for Education Technology at Wheeling Jesuit University, a major NASA facility for developing computer-based instructional materials. He is currently on detail with the Office of Education at NASA Headquarters, which gives him a broad perspective on computation technologies across NASA and—particularly—in NASA education.

Caroline Wardle, National Science Foundation, cwardle@nsf.gov

Caroline Wardle received a Ph.D. in mathematical physics in 1970 from the University of London, England. Her research interests have spanned theoretical physics, computer graphics, programming languages software engineering and information systems. Wardle joined NSF in 1990 as a Program Director in the CISE Office of Cross Disciplinary Activities (CDA), now the Division of Experimental and Integrative Activities (EIA). She has managed a number of research and education programs including Research Infrastructure, Research Instrumentation, Major Research Instrumentation, Educational Infrastructure, Faculty Awards for Women, Professional Opportunities for Women in Research and Education, Collaborative Research on Learning Technologies and CISE Advanced Distributed Resources for Experiments. She is currently leading a CISE research initiative to explore the underlying reasons for the under representation of women and minorities in the Information Technology (IT) workforce.

4:30pm - 5:30pm
Birds-of-a-Feather: **Coalition to Diversify Computing (CDC): Distributed Rap Session**
Grand Ballroom, Salon ABCD

Birds-of-a-Feather Organizers: Allison Clark, Phoebe Lenear, National Center for Supercomputing Applications

Strong support systems are critical to the success of any rigorous graduate program, especially graduate programs in computer engineering, computer science, and computational science. It is well known that a community of peers can provide this needed support system, but it is important that this community consists of peers with common backgrounds, both ethnically and intellectually. This can be a problem for minority graduate students in the area of computing, for which the numbers are very small. The goal of the CDC's Distributed Rap Session project was three-fold: 1) Continue the project that began in 2001 by Valerie Taylor and Bryant York that focused on building a virtual community of minority undergraduate and graduate students, 2) Expose minority undergraduate computer science and engineering students to research, and 3) Hold short research meetings with undergraduate students to discuss research progress, problems encountered, and goals achieved. The project made use of the Access Grid (AG), which is an ensemble of resources that can be used to support human interaction across distributed sites, called Access Nodes. The resources include multimedia displays, presentations and interaction environments as well as the interfaces to visualization technology. Access Grid nodes are "designed spaces" that explicitly contain the high-end audio and video technology needed to provide high-quality compelling user experiences. During summer 2003, the AG was used to create a virtual community of underrepresented minority undergraduate students from Clark Atlanta University (CAU) and the University of Illinois at Urbana-Champaign (UIUC), and to discuss graduate school opportunities and research projects. In addition to exploring the virtual community concept, the project investigated the use of the AG to support distant mentoring. Can the AG support the research process between remote students and faculty?

Allison Clark, National Center for Supercomputing Applications, aclark@ncsa.uiuc.edu

Allison Clark is the assistant director of Digital Equity Initiatives at the National Center for Supercomputing Application (NCSA). NCSA is the leading edge site of the National Computational Science Alliance (Alliance), one of the two partnerships funded by the National Science Foundation's (NSF) Partnerships for Advanced Computational Infrastructure program. Clark develops programs to create strategic relationships between the Alliance and members of underrepresented groups in the area of high performance computing. Her Digital Equity Initiatives program and Minority Serving Institutions' (MSIs) programs are comprehensive efforts to involve African American, Hispanic, Native American, and female scientists and engineers in Alliance and NCSA research efforts. Clark earned her Ph.D. in mass media from Michigan State University. Her research interests are comprised of investigating culturally specific approaches to bridging the digital divide-specifically the combination of information technology with Hip Hop Culture. Recently, in an effort to utilize high performance computing in the social sciences and humanities, she has begun to explore the feasibility of creating self-sustaining, interdisciplinary communities of collaboration.

Phoebe E. Lenear, National Center for Supercomputing Applications, p-lenear@ncsa.uiuc.edu

Phoebe E. Lenear received her B.S. and M.S. degrees in general engineering from the University of Illinois at Urbana-Champaign (UIUC) with specializations in mathematics and human-computer interaction. In January 2004, she will be receiving her Ph.D. in Human Resource Education, with an emphasis in technology education and training, instructional design, and program evaluation. Her dissertation topic is entitled, "The Effect of an Internet-based Mentoring Program on the Transactional Distance, Interaction, and Dialogue between Mentors and Proteges". She plans to continue research in online mentoring and work with inner city schools to assist them with integrating technology into the classroom. She currently works as a Program Manager at the National Center for Supercomputing Applications (NCSA) in Champaign, IL and serves as the chairperson of the NCSA Diversity Committee.

Break 5:30pm - 6:30 pm
Grand Ballroom Foyer - Assembly Area

AWARDS CEREMONY AND BANQUET
6:30pm - 9:00pm
Grand Ballroom, Salon EFGH

Master of Ceremonies: Roscoe Giles, Boston University, roscoe@bu.edu

At the celebratory banquet, good food, music, dancing, and an awards ceremony will be accompanied by a talk from Eloy Rodriguez. Rodriguez, a renowned chemical biologist, will speak on, "Computers! I Don't Need No Stinking Computers!" In addition to networking with a diverse group of students, faculty, and researchers from many areas, you will be able to socialize with a number of leaders in the field of computing in an informal setting. Don't miss this special evening event!

"Computers! I Don't Need No Stinking computers"
- Famous Last Words From a Tropical Medicine Drug Explorer
Banquet Speaker -
Eloy Rodriguez, Cornell University
James A. Perkins Endowed Chair in Environmental Biology and Studies

Eloy Rodriguez will highlight interdisciplinary approaches to the discovery of natural drugs that inhibit gastric cancer cells to rather bizarre cocktails of toxic arthropods and hot fruits that outperform synthetic EDs or viagra. Rodriguez will also highlight the importance of bringing together different disciplines ranging from computer bioinformatics, organic and molecular biology and digital imaging in uncovering new drugs from the forbidden jungles of the Amazon. Using a laptop computer with digital images of plants and animals, Rodriguez has been able to communicate with people of the Amazon to find rare plants and insects that cannot be described through words. Lastly, Rodriguez will examine the successful scientific careers of two very bright and handsome young Chicanos, one born and raised in Texas and the other in California. Both grew up in homes with heavy hearts and compassion, but homes lacking in books and most certainly in computer technology. Later, both became heavily involved in the education and training of young minority students, many of whom are becoming leaders in their disciplines.

Eloy Rodriguez was born in Texas and received his Ph.D. in Plant Chemistry and Biology at the University of Texas. Rodriguez was a Canadian Medical Postdoctoral fellow and is presently the James A. Perkins Endowed Chair in Environmental Biology and Studies at Cornell University. He has published over 157 research articles, two books and presented hundreds of research lectures throughout the world. His research is currently supported by NIH and has been previously supported by NSF, USDA, and the Hughes Medical Foundation. Rodriguez has produced over 15 Ph.D./Masters students of which 50% are U.S. minorities. He has established the KIDS program that impact hundreds if not thousands of minority students. Rodriguez is married to Helena Viramontes, a Chicana fiction writer and novelist, and has two college-bound children.

Full Schedule Bios, and Abstracts Saturday, October 18

PLENARY SESSION
9:00am - 10:00am
Grand Ballroom, Salon ABCD

Session chair: Juan Meza, Lawrence Berkeley National Laboratory

Technology Challenges in High-End Computing
José L. Muñoz, Security Administration, Jose.Munoz@nnsa.doe.gov

There have been several studies/plans over the past two years looking at issues in high-end computing (e.g. Interagency High End Computing, High End Computing Revitalization Task Force). This talk will present what technologies need attention, some of the key ideas being discussed, what are the barriers to moving forward and where do the key drivers come from? Specifically, to be presented will be hardware, software and systems issues requiring attention and some fascinating innovations being considered to address them.

José Muñoz has been with the Federal government for the past 30 years. Currently, Muñoz is Director Simulation and Computer Science Office in NNSA's Advanced Simulation and Computing program (ASCI). Previous to that, he served as Program Manager and Assistant Director in DARPA's Information Technology Office. While at DARPA he managed the Embedded Systems, Adaptive Computing Systems, Data Intensive Systems and Power-Aware Computing and Communications programs. Prior to DARPA he was at the Naval Undersea Warfare Center (NUWC) where he held several positions involving the application of high performance computing to sonar signal processing. Muñoz Co-chairs the Federal government's High-End Computing and Computation Coordinating Group (HECCCG), part of the Federal government's Interagency Working Group for Information Technology. He has collateral responsibility in ASCI as Program Manager for ASCI's Advanced Architecture initiative and PM for ASCI's Institute program (an academic outreach initiative). Muñoz received his Ph.D. in Computer Science from the University of Connecticut. He is a member of the ACM and the IEEE Computer Society. He has several publications in the areas of simulation, high performance sonar/signal processing in addition to patents.

Break 10:00am - 10:30am
Grand Ballroom Foyer - Assembly Area

PARALLEL SESSIONS
10:30am - Noon

T6 - Technical Talks: Virtual Environments and Visualization
Grand Ballroom, Salon E

Session Chair: Tazama St. Julien, Georgia Institute of Technology

Visual Modeling and Iterative Program Development in the Computer Science Curricula Firefighter Command Training Virtual Environment
Tazama St. Julien, Georgia Institute of Technology, stjulien@cc.gatech.edu

The Firefighter Command Training Virtual Environment is being developed at Georgia Tech in collaboration with the Atlanta Fire Department. The VE allows the user to: navigate around the environment, viewing a house on fire from any angle; command firefighters and watch them execute those commands; and see realistic fire and smoke behavior reacting to changes in the environment. The VE user is a commanding officer trainee who instructs teams of virtual firefighters to perform different actions to help put out virtual fires. The correct sequence of commands will successfully extinguish the flame with the least amount of danger to the firefighters and the least amount of damage to the home. This simulation was developed using the Simple Virtual Environment (SVE) library, an extensible framework for building VE applications. This is the first example of a firefighter training environment that combines representations of animated firefighters with a reasonable simulation and animation of smoke and fire.

Virtual Environments and Visualization
Bill Ribarsky, Georgia Institute of Technology, ccsupwr@cc.gatech.edu

No abstract available at press time.

P8 - Panel: Equal-Opportunity Disenfranchisement: Who Gets to Count Your Vote?
Southern Ballroom

Panel Organizer/Panelist: Barbara Simons, IBM Research (retired)

Voting problems associated with the 2000 U.S. Presidential election have spurred calls for more accurate voting systems. Unfortunately, many of the new computerized voting systems being purchased today have major security and reliability problems. Anyone who doubts the result of an election is now obliged to prove that those results are inaccurate. But paper ballots, the main evidence that would provide that proof, are being eliminated. Vendors and election officials are free to claim that elections have gone 3smoothly,2 when there is no way for a voter to ascertain whether the ballot cast was recorded or tabulated correctly by the voting system. Furthermore, the new equipment does not provide any way to perform an independent audit, so the idea of a recount is becoming meaningless. We will discuss the technical, legal, and political issues relating to e-voting. We look forward to active audience participation relating to this very important issue.

Barbara Simons, IBM Research (retired), simons@acm.org

Barbara Simons is a Fellow of both the American Association for the Advancement of Science (AAAS) and the Association for Computing Machinery (ACM). In 1992 she was awarded the CPSR Norber Wiener Award for Professional and Social Responsibility in Computing. She founded and co-chairs the ACM U.S. Public Policy Committee. She was selected by c|net as one of its 26 Internet "Visionaries" and by Open Computing as one of the "Top 100 Women in Computing". Science Magazine featured her in a special edition on women in science. Simons received her Ph.D. in computer science in 1981 from UC Berkeley. She worked at IBM for many years, holds several patents and has authored numerous technical papers. Recently, Simons has been teaching technology policy at Stanford University. Simons served on the President's Export Council's Subcommittee on Encryption and on the Information Technology-Sector of the President's Council on the Year 2000 Conversion. She is on the Board of Directors of the U.C. Berkeley Engineering Fund, the Oxford Internet Institute, Public Knowledge, the Math/Science Network, and the Electronic Privacy Information Center, as well as the Advisory Boards of the Oxford Internet Institute and Zeroknowledge.

Panelists

Rebecca Mercuri, Bryn Mawr College, mercuri@acm.org

Rebecca Mercuri is an internationally recognized expert on electronic voting. Her 14 years of study on this subject include her present research affiliation with Harvard University's John F. Kennedy School of Government, and prior work at the University of Pennsylvania's School of Engineering where she earned her Ph.D. Mercuri was requested to provide testimony in Florida's infamous Bush v. Gore case and was cited in one of the briefs to the U.S. Supreme Court. She has also given formal comment on voting technology to the U.S. House Science Committee, the Federal Election Commission and the U.K. Cabinet. In her spare time, she serves as an emergency (Ham) radio operator and received a commendation for her work with the Red Cross during the 9-11 crisis. For over a decade, Rebecca has also participated in educational events to encourage women's involvement in the computer field.

Alice Allen, Alpha Data Services, Inc., alice@alphdatser.com

No bio available at press time.

10:30am - 11:15am
P9 - Panel: The Hows and Whys of Graduate School: A Graduate Education
Grand Ballroom, Salon ABCD

Panel Organizer/Panelist: Andrea Lawrence, Spelman College

Increasing the numbers of students from underrepresented minority populations attending graduate school will help to build a more diversified scientific workforce. Information about opportunities and processes involving graduate school can help these students make informed choices. The panel will address several topics, providing an overview of M.S. and Ph.D. programs, the logistics of the admissions process, and a discussion of graduate school life. The panel will consist of presentations from faculty members from a variety of institutions and underrepresented minority students who are currently enrolled in graduate programs.

Andrea Lawrence, Spelman College, Lawrence@spelman.edu

Andrea Lawrence is the Chair of the Computer Science Department at Spelman College. Her research interests include Human Computer Interactions, particularly using computer animations to teach compute algorithms. Lawrence has the distinction of being the first African American to earn a Ph.D. in Computer Science at Georgia Tech. She also has a B.S. in Mathematics from Purdue University and M.S. in Computer Science from Atlanta University. Lawrence is a member of ACM and MAA.

Panelists

John Trimble, Howard University, trimble@scs.howard.edu

John Trimble is currently an associate professor in the Systems and Computer Science department at Howard University. Trimble received a B.S. in Science Engineering from Northwestern University, an M.S. in Computer Science from Stanford University, an M.S. in Operations Research from UC Berkeley, and a Ph.D. in Industrial and Systems Engineering from the Georgia Institute of Technology. His current research interests include system dynamics, expert systems, software engineering, and knowledge management. Trimble is a member of IEEE and ACM.

Loretta Moore, Jackson State University, moorela@stallion.jsums.edu

Loretta Moore is currently the chair of the Computer Science department at Jackson State University. Moore received her B.S. in Computer Science from Jackson State University and her M.S. and Ph.D. in Computer Science from the Illinois Institute of Technology.

Jamika Burge, Virginia Tech University, jaburge@vt.edu

Jamika Burge is currently a Ph.D. student in the Computer Science department at Virginia Polytechnic Institute and State University. Burge received her B.S. (magna cum laude) in Computer Science at Fisk University and her M.S. in Computer Science at North Carolina A&T University. Her current research interests include community networking and computing as a means of broadening the reach of computing technology. Burge is a member of ACM and the Institute for African American E-Culture.

Deidre Williams Evans, Florida A&M University, williams@cis.famu.edu

Deidre Williams Evans is an associate professor in the Department of Computer and Information Sciences at Florida A&M University. Williams Evans received her Ph.D. in Electrical and Computer Engineering from Georgia Institute of Technology. She also possesses a M.S.E.E. and B.E.E. from Georgia Institute of Technology and a B.S. in Computer Science from Spelman College. Her current research interests include cryptography, data compression, and formal specifications.

11:15am - Noon
P10 - Panel: Diversifying the Computing Pipeline
Grand Ballroom, Salon ABCD

Panel Organizers/Panelists: Raquel Hill, University of Illinois at Urbana-Champaign; **Tiki Suarez,** Florida A&M University; **Tiffani Williams,** University of New Mexico; **Juan Gilbert,** Auburn University

It is well known that African-Americans, Hispanics, Native Americans and other racial minorities are inadequately represented in both academic and professional computing. What are the reasons behind such dismal numbers? How do we increase the number of underrepresented minorities in undergraduate and graduate programs in addition to supporting those already in the pipeline? A full understanding of the experiences that limit the participation of racial minorities in computing must be addressed. Only then will the computing sciences benefit from an increased participation from these groups. This panel will address the above questions and other issues facing minorities in the computing sciences. Strategies will be presented that encourage underrepresented minorities to study computing; strategies to retain minority students currently in undergraduate and graduate programs will also be discussed.

Raquel Hill, University of Illinois at Urbana-Champaign

Raquel L. Hill earned her Ph.D. in Computer Science from Harvard University in November 2002. She earned her B.S. and M.S. degrees in Computer Science from the Georgia Institute of Technology in 1991 and 1993 respectively. From 1993-1996, Hill worked as a Member of Scientific Staff at Nortel Networks. From November 2002 - August 2003, Hill worked as a Post-Doctoral Fellow within the School of Electrical and Computer Engineering at Georgia Tech where she taught Introduction to Digital Circuits. Currently, Hill is a Post-Doctoral Research Associate within the Department of Computer Science at the University of Illinois at Urbana-Champaign.

Tiki Suarez, Florida A&M University, tiki.suarez@famu.edu

Tiki Suarez received her B.S./M.S. degrees in computer science from Clark Atlanta University in 1995 and her Ph.D. in computer science at Florida State University in 2001. Currently she is an Assistant Professor in the School of Business and Industry at Florida Agricultural and Mechanical University where she teaches MIS/IT courses. Her research interests include Networking, MIS, Information Technology and the Digital Divide. Suarez is also the owner of Tiki's Tasties, www.tikistasties.com.

Tiffani Williams, University of New Mexico, tlw@cs.unm.edu

Tiffani L. Williams is an Alfred P. Sloan Postdoctoral Fellow in the Computer Science Department at the University of New Mexico, and received her Ph.D. in Computer Science from the University of Central Florida in Orlando, FL. Her research interests are in the areas of computational biology and high-performance computing, with particular emphasis on applying high-performance techniques to phylogeny reconstruction. She is a member of the ACM and IEEE.

Juan Gilbert, Auburn University, gilbert@eng.auburn.edu

Juan E. Gilbert is an assistant professor in the Computer Science and Software Engineering Department at Auburn University. He is a lead faculty member of the Intelligent & Interactive Systems (IIS) Laboratory at Auburn. As a member of the IIS Lab, he heads the Human-Centered Computing Research Group. His research focus is on Human-Computer Interaction with an emphasis on Universal Learning through culture-specific personalization. He also works on electronic commerce with respect to adaptive, web-based advertising models. Gilbert holds memberships in the ACM, Association for the Advancement of Computing in Education (AACE) and the Institute for African-American E-Culture (iAAEC).

Lunch and Town Hall Meeting Noon - 1:30pm
Grand Ballroom, Salon ABCD

The Town Hall Meeting at the Tapia Conference 2003 is important for all attendees. This plenary session provides an opportunity for attendees to give feedback to the conference organizers, which will be a great help in planning the next Richard Tapia conference. Please attend this session and actively participate! We need your valuable ideas and comments!

Poster Session
Thursday, October 16
6:00pm-9:00pm

Grand Ballroom Foyer - Assembly Area

You are encouraged to attend to learn about the research featured on more than 20 posters authored by undergraduate and graduate students, post-docs and faculty. The topics include mathematics, computational biology, human computer interfaces, physics, networking, and societal and educational applications of technology. Poster judges will talk to presenters at their poster during the course of the session and present a $1000 prize for the best student poster in the awards ceremony Friday evening.

*Alphabetized by first author listed. Presenting author in **bold** font.*

Bagging Bayesian Networks: Investigating Determinants of Disaster Risk

Kobi Abayomi, Upmanu Lall, Andrew Gelman, Columbia University, kaa71@columbia.edu

A common quantification of Risk, of a disaster, under spatial independence, is as a probabilistic product over exposed elements and their vulnerability to the disaster. A non-trivial joint quantification of Risk, from multiple disasters, involves the determination of dependencies between the elements and vulnerabilities. A Bayesian Network (BN)—a Directed Acyclic Graph (DAG) where the joint [probability] distribution is the product of marginal, conditionally independent distributions—can be applied to the problem of divining dependency structure. We investigate BN learning on a composite global disaster dataset of large dimension (n=15600,k>6) using the DEAL algorithm—which reduces the NP-complete problem by using a heuristic search with random restarts. The DEAL algorithm is highly sensitive to perturbations in the learning set—to improve accuracy, we apply Bayesian Aggregating (Bagging) across many learned networks.

On the Development of an Inexact Newton Trust Region Interior-Point Algorithm for Large-Scale Nonlinear Programming Problems

Miguel Argaez, Leticia Velazquez, **Jaime Hernandez Jr.,** University of Texas-El Paso, jaimeh@utep.edu

We present an algorithm for solving large-scale nonlinear programming problems. We use interior-point methodology, a trust region globalization strategy, and conjugate gradient, with Steihaug's ending conditions, to find a solution of the problem. Some preliminary numerical results are presented.

Compact Routing in the Name Independent Model

Marta Arias, Lenore J. Cowen, **Kofi A. Laing,** Rajmohan Rajaraman, Orjeta Taka, Tufts University, laing@eecs.tufts.edu

This poster discusses compact routing in the name independent model first introduced by Awerbuch et al. for adaptive routing in dynamic networks. Compact routing is the problem of finding good tradeoffs between the amount of space used to store routing tables and the length of the paths the routing algorithm specifies. For space, we focus on the maximum space required per node in a network, and for path lengths, we consider the stretch, which is defined as the maximum ratio of the length of a path taken between a pair of nodes, to the length of the optimal path between those two nodes. Our work presents solutions in the name-independent model, referring to our assumption that the graph may not be relabeled in a way that encodes topological information. A compact routing scheme that uses O(n^{1/2})-sized local routing tables, O(log^2 n)-sized packet headers, and stretch bounded by 5 is obtained. Alternative schemes reduce the packet header size to O(log n) at cost of either increasing the stretch to 7, or increasing the table size to O(n^{2/3}). For smaller table-size requirements, the ideas in these schemes are generalized to a scheme that uses O(log^2 n) -sized headers, O(k^2n^{2/k})-sized tables, and achieves a stretch of min{ 1 + (k-1)(2^{k/2}-2), 16k^2+4k }, improving the best previously-known name-independent scheme due to Awerbuch and Peleg.

Fermion Monte Carlo Calculations for the Beryllium Atom

Alan Aspuru-Guzik, Malvin H. Kalos, William A. Lester, Jr., University of California, Berkeley, alan@aspuru.com

Most calculations of atoms and molecules using Monte Carlo methods present a "sign problem" for which the most common solution is to apply the fixed-node approximation. An extensive body of work by several authors has shown that this approximation is very effective, but the fixed-node error cannot be estimated a priori. An exact Monte Carlo method for Fermions has been recently proposed by Kalos and Pederiva and extended to molecular systems by Kalos and Hood. We apply the method to the ground state of the Beryllium atom.

The Effects of Pedagogical Agent Gender and Ethnicity on Student Motivation

Amy L. Baylor, E Shen, Yanghee Kim, Xiaoxia Huang, Florida State University, baylor@coe.fsu.edu

Recent empirical studies have shown that animated pedagogical agents have great potential for serving as effective human-like mentors in computer-based learning environments (e.g., Atkinson, 2002; Baylor, 2002; Moreno, Mayer & Lester, 2001). One critical factor in determining the potential effectiveness in support of learning is the extent to which they are perceived by learners as viable mentors. In two controlled studies, we examined the effect of pedagogical agent image, by gender and ethnicity, on undergraduates' perceptions and motivation

toward learning. From one basic face shape, eight agent images differing by ethnicity (Black, White), gender (male, female), and realism (cartoon, realistic) were constructed by a graphic artist. After validating their operational effectiveness, these images were implemented as animated pedagogical agents within the MIMIC (Multiple Intelligent Mentors Instructing Collaboratively) agent-based research environment. Importantly, each agent was implemented within MIMIC with identical animations, scripts, and computer-generated voices, differing *only* by image. In the first "choice" study, 167 participants (99 White and 68 Black) were presented with all eight agent images simultaneously and were asked to select the agent from which they would like to learn, and then learn from it. Results indicated that African American students were more significantly likely to choose an African American agent (although White students were not more likely to choose a White agent), and females were more likely to choose a cartoon agent. Open-ended responses revealed that Black students were much more likely to choose an agent that they could 'better relate to' in terms of ethnicity and gender. Additional findings will be presented.

A Multi-Agent System to Improve the (RAS) of Large High-Performance Computational Clusters

Nina Berry, Jim Brandt, and Ann Gentile, Sandia National Laboratories; **Rose Yao,** University of Nebraska, Lincoln, ryao@unlnotes.unl.edu

Large computational clusters rely on different levels of "RAS"—Reliability (infrequency of problems), availability (usability during failures or maintenance), and Serviceability (ease of maintenance and problem diagnosis). Current methods of ensuring "RAS"; use predefined events that signals a single central management node which invokes the appropriate scripts. This design is very limited in the complexity of the situation it can handle and in its scalability. The MAS for RAS project is focused on developing software to address RAS problems in large computational clusters by distributing agents with decision-making capabilities on each node in the cluster. Each RAS entity will run on its own service processor, therefore the performance of the node will not be compromised. To simulate this situation, we are currently using Zaurus PDAs acting as "service processors"; to run our software. The MAS for RAS software has several advantages over existing systems. First, it is a decentralized system, which means the RAS of the entire cluster is no longer dependent on one node. Second, the software agents will be independent and is capable of making local and global decisions. This makes the system quasi self-healing and minimizes the work of the system administrator. For those reasons, our system can handle more complex situations and is easily scalable to a large cluster.

Text-Constrained Speaker Recognition Using Hidden Markov Models

Kofi A. Boakye, University of California, Berkeley, kaboakye@icsi.berkeley.edu

This poster presents a possible application of a text-dependent speaker recognition system within the unconstrained domain of telephone conversation speech, as contained in the Switchboard I corpus, a standard corpus in the speaker recognition community. The system utilizes word-level Hidden Markov Models to generate likelihood scores for key words among the backchannel, filled pause, and discourse marker categories.

Examining Cross-Generational Collaboration in a Visual Programming Environment

Jamika D. Burge, Virginia Polytechnic Institute and State University, jaburge@vt.edu

Our research investigates how community members work together to use computing technology in an effort to understand more about their community and its members. These members can also share their ideas and opinions about how to make their community better. Specifically, we are interested in how elderly community members collaborate with student community members as they work together in a visual programming environment. From our research, we expect to understand community collaboration at two levels. First, we want to study novice users in and across generational pairings. Want hope to understand how senior community members influence the younger student community members, and vice versa. Secondly, we want to investigate roles and how they are reciprocated during programming activities. So, instead of assigning specific roles to the elder-student pairings, we are interested in examining how people fall into their roles naturally.

Implementing an Algorithm to Solve Sequential Testing Procedure

Kalatu Davies, Rice University, kdavies@rice.edu

Cervical pre-cancer is a disease that affects many women across the world and if left untreated it can lead to infertility and cancer of the cervix. Thus, it is very important to be able to properly diagnose the disease in the pre-cancerous stage. There is a standard testing sequence that is currently being used for the detection and treatment of pre-cervical cancer. We want to use sequential decision analysis to determine if the current standard of care is optimal and the decision rules for each stage of a disease testing sequence. This optimal decision procedure has been solved in the past using backward induction methods for a two stage, binary procedure. However, this method poses many computational limitations. Thus, the main objective of my research is to develop a method for implementing an algorithm to solve the sequential decision problem in relation to disease screening, specifically for cervical pre-cancer. This algorithm may be applicable to many other disease screening procedures.

Bifurcations and Simulations of Jeffery-Hamel Flows

Jessica Deshler, University of New Mexico, deshler@math.unm.edu

Nearly all industrial machines which involve fluid flow have a point at which the fluid must flow from a small area to a larger area, or more simply, through an expanding channel. For a particular wedge angle and at some critical Reynolds number a bifurcation in the flow occurs and the flow changes from pure outflow to flow with regions of outflow and inflow. Clearly, this limits the throughput of the channel and thus the efficiency of any machine with such a design. The more we understand the behavior of these flows, the better able we will be to build efficient machines. Simulation of this radial and two-dimensional flow is done using MPSalsa, a finite element CFD code developed at Sandia National Laboratories, which solves the Navier-Stokes system of equations on the geometry of the wedge. The two dimensional simulations are validated via comparison to experimental data and results from basic numerical codes written to solve the Jeffery-Hamel system of equations. By comparing numerical, computational and experimental data, these results are perhaps among the most complete descriptions of Jeffery-Hamel flows. These results may also have future implications in the determination of the selection mechanism as Jeffery-Hamel flows exhibit multiple solutions.

Bivariate Mean Residual Lifetime Function

Musie Ghebremichael, Javier Rojo, Rice University, musie@stat.rice.edu

In survival analysis, the additional lifetime that an object survives past a time is called the residual life function of the object. Mathematically speaking if the lifetime of the object is described by a random variable then the random variable is called the residual life random variable. The quantity is called the mean residual lifetime (mrl) function or the life expectancy at age . There are numerous situations where the bivariate mrl function is important. Times to death or times to initial contraction of a disease may be of interest for twin studies in humans. The time to deterioration level or the time to reaction of a treatment may be of interest in pairs of lungs, kidneys, breasts, eyes or ears of humans. In reliability, the distribution of the life lengths of a particular pair of components in a system may be of interest. Because of the dependence among the event times, we cannot use the univariate mrl function on each event times in order to assess the aging process. A bivariate mrl function is useful in analyzing the joint distribution of two event times where there is dependence between the event times. In recent years, though a considerable attention has been paid to the univariate mrl function, relatively little research has been devoted to the analysis of bivariate mrl function. The purpose of my work is to extend and apply the concept of mrl functions to a problem that arise in a bivariate survival analysis.

A Solver for the Maximum-Weight Independent Set Problem

Illya V. Hicks, **Jeffrey S. Warren,** Texas A&M University, j-warren@tamu.edu

For a weighted simple graph G=(V,E), the maximum-weight independent set (MWIS) problem is that of finding an independent set of vertices such that the sum of the weights of these vertices is maximum among all independent sets of the graph. The problem is famously NP-hard. Yet, because of its numerous applications (e.g., in coding theory and computer vision) and its relationship to other interesting and difficult computational problems (e.g., the minimum coloring problem), it is worthwhile to develop exact algorithms that can solve the problem on small graphs in a reasonable amount of time. Balas and Xue developed a branch-and-bound algorithm for the MWIS problem that solves the MWIS problem quickly on a chordal subgraph, finds a larger subgraph on which the solution is still optimal, and then uses the resulting subgraph to make branching decisions. We, too, find subgraphs for which the MWIS problem is easily solved and use them to make branching decisions. However, we construct a high-weight independent set first and then build the subgraph around it. Our goal is to produce larger subgraphs than do Balas and Xue, thereby producing fewer child nodes at every branching instance. Herein, we present our algorithm and compare its performance to other algorithms for the MWIS problem, with special attention to the Balas-Xue algorithm. We also discuss supplementary upper bound computations for these two algorithms, noting their effect on branch-and-bound tree size and run time.

The Development of a Program to Simulate Contact Mode Atomic Force Microscopy

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The atomic force microscope (AFM) is a powerful scanning probe technique used for high-resolution imaging and characterization of nanoscale surfaces of various materials, including silicon. Atomic force microscopy allows the researcher to obtain quantitative information on the surface topography and adhesion activity as well as on the micromechanical properties of the superficial layers of materials. The atomic force microscope probes the surface of a sample with a sharp tip a few microns long and around 100 angstroms in radius. The tip is mounted at the free end of a cantilever that is between 100 and 200 micrometers in length. One major drawback identified in AFM imaging is the dependence of the image's precision on the shape of the probe tip. Artifacts are introduced during AFM imaging as a result of convolution between the tip and the sample. This study aims at providing a simulation to investigate artifacts in Atomic Force Microscopy. A program has been developed to simulate AFM in the contact mode to investigate the effect of tip design on the quality and accuracy of AFM images. Tips of varying dimensions are used in the simulation program to image a sample surface which has features suspected to produce artifacts. The images produced are analyzed and compared to evaluate tip-image convolution. This program

shows promise as a tool to help scientists in the measurement and characterization fields, separate true images from artificial images in AFM.

Efficient Gradient Estimation for Motor Control Learning

Gregory Lawrence, Noah Cowan, Stuart Russell, University of California, Berkeley, gregl@cs.berkeley.edu

The task of estimating the gradient of a function in the presence of noise is central to several forms of reinforcement learning, including policy search methods. We present two techniques for reducing gradient estimation errors in the presence of observable input noise applied to the control signal. The first method extends the idea of a reinforcement baseline by fitting a local model to the response function whose gradient is being estimated; we show how to find the response surface model that minimizes the variance of the gradient estimate, and how to estimate the model from data. The second method improves this further by discounting components of the gradient vector that have high variance. These methods are applied to the problem of motor control learning, where actuator noise has a significant influence on behavior. In particular, we apply the techniques to learn locally optimal controllers for a dart-throwing task using a simulated three-link arm; we demonstrate that the proposed methods significantly improve the response function gradient estimate and, consequently, the learning curve, over existing methods.

Infrastructure for Performance Tuning LAM/MPI Applications

Kathryn Mohror, Karen L. Karavanic, Portland State University, kathryn@cs.pdx.edu

Clusters of workstations are becoming increasingly popular as a low-budget alternative for supercomputing power. In these systems, message-passing is often used to allow the separate nodes to act as a single computing machine. Programmers of such systems face a daunting challenge in understanding the performance bottlenecks of their applications. This is largely due to the vast amount of performance data that is collected, and the time and expertise necessary to use traditional parallel performance tools to analyze that data. Paradyn is a parallel performance tool that addresses these issues by employing dynamic instrumentation to insert the performance measurement instructions into the application and by automatically locating bottlenecks for the programmer. This project implements support for LAM/MPI into Paradyn. LAM/MPI is one of the two most important implementations of the Message Passing Interface (MPI), and also includes several newer MPI features, such as dynamic process creation. As a result of this project, parallel application programmers will be able to use LAM/MPI and have access to detailed performance data while developing their applications. This project will also lay the foundations for future performance tool support for the newer features of MPI.

Reverse Engineering of Genetic and Protein Networks

Edusmildo Orozco, D. Bollman, O. Moreno, University of Puerto Rico at Mayagüez, eorozco@cs.uprm.edu

The graphical representation of a network consists of a set of nodes and a set of edges that connect certain pairs of nodes. In a genetic network the nodes represent genes and an edge from node g1 to node g2 represents the idea that a change in the activity of gene g1 changes the activity in gene g2. In a protein network each node represents a protein and an edge from node p1 to node p2 represents the idea that protein p1 interacts with protein p2. Traditionally the networks used for such modeling purposes are Boolean. In such a model, either one gene can affect another or not and either one protein reacts with another or not. We consider a more general type of network in which nodes are represented by variables that vary over finite fields. These networks allow for more realistic models, in which the effect of one gene on another or the rate of a chemical reaction involving two proteins can be measured over a full range of discrete values. Although reverse engineering methods have been applied mostly to genetic methods, it could be advantageous to apply them to protein networks as well. The reverse engineering problem is the problem of determining the network, given experimental data. In this ongoing work we study efficient algorithms for solving the reverse engineering problem for networks over finite fields.

The African American Distributed Multiple Learning Styles System (AADMLSS)

Nicholas Parks, Tanecia K. Simmons, **Juan E. Gilbert,** Auburn University, gilbert@eng.auburn.edu

Each student has a personal learning style that originates from innate tendencies and environmental experiences. Because cultural groups often share common values, the experiences of children growing up with those values are reflected in their classroom learning behaviors (i.e. cultural learning style). Therefore, a culturally relevant pedagogy is central to the academic success of minority students. The research described in this talk is influenced by the compelling impact of social and cultural issues on academic performance. Accordingly, the African American Distributed Multiple Learning Styles System (AADMLSS) was developed to provide Educators with an easy to use viable alternative, for supplementing their classroom instruction portfolio, with culture specific e-learning tools. AADMLSS embraces the differences in cultural learning styles by providing a culturally sensitive, multi-curriculum, e-learning pedagogical environment, in an effort to enhance a student's overall learning experience and classroom performance. In this presentation, we present the infrastructure and empirical data findings for AADMLSS.

A Visual Navigation Environment to Illustrate Various Navigation Specifications in SpecTRM

Amber Roberts, Nik Dulac, Thomas Viguier, Nancy Leveson, Margaret-Anne Storey, Massachusetts Institute of Technology, acr@mit.edu

During recent years, it has been a goal to create more and more complex navigational systems that consider every reliable, retrievable datum from flight management systems and other components of air traffic control. While the more complex systems can be more complete in their representation of information, they also tend to be very difficult to follow because of their intricacy. Safeware Engineering has developed software that lists all the formal requirement specifications for a given navigational unit, and MIT has created a visual navigation environment, which illustrates the inter-relationships of different elements of that unit as the readings of flight instruments change. This environment will be a real-time diagram that is designed to be easier to follow using charts and color-coding for quicker understanding of the ever-changing flight conditions. The goal is to allow and assist teams of individuals with different specialties to understand the system functional specifications so that they can review them and find potential errors. These errors might include omissions or misstatements of requirements for flight paths in emergency or urgent situations.

Aerodynamic Simulation of a Falling Paratrooper: Mesh Refinement Techniques for Higher Accuracy in the Computational Boundary Layer

Victor Udoewa, Tayfun Tezduyar, Rice University, udoewa@rice.edu

Our target is to develop computational techniques for studying aerodynamic interactions between multiple objects with emphasis on studying the fluid mechanics and dynamics of an object exiting and separating from an aircraft. The object could be a paratrooper jumping out of a transport aircraft or a package of emergency aid dropped from a cargo plane. These are applications with major practical significance, and what we learn and develop can make a major impact on this technological area. The computational tools we are developing are based on the simultaneous solution of the time-dependent Navier-Stokes equations governing the airflow around the aircraft and the separating object, as well as the equations governing the motion of that object. In addition, the computational challenge is to predict the dynamic behavior and path of the object, so that the separation process is safe and effective. The gravitational and aerodynamic forces acting on the object determine its dynamics and path. We are focusing on more accurate computation of the boundary layer around the aircraft, so that the aerodynamic forces acting on the paratrooper during the period immediately following the exit from the aircraft are calculated more accurately.

A Reduced Basis Method for Molecular Dynamics Simulations

Rachel E. Vincent, Danny C. Sorensen, Rice University; B. Montgomery Pettitt, University of Houston, rvincen@caam.rice.edu

Molecular dynamics (MD) simulations allow scientists to computationally determine atomic positions in a molecule over a specified period of time. These simulations are computationally expensive and generally require a large amount of data storage. We expect to reduce computational costs and storage requirements using singular value decomposition (SVD) analysis. In any trajectory, whether generated by traditional dynamics methods, time-averaged refinements, or a reduced basis set method, classical principal component analysis may be used to classify and represent the dominant characteristics of the MD trajectory. Here we augment the classical principal component analysis with an SVD updating scheme. SVD analysis of the computed trajectories will be developed to augment abilities to locate active sites, to identify preferred molecular configurations, and to study periodic behavior. Preliminary results obtained with respect to our reduced basis method provide insight into the relationship between the reduced and standard simulations. Furthermore, they suggest that constraints are necessary to insure the integrity of the simulated molecule.

Durable Wide Area Archival Storage in OceanStore

Hakim Weatherspoon, University of California, Berkeley, hweather@cs.berkeley.edu

Traditional archival media are rapidly being replaced with digital repositories. This has generated a need for long-term, digital archival storage. In this poster, we describe the architecture of a global-scale, distributed storage infrastructure that is self-repairing and resilient to faults and malicious attacks. This infrastructure employs erasure-coding to enhance durability, coupled with mechanisms for location-independent routing, introspective failure analysis, and automatic repair. The result is archival storage that has the potential to preserve information indefinitely. We present results from the prototype archival layer of OceanStore, currently under construction at Berkeley. The results include expected throughput, latency, and other application usage details. That is, we present what is required to use the archival layer of OceanStore for our everyday storage needs. By building the system, we are able to determine the minimal set of requirements to maintain data reliably in the wide area.

Mathematical Modeling Framework for American Option Valuation with Financial Constraints

Donald C. Williams, Rice University, donald@caam.rice.edu

Fundamental to many complex financial derivative securities is the valuation and optimal exercise of options with American-style exercise features. This remains one of the most important and intellectually challenging problems within option pricing theory. This work proposes a direct computational algorithm for solving the American option valuation problem within an optimization framework. The algorithm employs a Newton type constrained nonlinear interior-point optimization method for solving the discretized variational inequality problem that arises. Considerations are made in terms of numerically approximating, in a stable manner, the governing parabolic partial differential equation that can become convection dominated in certain areas of the solution domain. Considerations are also made for incorporating additional economic constraints within the optimization framework. Some example computations are presented for special cases of American-style options with the aim of revealing the general applicability of the constrained optimization pricing methodology.

Optimization of Trajectories to Mars Using Electric Propulsion

Powtache Williams, Rice University, powwow@rice.edu

Although chemical rocket propulsion is widely used in space transportation, large amounts of propellant and vehicle mass limit designs for a human mission to Mars. Electric propulsion, which requires a smaller propellant load while producing greater speed, is an alternative system that can be used for manned interplanetary flight. This research investigates the use of ion electric rockets in previous robotic missions for the design of manned missions. Specifically, this research modifies the sequential gradient-restoration algorithm (SGRA) to a multiple-subarc sequential gradient restoration algorithm (MSGRA) and includes specifications of ion electric engine (Isp = 3,000 sec, Deep Space 1 Engine) for optimization of maximum payload and minimum time trajectories. Additional studies will be made on the design of hybrid launch vehicles, which includes the use of chemical engines for flight from Earth to low-Earth atmosphere and ion electric engines for interplanetary space flight for both manned and unmanned missions.

Multimodal SQL - Mobile Access to Databases

Dale-Marie Wilson, Auburn University, wilsodc@eng.auburn.edu

The increasing sizes of databases coupled with the decreasing sizes of mobile computing devices introduce increasing restrictions on information display and output. The ballooning sales of these devices and the rising number of Internet users, have led to the onset of pervasive human-centered computing. New advances in speech and multimodal interfaces complement this trend. This poster presents Multimodal SQL, a speech interface that allows users to remotely access their databases using their voices. Multimodal SQL consists of three major components: a speech interface coded using VoiceXML and JavaScript; a relational database; and an interface for the presentation of the results. Multimodal SQL is the first iteration of this software development cycle and its results are presented visually. The cycle is projected to conclude in an interface that accepts spoken queries and returns visual and auditory results. A usability study to determine both the effectiveness and user satisfaction of the first iteration will be presented. The results of this study indicate that Multimodal SQL provides efficient access to databases using voice queries.

Learning Rules for the Low-dimensional Clifford Neural Networks

Qing Yi, Bryant York, Portland State University, yiq@cs.pdx.edu

Low-dimensional Clifford algebras include the real numbers, the complex numbers, and the quaternions. Most neural network theory is applied to the learning (or approximation) of real-valued functions of a real variable. In the past decade, researchers have begun to study the approximation of functions defined on the complex numbers and the quaternions. A number of theoretical results exist; however, the extension of the universality results from the real numbers to these arbitrary low-dimensional Clifford algebras has met with some resistance. Because the Clifford algebras are generally normed, associative algebras (not necessarily commutative), Clifford analysis poses different problems from real and complex analysis. The learning rules for multilayer perceptrons using the backpropagation algorithm are critically dependent on gradient-descent and the notion of differentiability in the optimization space. In this work, we outline the essential differences between, real, complex, quaternionic, and Clifford analysis as they pertain to the development of effective learning rules for Clifford neural networks. In addition, we demonstrate the effectiveness of these learning rules for a variety of applications.

Career Information Center Schedule and Abstracts

Tapia Conference 2003 Sponsor and Supporting Organizations
Grand Ballroom Foyer - Assembly Area

Conference attendees should be sure to visit the Career Information center for an opportunity to learn more about the programs and activities offered by the Tapia Conference 2003 sponsors and supporting organizations. These supporters, who represent academia, government, and industry, will have information on hand regarding graduate school opportunities, summer internships, faculty fellowships, post-doc internships, employment opportunities, and general information about their organizations.

The Career Information Center will be open:
Wednesday, October 15 - 8:00pm-10:00pm
(during the Welcome Reception)
Thursday, October 16 - 8:30am-5:30pm
Friday, October 17 - 8:30am-5:30pm

Representatives from the organizations participating in the Career Information Center will be available:
Wednesday, October 15 - 8:00pm-10:00pm
(during the Welcome Reception)
Thursday, October 16 - 10:00am - 10:30am; 2:30pm - 3:00pm
Friday, October 17 - 10:00am - 10:30am; 2:30pm - 3:00pm

(Private rooms will be available for sponsor and supporter interviews.)

Sponsors

The Tapia Conference 2003 Committee is particularly appreciative of the strong support from our sponsors throughout the planning for this year's event.

Association for Computing Machinery (ACM)
Tapia Conference 2003 Sponsor and Silver Supporter
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1515 Broadway
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212-626-0606
baglio@hq.acm.org
http://www.acm.org

Computer Research Association (CRA)
Tapia Conference 2003 Sponsor
http://www.cra.org

CRA is an association of more than 180 North American academic departments of computer science and computer engineering; laboratories and centers in industry, government, and academia engaging in basic computing research; and affiliated professional societies. Our mission is to promote research and advanced education in the computing-related disciplines. The booth features materials related to our programs concerning underrepresented groups in the computing research community.

CRA committee on the Status of Women in Computing Research (CRA-W)
http://www.cra.org/Activities/craw

CRA's Committee on the Status of Women in Computing Research (CRA-W) takes positive action to increase the number and successes of women in computing research and education. CRA-W's booth contains literature describing our current projects, especially those targeted to conference participants (undergraduates, graduate students, faculty, and researchers.)

In Cooperation with:
IEEE Computer Society
http://www.computer.org

Supporting Organizations

American Association for Artificial Intelligence
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Carol McKenna Hamilton, Executive Director
445 Burgess Drive
Menlo Park, CA 94025-3442
650-328-3123
http://www.aaai.org

The AAAI contribution was facilitated by Dr. Barbara Grosz, Harvard University.

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http://www-fp.mcs.anl.gov/division/welcome/default.asp

The mission of MCS at ANL is to increase scientific productivity in the 21st century by providing intellectual and technical leadership in the computing sciences — computer science, applied computational mathematics, and computational science. Research in the MCS Division at Argonne National Laboratory is funded principally by the Mathematical, Information, and Computational Sciences Division, Office of Advanced Scientific Computing Research, Office of Science of the U.S. Department of Energy.

Center for Computational Sciences (CCS)
University of Kentucky
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John Connolly
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The University of Kentucky Center for Computational Sciences has become established as the major center for computational activity at the University of Kentucky. It currently serves to: encourage new and innovative uses of computers; provide an optimum environment for training, and for development of programs; support interdisciplinary projects where the computational expertise of one discipline can be transferred to another; initiate collaborations with outside research through the support of visitors, seminars, workshops and conferences; test state-of-the-art hardware and software; and serve as the principal liaison between the researchers and the Computing Center.

Coalition to Diversify Computing (CDC)
Tapia Conference 2003 Bronze Supporter

John Hurley
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jhurley66@earthlink.net
http://www.ncsa.uiuc.edu/Outreach/CDC/

Currently, CDC is focused on increasing the participation of minorities in graduate computer science, computer engineering, and computational science programs. CDC's projects are focused on three areas: (1) recruitment of minority undergraduates to MS/Ph.D. programs, (2) retention of minority graduate students enrolled in MS/Ph.D. programs, and (3) transition of minority MS/Ph.D. graduates into academia and industry.

Georgia Institute of Technology

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Founded in 1931, Ernest Orlando Lawrence Berkeley National Laboratory (LBML) is the oldest of America's national laboratories. The men and women who make up this Laboratory are dedicated to solving problems, which improve the way we live while also investigating and unraveling the secrets of the universe. The scientist and researcher at LBNL have made major contributions to the sciences. The computer scientists are among the pioneers who helped build the Internet. At one point, they helped prevent its collapse by developing protocols to regulate traffic flow on the net. The life scientists at LBNL developed a mouse model that would allow testing of experimental treatments of human sickle cell disease; LBNL's material scientists are working at the frontier of nano-scale engineering.

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Rice University - Alliances for Graduate Education and the Professoriate (AGEP)

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Rice University is consistently ranked among the top 20 research universities and the top three best buys for higher education by national magazines. More than half of the graduate students are enrolled in science and engineering disciplines. For graduate study specifically, the Weiss School of Natural Sciences and Brown School of Engineering offer exciting research environments at the frontiers of scientific inquiry. Outstanding faculty, state-of-the-art facilities, and nationally-recognized research centers create a scholarly academic environment within a dynamic, thriving city synonymous with scientific progress and technological innovation. The Alliances for Graduate Education and the Professoriate (AGEP) Program at Rice is funded by the National Science Foundation, and it provides a year-round community experience that encourages science, technology, engineering, and mathematics (STEM) graduate enrollment, supports Ph.D. degree completion, and exposes students to rigorous academic discipline.

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Texas A&M University - Computer Science Department
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General Information

Location
Atlanta Airport Marriott
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Atlanta, GA 30337
Phone: (404) 766-7900
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Nestled on 14 picturesque acres, the Atlanta Airport Marriott is located five minutes from Hartsfield International Airport with convenient interstate access to downtown. All guest rooms are equipped with remote-control TVs, voicemail, and high speed internet access (at additional cost). Other guest amenities include indoor pool, 24 hour fitness center, and sauna.

Local Transportation

- There is a 24-hr complimentary Atlanta Marriott shuttle to and from the airport.
- A MARTA rapid transit station is located at the airport.

Driving Directions from Hartsfield International Airport

- Turn right onto Riverdale Road.
- Travel 1/2 mile.
- Turn left onto Best Road Connector.
- Turn right onto Best Road and next right into hotel.

Parking

Valet as well as self-parking is available. Self-parking is complimentary for all conference attendees. Valet parking is available at an additional fee to the conference attendee.

Business Center Services

The Atlanta Airport Marriott provides a full service business center, which is located on the main floor. The business center offers copying services, FAX capabilities, laptop docking, Internet access, computer use and rental, binding, and Federal Express shipping services.
The Business Center hours are 7:30am - 4:00pm Monday through Thursday and 7:30am - 1:00pm on Friday. For after hours service on weekdays, please contact Lobby Guest Services.

Bag Check

The hotel provides limited bag check services with the bellstand, which is located in the main lobby.

Babysitting Services

The hotel does not provide babysitting services.

Registration Desk

The conference registration desk, located on the first floor, near the Grand Ballroom - Salon ABC. It will be open during the following times:

Wednesday	3:30pm - 10:00pm
Thursday	7:30am - 5:30pm
Friday	7:30am - 5:30pm
Saturday	8:00am - 1:30pm

Scholarships to Attend the Conference

The Tapia Conference 2003 scholarship program is critical to ensuring that students, faculty, and professionals from diverse backgrounds were able to attend the conference. Funded by our generous supporters, these scholarships greatly enhanced the overall conference. The Tapia Conference 2003 Committee is deeply grateful to our many supporters who provided a total of more than 90 scholarships. Furthermore, we appreciate the scholarship recipients, whose interest and dedication to advancing their respective careers is most impressive.

T-shirts

Each attendee will be given a Tapia Conference 2003 T-Shirt. You will receive a coupon for a T-shirt in your registration bag; this coupon can be redeemed for a T-shirt in the registration area.

Welcome to Atlanta, Georgia
http://www.atlanta.com/
http://www.atlanta.net/atlantanet/

Each year, metropolitan Atlanta hosts more than 17 million visitors from destinations worldwide.
Of those, more than 27 percent visit Atlanta for the sole purpose of sightseeing. Hartsfield Atlanta International Airport, the world's busiest airport, has more than 80 million annual passengers, and feeds heavily the city's vital service businesses, especially the convention and visitors market.

A large percentage of Atlanta's 3.5 million annual convention delegates also tour the city's major attractions before or after their meetings. Filled with a wealth of attractions and activities, metropolitan Atlanta offers something for every visitor. Some of Atlanta's well-known favorites include the Atlanta Cyclorama, CNN Studio Tours, Stone Mountain Park, the Martin Luther King, Jr. National Historic Site, Six Flags Over Georgia and Zoo Atlanta. Atlanta has also been host to the 1988 Democratic National Convention, Super Bowl XXVIII in 1994, the Centennial Olympic Games in 1996, Super Bowl XXXIV in 2000 and the 2002 NCAA Basketball Final Four.

Originally called Terminus, Atlanta was also once named Marthasville, after the daughter of Gov. Wilson Lumpkin.
The city of Atlanta was given its present name, supposedly a feminine form of "Atlantic" in 1847, the same year it was incorporated.

In the 1800's, Atlanta was a thriving industrial city. It was a major railroad hub, manufacturing center and supply depot. However, during the Civil War, Union General William T. Sherman's army burned all of the railroad facilities, almost every business and more than two-thirds of the city's homes to the ground during his infamous "March to the Sea."

Atlanta's first resurgence began soon after the Civil War. Within four years of Sherman's attack, the Georgia capital was moved from Milledgeville to Atlanta and a drive to attract new business was underway. One man, newspaper editor Henry W. Grady, earned much of the credit for coaxing the "brave and beautiful city", as he called it, toward a new economic agenda in a new, reconciled South.

In the meantime, colleges and universities began to open, telephones were introduced and trolleys began to roll. In 1895, the Cotton States and International Exposition in Piedmont Park showed 800,000 visitors and residents that Atlanta was headed in a new direction and braced for the 20th century. By the late 1920s, a downtown business sector, ringed by residential districts, had taken shape giving Atlanta much of the distinct pattern it maintains today.

The Coalition to Diversify Computing(CDC)

A joint organization of the ACM, CRA and IEEE-CS
http://www.cdc-computing.org

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Major progress in computing technologies over the last decade has been accompanied by vast improvements in computing middleware, hardware and networking. An unexpected consequence of these advancements has been a shortage of a highly trained workforce of scientists and engineers capable of understanding and implementing the resources. The Coalition to Diversify Computing (CDC) seeks to address the shortfall through the development of a diverse community of professionals that can effectively meet the computing demands of an evolving society. CDC projects target students and faculty with the expressed intent of increasing the number of minorities successfully transitioning into computing-based careers in academia, federal labs and industry. Additional projects seek to increase the available pool of faculty members through partnerships and mentoring. Current emphasis is placed on the following three areas: (1) recruitment of minority undergraduates to M.S./Ph.D. programs, (2) retention of minority graduate students enrolled in M.S./Ph.D. programs, and (3) transition of minority M.S./Ph.D. graduates into academia and industry. Present projects include:

1. Richard Tapia Celebration of Diversity in Computing Conference
    a. Next conference (October 15-18, 2003 in Atlanta, GA), URL: www.ncsa.uiuc.edu/Conferences/Tapia2003.
2. Sending Students/Mentors to Technical Conferences
3. CDC Database
4. Distributed Rap Sessions
5. Traveling Graduate School Forum
6. Distinguished Lecturer Series
7. Traveling Academic Forum
8. CREW/M - (Collaboration with CRA-W)

The diverse membership of CDC from areas of academia, industry and federal laboratories enables a variety of different perspectives and approaches to be utilized in achieving the above stated goals. CDC also partners with a number of organizations with similar missions to leverage resources to optimize outcomes.

The CDC membership consists of the following people:

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Eric Brittain, Massachusetts Institute of Technology
Allison Clark, National Center for Supercomputing Applications
Theresa Chatman, Rice University
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Thank You: Sponsor, Supporting Organizations, Committee Members, and Attendees

The Richard Tapia Celebration of Diversity in Computing Conference 2003 is a celebration of the technical contributions and career interests of diverse people in computing fields. The theme of this year's conference, "Building Diverse Leadership in Computing", focuses on leadership and minority leaders in the academic, industrial, and government communities.

This conference would not have been possible without the tremendous dedication and contributions of our sponsors, ACM and CRA, in cooperation with IEEE Computer Society, our supporting organizations, and our committee members. We extend a sincere than you to everyone, including the participants, who made this even possible.

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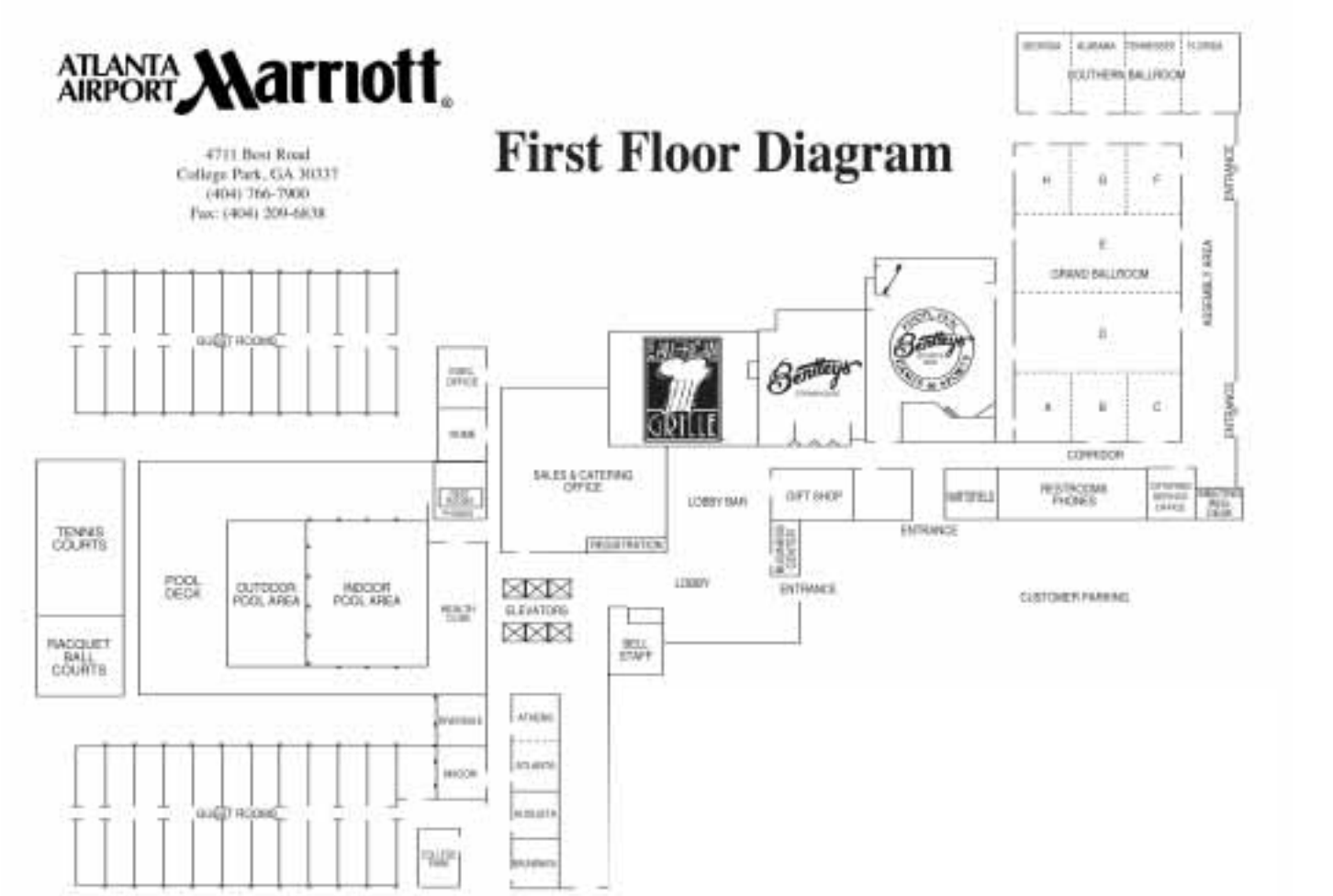

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October 15-18, 2003

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