

# Message from Sally Haerer, CUG Vice-President

To the Members of CUG:

It is with great pleasure that I extend to you a warm welcome to the 38th Cray User Group meeting in Charlotte, North Carolina, October 14–18, 1996. This area of the United States is truly quite beautiful. From Charlotte, it's just a short drive to either the Carolina beaches on the Atlantic or the majestic Blue Ridge Mountain range. The old expression "southern hospitality" will be yours to experience in this friendly part of the country. While in Charlotte, you can enjoy Victorian neighborhoods, tree-lined streets, golf courses, a performing arts center, and of course, an excellent assortment of shops, restaurants, and nightclubs. Then there is the Charlotte Motor Speedway, America's premier NASCAR facility and home of the Coca-Cola 600 race event! This facility inspired our conference theme, "Speeding by Design," which will play a significant role in many of the technical talks and discussions.

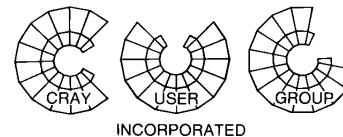
The Program Committee has planned an exciting agenda that will offer something for each of you. In addition, this meeting is especially noted as being one of the best to foster useful interactions among old and new friends who share similar interests regarding careers and computing environments. The potential for helpful information-interchange is at its peak during both technical sessions and various social events. Here are some important highlights of the program:

- The conference will begin on Monday morning with a full schedule of very exciting tutorials that you will not want to miss.
- The Monday afternoon session will showcase our keynote address. We are pleased to have as our keynote speaker, Paul Huray, Carolina Distinguished Professor, Southeast Manufacturing Technology Center, Swearingen Engineering, which is adjacent to the University of South Carolina campus. The emphasis of his talk will be on applications of design for manufacturability and reliability. Although the researchers have not been specifically associated with the design of racing cars, his group has provided a number of designs for automotive parts suppliers. Dr. Huray will also provide a number of case studies to demonstrate how academic computing researchers can serve the needs of business and have an impact on our economy.

- Several other qualified General Session speakers have been chosen to add excellence to the program with general-interest topics. These talks will be featured every day of the conference.
- Cray Research and Silicon Graphics will provide a complete update of their cooperative merger in the areas of business, hardware, software, and service; members of all sectors of Cray Research will be available to you for discussion and feedback. Times will also be scheduled for you to visit with developers.
- Specialized areas of technical interest will be offered through parallel sessions featuring speakers whose topics have been reviewed and selected by the Chairs of our various CUG Special Interest Committees.
- Elections will be held Wednesday morning. Several officers will be elected and By-Law changes will be on the ballot as well. These By-Law changes involve the option to move from two CUG conferences a year to one and various SGI user issues and considerations. Open discussion of these issues is scheduled for Tuesday afternoon.
- Birds-of-a-Feather (BOF) sessions continue to be popular at CUG, bringing together those people with a common interest in specific issues and problems. Rooms for BOFs will be available Tuesday, Wednesday, and Thursday evenings and may be scheduled at the meeting. (If you wish to organize a BOF, please contact me at the conference.)

We believe we can offer something you need. We have planned a program that will not only be fun, but will also be educational and professionally beneficial to you.

Welcome to the Carolina CUG!



Sally Haerer

Program Chair

CUG Vice-President

National Center for Atmospheric Research

# Program Notes

## Special Interest Meetings

The Special Interest Committees (SICs) and Mutual Interest Groups (MIGs) will hold open meetings on Monday. These meetings provide a forum to discuss the future direction of the SICs and MIGs, important issues, and talks of interest to CUG members. All conference attendees are invited and encouraged to attend any of these open meetings.

## Program Committee Meeting

All conference attendees are invited to attend and contribute to the planning of the next CUG conference. The Open Program Committee meeting will be held Thursday evening.

## Video Theater

Supercomputers generate data that, via scientific visualization, can be transformed into pictures that provide a way for scientists to understand the information more fully and quickly. Although the primary purpose of visualization is to facilitate the discovery process, scien-

tists are increasingly coming to rely on it also to present their research conclusions. This session showcases the latest in scientific/engineering visualization.

It promises to be both educational and entertaining. The Video Theater will be held on Friday morning (Session 15C).

## Cray Research Product Demonstrations

CRI will offer demonstrations of some of the latest CRI products and services before and after the Sessions.

- UNICOS Under UNICOS
- CrayTools: PVP Performance Tools
- CRInform 5.0
- CrayTools: TotalView
- CrayTools: MPP Performance Tools
- The Cray World Wide Web Document Server

## Vision Dome Tours

MCNC, NCSC, CRI and SGI will offer Vision Dome tours daily starting at 7:30 a.m., 1:00 p.m., and 5:45 p.m. Also, on Monday, October 14, during the CRI

Reception, demos will start at 7:30 p.m. and conclude at 8:30 p.m.

Alternate Realities Inc., an entrepreneurial company spun-off from MCNC, will be demonstrating its VisionDome® using models developed by the North Carolina Supercomputing Center, CRI and SGI. VisionDome—proclaimed the world's first and only digital, virtual reality theater—boasts a stereoscopic effect that allows its visitors to experience 3-D visuals without goggles or glasses.

## Social Events

### Golf Tournament

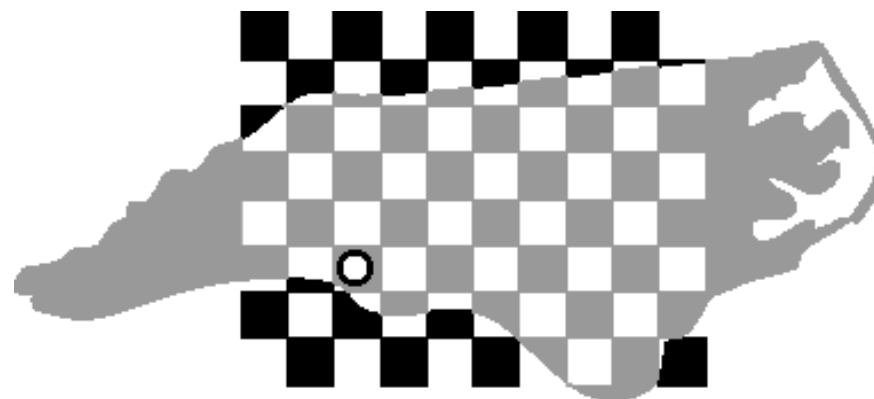
Sunday Afternoon, October 13

Conference participants and their guests are invited to participate in a captain's choice golf tournament. Space is limited to 72 players so don't delay in signing up when you register. Please remember to indicate your average score and whether you will need clubs. Transportation will be provided for you. Cost for the tournament is \$80.00 (club rental will be extra).

### CRI Reception

Monday, October 14

CUG attendees are invited to an evening reception, sponsored by CRI.





## Newcomer's Reception

Tuesday, October 15

First-time CUG participants are invited to a Newcomers' Reception.

At the reception, first-time attendees can meet the CUG Board of Directors, the Special Interest Committee and Mutual Interest Group Chairs, and executives from CRI.

There will also be a brief presentation of "What is CUG?"

## CUG Night Out Gala

Wednesday, October 16

The Carolina CUG Night Out gala will be held at the Mint Museum of Art. Buses will be available at the Hotel Marriott starting at 6:30 pm for transportation to the Mint Museum of Art.

Due to the special setting of this CUG gala event, more formal dress is requested than is customary for CUG activities. Although not mandatory, we simply suggest something non-casual (other than jeans and sneakers). Note: Guests of attendees must have a paid guest ticket to attend.

## Food Service

The conference fees include:

- Coffee breaks from Monday to Friday mornings and Monday to Thursday afternoons.
- Lunch from Tuesday to Thursday.
- CUG Night Out on Wednesday evening.

The reception on Monday evening is sponsored by CRI.

The Newcomers' reception on Tuesday evening is sponsored by CUG.

## How to Contact Us

Until October 10, 1996 and after the conference

North Carolina Supercomputing Center

Carolina CUG

PO Box 12889

3021 Cornwallis Rd.

Research Triangle Park, NC 27709-2889 USA

Phone: (1-919) 248-1922

Fax: (1-919) 248-1101

October 12-18, 1996

Charlotte Marriott City Center

100 West Trade Street

Charlotte, NC 28202 USA

CUG Office Phone: (1-704) 358-6528

CUG Office Fax: (1-704) 358-6529

Hotel Fax: (1-704) 333-9000

Hotel Phone: (1-800) 228-9290

Email and Web

E-mail: [carolinacug@ncsc.org](mailto:carolinacug@ncsc.org)

Up-to-date information on the Carolina CUG and tourism in the area is available at:

<http://www.mcnc.org/CUG/CarolinaCUG.html>

## Contents

Message from Sally Haerer	1
Program Notes	2
Schedule	4
Monday	4
Tuesday	6
Wednesday	8
Thursday	10
Friday	12
Abstracts	13
Cray Demonstrations	33
Contacts	34



Salon D

Tutorial I

8:00 T3E Optimization  
Jeff Brooks, CRI

9:30

Salon E

Tutorial II

8:00 UNICOS Network Security  
Ned Deily, CRI

9:30

Salon A&B

Tutorial III

8:30 J 90 - Performance and  
Tuning  
Chad Vizino, PSC

9:30

Salon F&G

Tutorial IV

8:00 DMF and the Advanced  
Tape MSP  
Paul C. Ernst, CRI

9:30

Salon A - E

Special General Session

Chair: Claude Lecoeuvre, CEL-V

9:45 SGI Merger: Impact on Cray Users  
Ed McCracken, President and CEO, SGI

Break 10:30 - 10:50 a.m.

Tutorial V

10:50 CrayTools: Performance  
and Debugging Tools  
Koushik Ghosh, CRI

12:20

Tutorial VI

10:50 UNICOS File Management  
Howard Mundy, CRI

12:50

Tutorial VII

10:50 Installation and  
Configuration of  
UNICOS/mk on the T3E  
David Holst, CRI

12:20

Tutorial VIII

10:50 F90/IEEE Porting Tutorial  
Bill Harrod, Jon Steidel, CRI

12:20

Lunch 12:20 - 2:00 p.m.



Salon A – E

**1** General Session

Chair: Robert Silvia, NCSC

- 2:00 Welcome—NCSC
- 2:20 Keynote Address  
Dr. Paul Huray, Carolina Distinguished Professor  
Southeast Manufacturing Technology Center
- 3:05 CUG Report  
Claude Lecoeuvre, CEL-V, CUG President  
Sally Haerer, NCAR, CUG V.P. / Program Chair

Break 3:30 – 4:00 p.m.

Salon A, B, C

**2A** Open Meetings

- 4:00 Operating Systems SIC  
Chair: Terry Jones, Grumman
- 4:30 (Cont.)
- 5:00 Security MIG  
Chair: Bonnie Hall, EUTeC
- 5:30 MSS SIC  
Chair: Helene Kulsrud, CCR-P
- 6:00 Networking SIC  
Chair: Hans Mandt, BCS-ASL

Salon D

**2B** Open Meetings

- 4:00 Software Tools SIC  
Chair: Hans-Hermann Frese, ZIB
- 4:30 Applications & Algorithms SIC  
Chair: Rich Shaginaw, BMSPRI
- 5:00 (Cont.)
- 5:30 Performance and Evaluation SIC  
Jeff Kuehn, NCAR
- 6:00 (Cont.)

Salon E

**2C** Open Meetings

- 4:00 J90 MIG  
Chair: Jean Shuler, LLNL
- 4:30 (Cont.)
- 5:00 User Services SIC  
Chair: Barbara Horner-Miller, JPL
- 5:30 (Cont.)
- 6:00

Myers Park

**2D** Open Meetings

- 4:00 Operations SIC  
Chair: Fran Pellegrino, PSC  
Mike Brown, EPCC
- 4:30 (Cont.)
- 5:00 (Cont.)
- 5:30 Graphics SIC  
Chair: L. Eric Greenwade, INEL
- 6:00 (Cont.)

Cray Research Reception 7:30 – 9:30 p.m.

**AM** Tuesday, October 15, 1996

Salon A, B, C

**3A** Networking

Chair: Hans Mandt, Boeing

- 9:00 HIPPI-6400 Overview  
Greg Chesson, SGI
- 9:30 High-speed Networks:  
Switched Internetworking  
Bob Gaughan, Bay Networks
- 10:00 (Cont.)

Salon D

**3B** Performance and Evaluation

Chair: Jeffery A. Kuehn, NCAR

- 9:00 Benchmarking the SNL  
MPI Suite on the Cray T3E  
Mike Davis, CRI
- 9:30 FORTRAN90 Problems &  
Solutions for J90 & VPP300  
Frank Schmitz, HIK
- 10:00 Comparison of CF77 and  
CF90  
TBA, CRI

Salon E

**3C** Operating in a Variety of Environments

Chair: Mike Brown, EPCC

- 9:00 Operations at NCSC  
Robert J. Silvia, NCSC
- 9:30 Lights Out Operation  
Don Grooms, CRI
- 10:00 3rd Party Peripheral  
Support  
Pat Hughes, CRI

Break 10:30 – 11:00 a.m.

Salon A – E

**4** General Session  
Chair: Fred Johnson, NIST

- 11:00 Cray Corporate Report  
Bob Ewald, President & COO, CRI
- 11:45 Cray Supercomputing Report  
Irene Qualters, V.P. of Supercomputing, CRI

Lunch 12:30 – 2:00 p.m.

Salon A – E

**5** General Session

Chair: Barbara Horner-Miller, JPL

- 2:00 Hardware Report  
Steve Johnson, CRI
- 2:50 Software Report  
Mike Booth, CRI
- 3:30 Service Report  
Mick Dungworth, SGI/CRI

Break 4:00 – 4:30 p.m.

Salon A – E

**6** General Session

Chair: Sally Haerer, NCAR

- 4:30 CUG Future  
Helene Kulsrud, IDA/CCR-P
- 5:00 Discussion—Audience
- 5:30 By-Laws Changes  
Gunter Georgi, Grumman

Newcomers' Reception 6:00 – 7:30 p.m.

# AM Wednesday, October 16, 1996

Salon D	Salon E	Salon A, B, C	Board Room I
<b>7A</b> MSS: Designing Backup and Archiving Chair: Hartmut Fichtel, DKRZ	<b>7B</b> Algorithms and Speed Chair: Rich Shaginaw, BMSPRI	<b>7C</b> Operating Systems/Operations Chair: Terry Jones, Grumman	Cray Demonstrations
9:00 Data Migration Enhancement Program Thomas Lanzatella, CRI	9:00 New Method for Load-Balancing Using Newton's Method Brent Swartz, NESC	9:00 Software Support Update Laura Mikrut, CRI	8:30 UNICOS under UNICOS Jay Blakeborough, CRI
9:30 HYPERTape-Architecture & Functionality for Network Backup Dick Immerfall, MultiStream Systems, Inc.	9:30 DoD Scalable Software Initiative Brett Berlin, NESC	9:30 Installation & Configuration of a T3E Wayne Margotto, CRI	
10:00 Network-Backup at the University of Kiel Uwe Olias, UNIKIEL	10:00 Software Genome Project Bernard A. Hodson, GENETIX Software, Inc.	10:00 Automated T3E Error Reporting M.W. Brown, EPCC & W. S. Wilson, CRI	

Break 10:30 – 11:00 a.m.

## Salon A – E

<b>8</b> General Session Chair: Helene Kulsrud, CCR-P/IDA
11:00 CUG Elections Fred Johnson, NIST
11:30 Craig Upson, SGI
12:15 Election Results Fred Johnson, NIST

Lunch 12:30 – 2:00 p.m.

Salon D

**9A** UNICOS and UNICOS/mk Designs

Chair: Terry Jones, Grumman

- 2:00 UNICOS/mk on the T3E: Status and Update  
Jim Harrell, CRI
- 2:30 UNICOS/mk Performance Measurement  
Stephen Gipp, CRI
- 3:00 Operating System Update  
Laura Mikrut, CRI

Salon E

**9B** T3D Applications and Speed

Chair: Rich Shaginaw, BMSPRI

- 2:00 Dynamic Programming Algorithm for RNA Folding  
Jay Boisseau, SDSC
- 2:30 Chemistry Applications on the Cray T3E Supercomputer  
John Carpenter, CRI
- 3:00 Overview of Parallel Applications on T3E Systems  
David Caliga, CRI

Salon A, B, C

**9C** User Services

Chair: Barbara Horner-Miller, JPL

- 2:00 Creating a User Friendly Newsletter on the WWW  
Lynda Lester, NCAR
- 2:30 Network-Based Education: Lessons Learned  
Mladen Vouk, NCSU
- 3:00 (Cont.)

Board Room I

Break 3:30 – 4:00 p.m.

**10A** Security MIG: Secure Designs

Chair: Bonnie Hall, EUTeC

- 4:00 Kerberos/DCE, Secure Shell and Practical Internet Security  
Wayne Schroeder, SDSC
- 4:30 Multilevel Security in UNICOS/mk  
Jim Grindle, CRI
- 5:00 IRIX Security—Present and Future  
Jay McCauley, SGI

**10B** User Services / Software Tools

Chair: Barbara Horner-Miller, JPL

- 4:00 HTML Forms Data Processing Tool  
Dale Clark, ARSC  
Jayashree Harikumar, ARSC
- 4:30 NRSC's Outreach Experience  
C. L. Lee, NRSC
- 5:00 CUG Directory of User-Submitted Software  
Hans-Hermann Frese, ZIB

**10C** Graphics

Chair: L. Eric Greenwade, INEL

- 4:00 200MB/s HIPPI for Animation  
Nancy Rowe, CRI
- 4:30 Visualizing Cardiac Electrical Activity  
Alexandra A. Papazoglou, NCSC
- 5:00 Analysis and Visualization of Environmental Data  
Steve Thorpe, NCSC

Cray Demonstrations

- 5:30 CrayTools:  
PVP Performance Tools  
Koushik Ghosh, CRI
- 6:00 CRInform 5.0  
Michael Sand, CRI

CUG Night Out Gala 7:00 p.m.

Salon A, B, C

**11A** MSS: Standards and Futures

Chair: Helene Kulsrud, CCR-P

- 9:00 Status Report of the High Performance System Project  
Dick Watson, LLNL
- 9:30 IEEE Storage Systems Standards Report  
Jack Cole, ARL
- 10:00 Cray Future File System  
Brian Gaffey, CRI

Salon D

**11B** J90 Clustering

Chair: Jean Shuler, LLNL

- 9:00 Experiences of DFS on the 3 J90's at LLNL  
Doug East, LLNL
- 9:30 Experiences with DCE/DFS and HPSS at SNLA  
Walter H. Vandevender, SNLA
- 10:00 DCE/DFS on a Cluster of J90s  
Alan K. Powers, SS-NAD

Salon E

**11C** User Services

Chair: Barbara Horner-Miller, JPL

- 9:00 Implementing CRUISE, the CRI Call/Problem Tracking Tool  
Gary Sparks, CRI
- 9:30 Distance Learning—Does it Work?  
Rich Franta, CRI
- 10:00 A Cray WWW Document Server  
Gregory Matthews, CRI

Board Room I

Cray Demonstrations

- 8:30 CrayTools: TotalView  
Koushik Ghosh, CRI

Break 10:30 – 11:00 a.m.

Salon A – E

**12** General Session  
Chair: Eric Greenwade, INEL

- 11:00 Distributed, Interactive Ocean Modeling and Visualization  
Daniel Fox, et al., Naval Research Lab, Naval Oceanographic Office, Mississippi State University
- 11:45 Collaborative Engineering in the Industrial Design Process  
Ulrich Lang, University of Stuttgart Computer Center

Lunch 12:30 – 2:00 p.m.

Salon A, B, C

**13A** Networking SIC

Chair: Dieter Raith, University of Stuttgart Computer Center

- 2:00 NQE Update - Fall CUG 1996  
Chris Peters, CRI
- 2:30 An Update on Cray Networking Interfaces  
Gary Klesk, CRI
- 3:00 NFS Performance Update  
Brian Gaffey, CRI

Salon D

**13B** Software Migration and Optimization

Chair: Hans-Hermann Frese, ZIB

- 2:00 Migrating from Cray Y-MP to Cray T90 and T3E  
Ulrich Detert, KFA
- 2:30 So Optimization Breaks Your Code ...  
R.K.Owen, NAS
- 3:00 Distributed Computing with CraySoft NQE 3.0  
Victor Hazlewood, SDSC

Salon E

**13C** Cray Service Plans and Panel

Chair: Mike Brown, EPCC

- 2:00 Cray/SGI Service Plans  
Steve Ursenbach, SGI
- 2:30 CRI Panel  
Moderator: Charlie Clark, CRI
- 3:00 (Cont.)

Board Room I

Break 3:30 – 4:00 p.m.

**14A** MSS: User Designs I

Chair: Paul Anderson, DoD

- 4:00 Mass Storage at the Pittsburgh Supercomputing Center  
Phil Andrews, PSC
- 4:30 Lights Out Operation of Cray J90s  
Gary Smith, UTHPCF
- 5:00 CRI Scalable I/O Development  
Susan Crawford, CRI

**14B** Programming Environments

Chair: Hans-Hermann Frese, ZIB

- 4:00 Programming Environments Update  
Jon Steidel, CRI
- 4:30 Future Direction of Programming Environments & Models  
Dave Judd, CRI  
Ron Price, SGI
- 5:00 Cray T3E LIBSCI  
Bill Harrod, CRI

**14C** Performance and Evaluation

Chair: Jeffery A. Kuehn, NCAR

- 4:00 Multi-CPU Pools in an NQS Environment  
M. Armstrong, Cray UK  
R.G. Evans & G.T. Folkes
- 4:30 Automatic Performance Monitoring at CNRS/IDRIS  
E. Gondet, CNRS/IDRIS
- 5:00 GigaRing Channel Modeling  
Tomasz Kaczynski, CRI

Cray Demonstrations

- 5:30 CrayTools:  
MPP Performance Tools  
Koushik Ghosh, CRI
- 6:00 The Cray World Wide Web Document Server  
Greg Matthews  
CRI Software Publications

Open Program Committee Meeting 5:30 p.m.

Salon F, G, H

**15A** MSS: User Designs II  
Chair: Robert Silvia, NCSC

- 9:00 Cray Connectivity to ESCON-attached Storage Devices at NCAR  
John Merrill, NCAR
- 9:30 Experience with Redwood/D3 Tapes  
Hartmut Fichtel, DKRZ
- 10:00 Update on the CRI Shared File System  
Paul Anderson, DoD

Salon D

**15B** Joint: J90 MIG and Operating Systems  
Chair: Virginia Sotler, CEWES

- 9:00 J90 I/O Issues and Performance  
Donald Lee, Instrumental, Inc.  
Chris Brady, CRI
- 9:30 Integrating a Cray T3E into KFA's supercomputer complex  
Jutta Docter, KFA
- 10:00 Building a J90 Cluster  
Nicholas Cardo, NASA  
AMES

Salon E

**15C** Graphics  
Chair: Eric Greenwade, INEL

- 9:00 Visualization Theater
- 9:30 (Cont.)
- 10:00 Creating A Visualization Power Wall  
Barbara Horner-Miller, JPL  
James L. Lambert, JPL  
and Kathya G. Zamora, JPL

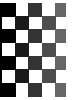
Break 10:30 – 11:00 a.m.

Salon D – H

**16** General Session  
Chair: CUG Vice-President

- 11:00 SIC/MIG Committee Reports
- 11:10 Computational Chemistry: Two Success Stories  
Dr. Lee Bartolotti, NCSC
- 11:40 SGI/Cray Next Generation  
Rick Bahr, SGI, and Karl Freund, CRI
- 12:25 The Silicon Valley CUG  
David Robertson, Sterling Software
- 12:35 Closing Remarks  
CUG President

# Abstracts of Papers, Panels, and Meetings



Monday October 14, 1996

## Tutorial I

8:00-9:30  
**T3E Optimization**  
Jeff Brooks, CRI

This tutorial will describe the node architecture of the T3E and explain several techniques that the programmer can use from a high level language to achieve maximum performance on a single node and on multiple nodes. Some sample codes will be analyzed.

## Tutorial II

8:00-9:30  
**UNICOS Network Security**  
Ned Deily, CRI

This tutorial will provide an overview of network security features provided in UNICOS and UNICOS/mk with emphasis on practical implementation approaches. Topics will include use of Multi-Level Security features, NFS ID mapping, Kerberos, and DCE services.

## Tutorial III

8:30-9:30  
**J90 - Performance and Tuning**  
Chad Vizino, PSC

This tutorial will offer various performance and tuning tips that the Pittsburgh Supercomputing Center has learned in operating three J90 computers. The first part of the tutorial will deal with planning file systems and configuring IO-related equipment on a J90. Part two of the tutorial will begin with a brief introduction to the J90 architecture, and an overview of some performance monitoring tools. User-level performance and tuning and the impact it has on overall system performance will be discussed.

## Tutorial IV

8:00-9:30  
**DMF and the Advanced Tape MSP**  
Paul C. Ernst, CRI

The Advanced Tape MSP is more powerful than the old tape MSP and also more complex. This tutorial gives an in-depth view into the MSP. Topics covered include general functionality, configuration, tuning and integrity issues, as well as tips on the conversion process. Some time for site-specific questions will be reserved.

## Tutorial V

10:50-12:20  
**CrayTools: Performance and Debugging Tools**  
Koushik Ghosh, CRI

The CrayTools package, released with every programming environment, enhances the programmers'

ability to produce solid, well-performing code faster and more efficiently. This tutorial will address debugging applications with the TotalView debugger and then tuning those applications with the suite of performance tools available on Cray systems.

Cray's Parallel Vector line of computer systems offers a suite of "view" tools to assist you in collecting performance data and analyzing/improving the performance of your codes. This set of tools now look and function very similarly. The tutorial will discuss features from the most commonly used tools from this suite. Interpreting the data from performance tools will be a focus.

## Tutorial VI

10:50-12:50  
**UNICOS File Management**  
Howard Mundy, CRI

This tutorial is a fairly detailed discussion of UNICOS file systems. Some topics to be covered are file system structure and configuration, directory and inode

## Special General Session

Chair: Claude Lecoivre. CEL-V

9:45 SGI Merger: Impact on Cray Users  
Ed McCracken, President and CEO, SGI





# Abstracts of Papers, Panels, and Meetings

Monday October 14, 1996 (continued)

format, user and system file tables, physical and logical device configuration, partitioning, mounting file systems, and allocation strategies. The material will be related to the UNICOS internals tutorials presented at the last two CUG meetings.

## Tutorial VII

10:50-12:20

### Installation and Configuration of UNICOS/mk on the T3E

David Holst, CRI

This tutorial will present the Common Install Tool (CIT), the Parameter Configuration Tool (PACT) and the Configuration Tool (CT) to the interested customer. All three of these tools are new with UNICOS/mk and the GigaRing I/O. They are all GUI interfaces that are intended to ease installation on the GigaRing. CIT is a common interface used to load software. PACT is a configuration tool specifically developed for use with UNICOS/mk and the configuration server. CT is a subsystem configuration tool that will be used to configure products not

serviced by the configuration server such as accounting.

## Tutorial VIII

10:50-12:20

### F90/IEEE Porting Tutorial

Bill Harrod, Jon Steidel, CRI

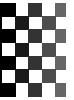
CF90 release 2.0 is the release of Fortran 90 that provides CF77 equivalence. Porting codes from one compiler to another is often not a simple matter of recompiling, especially where extensions have been used. A number of CRI extensions in CF77 have been standardized in Fortran 90, but have some different semantics. This tutorial discusses Fortran 90 features which have different behavior than the equivalent CF77 extensions and known differences that have been encountered in porting applications to CF90. Work arounds, solutions, or options to provide CF77 compatibility are presented for these differences. Performance considerations in using new features in Fortran 90 are also discussed.

A description of the 64-bit IEEE arithmetic implementation on the

Cray T90 system with IEEE floating point hardware architecture is presented. Migration to the new Cray T90 series with IEEE floating-point arithmetic presents a new challenge to applications programmers. New IEEE intrinsic functions, including the interrupt and exception control functions, are discussed. Some examples of programming style will be given that take advantage of IEEE arithmetic.



# Abstracts of Papers, Panels, and Meetings



Monday October 14, 1996 (continued)

## 1 General Session

Chair: Robert Silvia, NCSC

2:00

### Welcome—NCSC

2:20

### Keynote Address

Dr. Paul Huray, Carolina  
Distinguished Professor, Southeast  
Manufacturing Technology Center

The emphasis of Dr. Huray's talk will be on applications of design for manufacturability and reliability. Although the researchers have not been specifically associated with the design of racing cars, his group has provided a number of designs for automotive parts suppliers. Dr. Huray will also provide a number of case studies to demonstrate how academic computing researchers can serve the needs of business and have an impact on our economy.

3:05

### CUG Report

Claude Lecoivre, CEL-V  
CUG President  
Sally Haerer, NCAR  
CUG V.P. / Program Chair

## 2A Open Meetings

4:00

### Operating Systems SIC

Chair: Terry Jones, Grumman

5:00

### Security MIG

Chair: Bonnie Hall, EUTeC

The security MIG business meeting is open to anyone with an interest in UNICOS security issues. The follow topics will be discussed:

- Introductions
- Security MIG activities during the Carolina CUG
- Question and Answer session with Jim Grindle, CRI and Jim McCauley, SGI
- Around-the-room discussion as needed
- Plans for Security MIG sessions at future CUG meetings

5:30

### MSS SIC

Chair: Helene Kulsrud, CCR-P

- CRI Update on Current and Future Plans, Brian Gaffey, CRI

The CRI representative to the SIC will discuss plans in the MSS area. The question of shared tape

devices will be addressed. New goals for future tape support arising from the SGI-CRI merger will be described.

- Election of SIC Chairs
- Plans for the next CUG meeting

6:00

### Networking SIC

Chair: Hans Mandt, BCS-ASL

## 2B Open Meetings

4:00

### Software Tools SIC

Chair: Hans-Hermann Frese, ZIB

The Software Tools SIC open meeting will discuss all kinds of issues regarding software tools for Cray supercomputers.

Participants of the open meeting will have the chance to discuss their concerns and problems with colleagues from other sites and with representatives from CRI. Topics of the open meeting will include:

- Report on Software Tools for Cray MPPs and PVPs—Questions and answers
- Around-the-room discussion
- Plans for the next conference

4:30

### Applications & Algorithms SIC

Chair: Rich Shaginaw, BMSPRI

A&ADirections—The Merging of Architectures

5:30

### Performance and Evaluation SIC

Chair: Jeff Kuehn, NCAR

## 2C Open Meetings


4:00

### J90 MIG

Chair: Jean Shuler, LLNL

The J90 MIG open meeting is an informal gathering of attendees who have J90 specific issues or questions which they would like to discuss with CRI technical staff and people from other J90 sites. We will have a "round-the-room" discussion opportunity so everyone will have a chance to bring up their favorite issue. CRI J90 experts will attend this meeting to ensure that issues and concerns of the customers will be addressed by CRI. We will also solicit topics and speakers for future CUG meetings.





Monday October 14, 1996 (continued)

5:00

### User Services SIC

Chair: Barbara Horner-Miller, JPL

This session is open to all CUG participants and provides an excellent opportunity to meet people from other CUG organizations who share your User Services interests and problems. We focus on customer relations and interactions including training, documentation, technical consulting, and outreach programs.

Topics to be covered include:

- Introductions
- Report from Rich Franta, CRI Representative
- Election of SIC Deputy Chair
- Plans for the next CUG meeting
- Around-the-room discussion

### 2D Open Meetings

4:00

### Operations SIC

Chair: Fran Pellegrino, PSC  
Mike Brown, EPCC

The Cray Survey has been tracking operations, maintenance, and customer issues at Cray sites for over a decade. Fran Pellegrino

will provide the most recent update on site responses. The traditional "Around-the-Room" open forum for site introductions and identification of important/interesting issues will also be held.

Both of these will be used for input of issues into the Cray Panel discussion, offering Cray responses to important user topics, scheduled for a later session.

5:30

### Graphics SIC

Chair: L. Eric Greenwade, INEL

- Central facility graphics support
- Interactive tools
- Video tape vs WWW for animations
- Distributed/parallel visualization
- Visual programming environments
- Infrastructure issues: networks, performance, data migration. X/PEX/GL
- Graphical applications development
- User success stories
- Regional deputy elections
- CRI update

# Abstracts of Papers, Panels, and Meetings



Tuesday October 15, 1996

## 3A Networking

Chair: Hans Mandt, BCS-ASL

9:00

### HIPPI-6400 Overview

Greg Chesson, SGI

HIPPI-6400 is a physical layer (PHY) currently being developed within the HIPPI family of interconnect standards. The draft standard and related information can be found on the HIPPI Standards Activities Web page at <http://www.noc.lanl.gov/~det>.

This new interconnect can deliver 800 MBytes/s bandwidth for both high-capacity bulk data applications and low-latency messaging applications. It also provides several capabilities not found in other designs: both flow-control and error-control in hardware as well as the ability to control multiple high-bandwidth flows in near real-time.

9:30

### Dealing with High-Speed Networks: The Evolution of Switched Internetworking

Bob Gaughan, Advanced Technology Group, Bay Networks

A discussion of the bandwidth needs and other issues in the Campus LAN and how these networks are evolving from routed to switched and from frame to cell environments.

Discussion of VLANs, routers, switches (frame/cell and Layer 2/Layer 3) ATM, gigabit ethernet, etc. What kinds of architectures are needed today and how will they evolve in the future.

## 3B Performance and Evaluation

Chair: Jeff Kuehn, NCAR

9:00

### Benchmarking the SNL MPI Suite on the Cray T3E

Mike Davis, CRI

Sandia National Laboratories (SNL) has developed a suite of MPI-based codes for use in benchmarking MPP and scalable computing architectures. The codes are based on Sandia's most heavily-used engineering and physics simulation programs. This paper presents the results of benchmark-

ing the SNL MPI suite on a 128-node Cray T3E system.

9:30

### FORTRAN90 Problems and Solutions for J90 and VPP300

Frank Schmitz, HIK

The FORTRAN Programming Environment is the most used at the Research Centre Karlsruhe. This paper discloses the differences a Fortran90 user can find on two different kinds of PVP: J90 and VPP300. Performance evaluation, availability of tools, and different solutions for parallel applications are the main topics of the presentation.

10:00

### Comparison of CF77 and CF90

TBA, CRI

This paper will compare the performance of the CF77 and CF90 compiling systems.

## 3C Operating in a Variety of Environments

Chair: Mike Brown, EPCC

9:00

### Operations at NCSC

Robert J. Silvia, NCSC

In 1989 the North Carolina Supercomputing Center (NCSC) was created to aid academic researchers, explore computational science, and assist in economic development within the State. Originally, a Cray Y-MP8/432 was procured as the State entered the world of supercomputing. The Center has been through many changes in the past 6+ years, including the addition of a J916 mass storage system, a T3D (a T3E by the time the conference starts), as well as the installation of the first publicly available T916. We will discuss the past, present, and future of the Center.

9:30

### CRI Support for the Unattended Center

Don Grooms, CRI

"Lights out operation" may imply a variety of system capabilities:





# Abstracts of Papers, Panels, and Meetings

Tuesday October 15, 1996 (continued)

Automated power on/off, system health monitors, automatic problem notification, and automated system recovery/reboot are examples.

We begin with an examination of the meaning of lights out operation, and describe standard features of current Cray products that support lights out operation. Several examples will be given of additional features that have been implemented locally at Cray sites. The new GigaRing and System Workstation products also will be highlighted relative to the possibilities they introduce into a lights out operational strategy.

10:00  
**Cray Support for Attaching 3rd Party Peripherals**  
Pat Hughes, CRI

This talk will detail the 3rd party vendor peripheral support offered by CRI. Included will be comprehensive list of peripherals supported, the process used to qualify and certify 3rd party peripherals, and the value added by Cray in support of 3rd party peripherals.

**4 General Session**  
Chair: Fred Johnson, NIST  
  
11:00  
**Cray Corporate Report**  
Bob Ewald  
President & COO, CRI

11:45  
**Cray Supercomputing Report**  
Irene Qualters  
V.P. of Supercomputing, CRI

**5 General Session**  
Chair: Barbara Horner-Miller, JPL  
  
2:00  
**Hardware Report**  
Steve Johnson, CRI

2:50  
**Software Report**  
Mike Booth, CRI

3:30  
**Service Report**  
Mick Dungworth, SGI/CRI

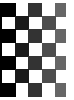
**6 General Session**  
Chair: Sally Haerer, NCAR  
  
4:30  
**CUG Future**  
Helene Kulsrud, IDA/CCR-P

5:00  
**Discussion—Audience**

5:30  
**By-Laws Changes**  
Gunter Georgi, Grumman



# Abstracts of Papers, Panels, and Meetings



Wednesday October 16, 1996

## 7A MSS: Designing Backup and Archiving

Chair: Hartmut Fichtel, DKRZ

9:00

### Data Migration Facility Development Update

Thomas Lanzatella, CRI

The Data Migration Facility is used at over 200 Cray customer sites. A two-year enhancement program for DMF has been defined. The result of this work will be a fully distributed hierarchical storage management service. The recent merging of SGI and CRI offers more justification for the technical direction of DMF and adds a requirement that DMF run on more systems than UNICOS. This talk describes new goals and ongoing work in DMF portability.

9:30

### HYPERtape-Architecture and Functionality for Backing a Heterogeneous Network and HYPERtapeMedia

Dick Immerfall, MultiStream Systems, Inc.

This talk describes a tool to back up a heterogeneous network of computers, workstations, and possibly PCs with at least one server. HYPERtape is a trademark of MultiStream Systems. It is distributed worldwide and has been developed by the German branch of MultiStream Systems in Munich. Several Cray sites use HYPERtape. This is one of three tools recommended by CRI and it has been installed in Eagan.

10:00

### Network Backup at the University of Kiel using HYPERtape and a UNICOS-Server

Uwe Olias, UNIKIEL

The University of Kiel has been running HYPERtape for network backup since September 1993 with a SIEMENS-Mainframe as a server platform. In spring 1996 we changed the server platform to UNICOS and run a Cray Y-MP EL as the server. One of the outstanding results is the increase of backup performance. This presentation will discuss the actual backup system at Kiel and the use of HYPERtape in a real user system.

## 7B Algorithms and Speed

Chair: Rich Shaginaw, BMSPRI

9:00

### A Practical Method for Load-Balancing Using Newton's Method on MPP Systems

Brent Swartz, NESC

A general method for load balancing an application over a given number of MPP nodes by determining what data will be distributed to each node (i.e., by determining the domain decomposition) such that each node finishes at precisely the same time will be presented. The procedure reduces the load balancing problem to one of finding a differentiable function which represents the amount of work (time) a processor must do as a function of the data domain, which is the data to be distributed over the nodes in a given partition. The first part of this presentation describes the theory on which this procedure is based. The second part generalizes the method to heterogeneous nodes. The third goes into the more practical details of implementation by going through an example appli-

cation of the method in one dimension. The fourth part discusses the application of this method to the multi-dimensional case.

9:30

### Department of Defense Scalable Software Initiative

Brett Berlin, NESC

The Department of Defense (DoD) has a long history of relying on high performance computing to enhance its operational capabilities and meet war fighting needs. The DoD's High Performance Computing Modernization Program (HPCMP) has the goals of improving the process of weapon system design and fostering the flow of HPC technology into the science & technology and developmental test & evaluation centers of the department. A review of the HPCMP and a status report on the Common HPC Software Support Initiative (CHSSI) will provide an overview into the efforts DoD is undertaking to help the scalable computing revolution.





# Abstracts of Papers, Panels, and Meetings

Wednesday October 16, 1996 (continued)

10:00  
**A General Software Development Model Using "Software Genes"**  
Bernard A. Hodson, GENETIX Software, Inc.

A peripheral use of parallel processors is described which requires little bandwidth and very little computing power. A paradigm has been developed called GENETIX which uses a virtual machine structure and "software genes" to develop applications, taking a very small fraction of the memory space required for a conventionally developed application. By placing copies of the "virtual machine processor" (which needs only 2 KB), dozens of applications can be processed simultaneously, either locally or via telecommunication lines. In the latter case, once the "software genes" have been transmitted, no further bandwidth is required.

7C Operating Systems/Operations  
Chair: Terry Jones, Grumman

9:00  
**Report from Cray's Software Division Product Support Section**  
Laura Mikrut, CRI

In November 1995, a Product Support section was created within the System Software group. The section was formed to bring focus back to customer problems. This Product Support section supports both UNICOS and UNICOS MAX. The goals of this section are to better reduce the SPR backlog, address major, minor and design SPRs, better inform customers of SPR statuses, get fixes to customers in a more timely manner, and to propose changes to our internal development process. This session will discuss the progress and challenges of each of these goals.

9:30  
**Installation & Configuration of a T3E**  
Wayne Margotto, CRI

The need to support software installations across several platforms on the new GigaRing has necessitated changes for loading media. CIT (Common Install Tool), which runs on the SWS, will be introduced with the GigaRing and T3E.

Serverized UNICOS (UNICOS/mk) requires a change in the way that the T3E will be configured. PACT (Parameter Configuration Tool), also running on the SWS, was developed to interface to the configuration server on the T3E.

Finally, a new T3E install tool, CT (Configuration Tool), which runs on the T3E, has been developed.

We will show how these new tools interact in the process of installing a T3E system.

10:00  
**Support for Unattended Operating Periods**  
M.W. Brown, EPCC  
W.S. Wilson, Cray/UK

The University of Edinburgh operates a national service on a 512-processor Cray T3D, a Y-MP4E and a J916 on behalf of the UK academic and research community. Very high availability and serviceability are demanded from these systems, but reductions in operations cover has meant that automated error detection and reporting is required so that anomalies can be detected and systems staff alerted during shifts not covered by machine room operations staff.

This paper describes the work done by the University and local Cray staff in which hardware and software monitoring is undertaken continuously, and problems detected and signaled automatically to systems staff.

# Abstracts of Papers, Panels, and Meetings



Wednesday October 16, 1996 (continued)

## 8 General Session

Chair: Helene Kulsrud, CCR-P/IDA

11:00

### CUG Elections

Fred Johnson, NIST

11:30

Craig Upson, SGI

12:15

### Election Results

Fred Johnson, NIST

## 9A UNICOS and UNICOS/mk Designs

Chair: Terry Jones, Grumman

2:00

### UNICOS/mk On the T3E: Status and Update

Jim Harrell, CRI

This talk presents an update on the status of the T3E system and UNICOS/mk. We will present the plans for the next several revisions of UNICOS/mk. The status will focus on performance and on the features available in UNICOS/mk.

2:30

### UNICOS/mk Performance Measurement

Stephen Gipp, CRI

Supporting the complexity of the UNICOS/mk distributed operating system required many of the performance measurement tools familiar from UNICOS to undergo some changes. These changes range from subtle ones, such as changing the meaning of some numerical values presented by 'sar/tsar' and 'acctcom' to support multi-PE performance and balance, to implementation of several new displays to 'xsam/xmp-view' and the definition of an additional concept of CPU time. This presentation will give an overview on these changes and explain how to interpret the numbers and displays.

3:00

### Operating System Update

Laura Mikrut, CRI

The purpose of this presentation is to give an update of development activities for UNICOS, UNICOS/MAX, and UNICOS/mk operating systems. This presentation will discuss future plans for

operating system releases beyond UNICOS 9.0 and for UNICOS 10.0, as well as support plans for UNICOS, UNICOS/MAX, and UNICOS/mk. A high level discussion of future collaborative operating systems between SGI and CRI may also be covered.

## 9B T3D Applications and Speed

Chair: Rich Shaginaw, BMSPRI

2:00

### Dynamic Programming Algorithm for RNA Folding

Jay Boisseau, SDSC

We have implemented and optimized Zuker's RNA secondary structure prediction program (MFOLD) on the Cray T3D. Our application is a systolic implementation of a dynamic programming algorithm. It performs nearest neighbor communications for message passing efficiency and to avoid cache problems. Our code appears to be the fastest available implementation of MFOLD, as well as permitting the prediction of structures for longer RNA molecules than any other current

implementation (up to 20,000 bases).

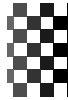
2:30

### Chemistry Applications on the Cray T3E Supercomputer

John Carpenter, CRI

Computational chemistry research continues to demand a large percentage of the supercomputer cycles available at current supercomputer centers. Quantum chemistry programs like GAMESS US are available on the Cray T3D and exhibits scalability of 45 out of 64 PEs. The increased single PE performance of the T3E will leverage this work and other programs like DGAUSS, QCHEM, and DMOL will join GAMESS in being available on the T3E in the near future. Likewise, molecular dynamics programs like CHARMM and AMBER have long been available on the Cray T3D and exhibit scalability close to 80 out of 128 PEs. These programs are joined by Discover 950 and XPLOR and other new programs like LAMMPS that use innovative spatial decomposition algorithms and exhibit even better scalability.





# Abstracts of Papers, Panels, and Meetings

Wednesday October 16, 1996 (continued)

## 3:00 Overview of Parallel Applications on T3E Systems

David Caliga, CRI

This presentation will review the activities of the general community in making parallel applications available on T3E systems. This presentation will discuss: (1) Issues confronting developers of parallel applications; (2) Success stories that have resulted from the parallel version of applications; (3) Performance and scalability of key applications; (4) Review of the third-party applications available for the T3E; and (5) Key lessons learned from our parallelization activities for future parallel systems.

## 9C User Services

Chair: Barbara Horner-Miller, JPL

## 2:00 How to Create a User-Friendly Newsletter on the World Wide Web

Lynda Lester, NCAR

This paper discusses how to avoid common mistakes and solve usability problems in creating a

newsletter for supercomputing users on the World Wide Web. Internet publishing has many advantages, but it is often difficult to entice people away from hard-copy—especially when poor interface design makes Web sites difficult to use. Our experience has taught us what mistakes to avoid, how to streamline navigation and searchability, and how to make a publication attractive on a variety of platforms by optimizing typography, graphics, and information structure. Other important issues are update frequency and notifying users of changes.

## 2:30 Network-Based Education—Lessons Learned in the "Regional Training Center on Parallel Processing" Project

Mladen Vouk, NCSU

To further the use of parallel processing, extend the use of parallel computing facilities to more than just a handful of experts, and promote the use of parallel programming and computing in high-technology industry in general, North Carolina State University (in collabo-

ration with other institutions and with NSF support) is in the process of establishing a Regional Training Center for Parallel Processing (RTCPP). The principal goal is to establish an environment and collect, evaluate, develop and distribute multimedia computer based instruction materials on parallel processing to students from industry and academia. This presentation will outline the project, demonstrate the developed Web-based network-based education environment, and discuss the issues related to content development and distribution of the material.

## 10A Security MIG: Secure Designs

Chair: Bonnie Hall, EUTeC

## 4:00 Kerberos/DCE, Secure Shell and Practical Internet Security

Wayne Schroeder, SDSC

Continuing with work described at the Fairbanks (Fall 1995) CUG conference, SDSC now has an operational Kerberos environment for authentication/encryption

within SDSC (Cray, Paragon, and workstations) and we are integrating it with DCE systems (DCE sec2 and HPSS). However, instead of extending these services to our national (and international) user community, we are using more focused and concise software systems, the Secure Shell (SSH) and Secure Network Key (SNK), to meet our immediate internet goals. This paper will discuss Kerberos/DCE, the Secure Shell, SNK, and how we are using them, and our longer term Single-Sign-On goal.

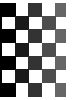
## 4:30 Multilevel Security in UNICOS/mk

Jim Grindle, CRI

This talk will describe Multilevel Security Features to be implemented in UNICOS/mk. Some aspects of MLS will differ between UNICOS and UNICOS/mk due to architectural differences in the systems. Every effort will be made to maintain MLS compatibility between UNICOS and UNICOS/mk. Factors that will influence implementation differences and schedules will be addressed.



# Abstracts of Papers, Panels, and Meetings



Wednesday October 16, 1996 (continued)

5:00  
IRIX Security—Present  
and Future

Jay McCauley, SGI

System security and integrity are an increasing concern for Silicon Graphics customer base. To meet these needs, a number of products and projects have been launched for the IRIX OS. This talk will present a high level view of the security features of IRIX, including:

- Identification/authorization support for novel devices
- Security event auditing
- Access Control Lists
- Least privilege mechanism
- Network Security features
- TIS Gauntlet Firewall
- Public domain products
- Trusted IRIX/CMW: B1 Security Product

This talk will attempt to compare and contrast similar features in the UNICOS OS.

10B User Services /  
Software Tools

Chair: Barbara Horner-Miller, JPL

4:00  
HTML Forms Data  
Processing Tool

Dale Clark, ARSC  
Jayashree Harikumar, ARSC

Online forms have extensively increased the degree of interaction between users on the World Wide Web, through HTTP. However the tools for creating forms and interpreting the resultant data are relatively primitive. At the Arctic Region Supercomputing Center (ARSC) we have developed an HTML Forms Data Processing Tool to help us process our online applications and other survey data. The interface consists of two parts, a general purpose form data preprocessor to decode embedded constraints to the submitted form data and an administrative tool to process the resultant data. The data preprocessor is designed to return to the user an annotated form with error advice in the event of an error, and the administrative tool is designed to store relevant user data to the database.

4:30  
NRSC's Outreach Experience  
C. L. Lee, NRSC

The National Supercomputing Research Centre, established in 1993, supports both academic and industrial research. NRSC's Critical Success Factor is encouraging Singapore organizations to find innovative uses of the technology applied to their internal business processes and products.

For industry outreach, NRSC uses several approaches: training seminars and workshop are conducted where necessary, and company visits are often arranged for the trainer to meet industrial users. Such visits are critical since users are more comfortable discussing their problems in a secured setting. Where possible, NRSC works with sister organizations in Singapore who have expertise in specific application areas. The Cray application analyst's expertise is heavily leveraged to complete some technology transfer projects.

5:00  
CUG Directory of User-  
Submitted Software

Hans-Hermann Frese, ZIB

CUGDUS was developed to share information on software utilities for Cray supercomputers among the Cray User Group. In this talk we shall present the design concepts for the new WWW interface for CUGDUS.





# Abstracts of Papers, Panels, and Meetings

Wednesday October 16, 1996 (continued)

## 10C Graphics

Chair: L. Eric Greenwade, INEL

4:00

### Using 200 Megabyte HIPPI Connection for Animation

Nancy Rowe, CRI

High Performance Parallel Interface (HIPPI) is a high speed channel specification.

Traditionally, 32-bit words are used to transfer data across a HIPPI connection. CRI has the unique ability among major computer vendors to transfer data across HIPPI connections using 64-bit words. By coupling a Cray supercomputer to a PsiTech framebuffer with a HIPPI connection and using 64-bit words to transfer data across the HIPPI connection we can display animations at film speed of images with a resolution of 2K x 1K.

4:30

### Visualization of the Electrodynamics in Cardiac Tissue

Alexandra A. Papazoglou, NCSC

Numerical models for cardiac tissue are becoming increasingly

more realistic and large scale.

Visualization techniques and tools for rapid animation of spatial and temporal events over complex geometries have proven to be useful in interpreting the simulation results. In particular, VENACAVA, developed at Duke University, animates data calculated for a two-dimensional domain and has been useful in analyzing the evolving dynamics of cardiac arrhythmias. AVS, a commercial package, has been used to visualize the three-dimensional nature of cardiac electrical events. As the cardiac models continue to grow in complexity, visualization techniques and tools must continue to be developed and improved to better interpret the simulated data.

5:00

### The Package for Analysis and Visualization of Environmental Data

Steve Thorpe, MCNC-North Carolina Supercomputing Center

We have developed the Package for Analysis and Visualization of Environmental data (PAVE), a flexible and distributed applica-

tion to visualize multivariate gridded environmental datasets.

Design goals included: (1) baseline graphics with the option to export data to high-end commercial packages, (2) access and manipulation of datasets located on remote machines, (3) support for multiple simultaneous visualizations, (4) an architecture that allows PAVE to be controlled by external processes, (5) low computational overhead, and (6) no software distribution cost.

Supported platforms include DEC, HP, IBM, SGI, and Sun workstations. Remote data can also be read from CRAY supercomputers.



# Abstracts of Papers, Panels, and Meetings



Thursday October 17, 1996

## 11A MSS: Standards and Futures

Chair: Helene Kulsrud, CCR-P

9:00

### High Performance Storage System (HPSS) Parallel I/O Architecture and Deployment Status

Dick Watson, LLNL

Datasets of terabyte scale and petabyte storage capacities are about to create serious imbalances in storage system I/O performance and current storage system capabilities as terascale computing becomes a reality. One promising approach is to use scalable parallel I/O for client access to storage, peripheral to peripheral transfer, and file transfer. This talk will outline the scalable parallel I/O architecture of HPSS and the current status of HPSS deployment.

9:30

### IEEE Storage Systems Standards Committee Report

Jack Cole, ARL

The IEEE Reference Model for Open Storage Systems

Interconnection is used as the basis for storage systems at many HPC sites around the world, including LLNL, NCAR, and others. The IEEE Storage System Standards Working Group has begun revision of the Reference Model, moved past final review of one Model component standard, and begun a new service standard entitled "Medium Changer Service" (MCS). MCS will standardize the common areas of existing industry practice in the software interfaces between robotic storage devices and related software applications. An overview of the model is presented along with current status of related standards.

10:00

### Cray Future File System

Brian Gaffey, CRI

Cray's future file system will be based on SGI's XFS file system. This talk will introduce XFS features and architecture. We will compare XFS to Cray's current file system (NC1FS) and present our approach to supporting NC1 features with the XFS technology.

## 11B J90 Clustering

Chair: Jean Shuler, LLNL

9:00

### Experiences of Distributed File System on the 3 J90's at LLNL

Doug East, LLNL

A general overview of the distributed file service on the J90 cluster will be given. There will be a discussion of the plans to install DFS and have a separate dedicated node for file service.

9:30

### Experiences with DCE/DFS and HPSS at Sandia National Laboratories

Walter H. Vandevender, SNLA

With the Accelerated Strategic Computing Initiative (ASCI), there is an increasing demand to share information and computing resources among the DOE National Laboratories. DCE and DFS provide enhanced security access controls and data integrity features that seem ideal for this networked computing environment. Using a DCE test cell, including a Cray J916, the author presents some

experiences with providing both DCE/DFS and High Performance Storage System (HPSS) services to internal and external users of some SNL computing resources. Included will be an evaluation of possible DCE cell configurations, as well as some operational and performance testing results.

10:00

### DCE/DFS on a Cluster of J90s

Alan K. Powers, SS-NAD

The Numerical Aerodynamic Simulation Facility (NAS) at NASA Ames Research Center (AMES) has installed 4 J90s to build a cluster environment. In building a J90 cluster, the file systems need to be in the same name space between the cluster members. NAS is beta testing DCE/DFS V1.1, which will provide a common name space within the cluster. This paper will present the trials and tribulations of using DCE/DFS in a cluster environment. Performance measurements will be taken on the cluster and their analysis will be discussed.





# Abstracts of Papers, Panels, and Meetings

Thursday October 17, 1996 (continued)

## 11C User Services

Chair: Barbara Horner-Miller, JPL

9:00

### Implementation of CRUISE (Cray Research Unified Information System Enterprise), the CRI Call/Problem Tracking Tool

Gary Sparks, CRI

Many companies are in the process of looking into the purchase and implementation of a "call/problem tracking" system to better manage their operations. CRI has recently implemented CRUISE (Cray Research Unified Information System Enterprise), which is based on a third-party call/problem tracking system. This talk will focus on the implementation issues CRI faced during the deployment of this information system.

9:30

### Distance Learning—Does it Work?

Rich Franta, CRI

Today's rapid-paced business environment doesn't allow students the time or budget to get the training needed to be proficient at

their jobs. Distance learning can solve these problems. This discussion will be a summary of the various techniques and technologies of distance learning including videoconference training, computer-based training (CBT), WEB-based training, and the various topics and situations that are best suited to these delivery mechanisms.

10:00

### A Cray World Wide Web Document Server

Gregory Matthews, CRI

Cray Research software publications are now available on the World Wide Web. Cray's WWW Document Server allows access to our documentation via the Internet for viewing with industry standard browsers such as Netscape and Mosaic. The Cray Software Publications document server dynamically converts existing SGML source into HTML. This talk, initially presented at the Spring CUG in Barcelona, provides additional information on the strategy, design, implementation, and current status of the Cray Document Server.

## 12 General Session

Chair: Eric Greenwade, INEL

11:00

### Distributed, Interactive Ocean Modeling and Visualization

Daniel Fox, et al., Naval Research Lab, Naval Oceanographic Office, Mississippi State University

11:45

### Collaborative Engineering in the Industrial Design Process

Ulrich Lang, University of Stuttgart Computer Center

Most large industrial projects are performed in cooperation by multiple industrial partners. This adds costs for coordination of work, traveling, relocation of engineers, etc. In the industrial design process supercomputers are used to analyze and optimize new products. Collaborative software environments that allow users to integrate the simulation and visualization process across wide area networks and heterogeneous hardware platforms improve the cooperation possibili-

ties. Since co-workers need not be relocated, travel as well as meeting efforts are reduced. In the framework of European projects the development of such a collaborative software environment, called COVISE, has been possible. It has now been introduced in companies in different industrial sectors in Europe.

## 13A Networking SIC

Chair: Dieter Raith, University of Stuttgart Computer Center

2:00

### NQE Update - Fall CUG 1996

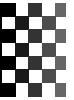
Chris Peters, CRI

NQE 3.0 was released in April 1996. NQE 3.0 has started the evolution to a new architecture. This architecture will be implemented over time and will allow NQE to evolve to meet the needs of workload management for current and future systems.

NQE 3.1 will be released in September 1996. It will be released for all supported platforms simultaneously. To accomplish this, NQE is being released asynchronously from UNICOS and UNI-



# Abstracts of Papers, Panels, and Meetings



Thursday October 17, 1996 (continued)

COS/Mk. This is a major step in providing a consistent NQE product with the same features and functionality for all supported systems at one time.

Additional plans and projects have begun to improve the integration of Cray and SGI systems in the same environment using NQE.

2:30

## An Update on Cray Networking Interfaces

Gary Klesk, CRI

This paper outlines the present industry standard network interfaces available on Cray systems and their performance, as well as, what direction Cray will take into the future.

3:00

## NFS Performance Update

Brian Gaffey, CRI

## 13B Software Migration and Optimization

Chair: Hans-Hermann Frese, ZIB

2:00

### Migrating from Cray Y-MP to Cray T90 and T3E

Ulrich Detert, KFA

The paper outlines the steps performed at KFA when migrating from Cray Y-MP/8 to a configuration of Cray T90/12 and T3E/512PE. Emphasis is put on experiences with application migration, software tools, and performance issues from the end-user point-of-view.

2:30

### So Optimization Breaks Your Code ...

R.K.Owen, NAS

Many compiler options can have an adverse affect on a code. Most notably, various levels of optimization can "break" a code, such that the program gives erroneous results. One option is to compile for the lowest common denominator. The other option is to identify which routines are adversely affected. The local utility, bchop

performs a binary chop between object files in two directories (./good and ./bad) compares the output and isolates which object files are causing the differences in output. This helps isolate problems due to changing compiler or preprocessor options. The number of runs performed is approximately  $2^E \log_2(N)$  where N is the number object files and E is the number of object modules causing errors. This utility, bchop, is similar to CRI's atchop for isolating multitasking problems.

3:00

### Distributed Computing with CraySoft NQE 3.0

Victor Hazlewood, SDSC

The "Network as the Computer" concept has been a vision of the HPC community for several years now, however, no one software product has proven to be the standard for the "Network as the Computer" model. NQE 3.0 was released in May 1996 as a product that could be used as a starting place for distributing jobs in a production heterogeneous computing environment. An evaluation of NQE 3.0 was initiated at

SDSC. Features and SDSC requirements investigated include: DCE compatibility, NQE scheduler configuration and flexibility, Web interface for job monitoring, and platform availability. The results of the evaluation are presented.

## 13C Cray Service Plans and Panel

Chair: Mike Brown, EPCC

2:00

### Cray/SGI Service Plans

Steve Urnsbach, SGI

Discussion of the merger of the two companies and the merger of the two service organizations. Plans to maintain/increase customer satisfaction and to support both low-end high volume products and high-end limited volume products. General overview of how service is currently structured and strategies for moving forward.

2:30

### CRI Panel

Charlie Clark, CRI (Moderator)

An interactive panel of several CRI technical management people





# Abstracts of Papers, Panels, and Meetings

Thursday October 17, 1996 (continued)

discusses and responds to issues raised from the Cray Survey and Operations SIC Open Meeting, with opportunity for comments and questions from the floor.

## 14A MSS: User Designs I

Chair: Paul Anderson, DOD

4:00  
Mass Storage at the Pittsburgh Supercomputing Center  
Phil Andrews, PSC

The PSC is moving to a new mass storage system based on a Cray J90 running DMF. The local J90 disk is presently in 8 file systems, each consisting of a mirrored primary and a 36 GB 4-way striped secondary. There are 8 IBM 3590 tape drives and a 3494 tape library robot with space for over 2,000 tapes. Initial access to the mass storage system is by stand alone custom software, but we intend experiments with a more transparent system using the recently released Data Migration API for interface between the mass storage system and a DFS server.

4:30  
Lights Out Operation of Cray J90s Using DLT Robot  
Gary Smith, UTHPCF

University of Texas' High Performance Computing Facility plans to continue 24 hour/day, 7 day/week operation of their Cray J90s by employing an STK 9710 robotics unit with DLT 4000 tape drives. Each DLT cartridge holds ~30 GB, so our entire 3+ TB (two copies) fits on 250 DLT tape cartridges. (Contrast to 33,000 3480 cartridges and manual operator mounting.) The STK 9710 can be expanded to 560 cartridges. Subsequent expansion could be via DLT 7000 tape drives that increase Type IV CompacTape DLT cartridge capacities to ~52 GB each and increase bandwidth of the tape subsystem from 1.5 MB/second/drive to 5.0 MB/second/drive (native, without compression). Both the primary and secondary MSP copies must be in the robot for "lights-out" operation. Absolute block positioning is required for this type of high-capacity media to be usable in the DMF context, as positioning times would otherwise be literally hours

for files near EOT. We have measured DMF performance with DLT 4000s and found that UNICOS 8.0/ DMF 2.4 tape positioning performance is approximately 20% slower than published Quantum specifications.

5:00  
CRI Scalable I/O Development  
Susan Crawford, CRI

This paper provides an update on the Cray Scalable I/O ION software that supports GigaRing channel I/O devices. Software status, performance measurements and long term directions will be presented.

## 14B Programming Environments

Chair: Hans-Hermann Frese, ZIB

4:00  
Programming Environments Update  
Jon Steidel, CRI

This presentation will lay out the current plans for Programming Environments 3.0, including major purposes, initiatives and priori-

ties; supported hardware and anticipated release timeframe. It will also cover the recent additions to the PE 2.0 releases, including phased support for the Cray T3E.

4:30  
Future Direction of Programming Environments and Models  
Dave Judd, CRI  
Ron Price, SGI

This paper will present the current programming models available from CRI and third-party vendors. It will also shed light on the future Programming Environments directions in the context of the SGI/CRI merger, such as how the SGI and CRI programming tools might be merged into a single set. Last, the paper will outline likely subsets of the programming models that will be propagated forward to new architectures, such as SMP.

5:00  
Cray T3E LIBSCI  
Bill Harrod, CRI

In this talk we will be presenting a brief overview of the Cray



# Abstracts of Papers, Panels, and Meetings



Thursday October 17, 1996 (continued)

Scientific and Mathematical Library—LIBSCI for the Cray T3E. Recent and future additions to LIBSCI in the areas of dense out of core solvers, banded solvers, and signal processing will be discussed. Some performance results of LIBSCI routines on the Cray T3E will also be discussed.

## 14C Performance and Evaluation

Chair: Jeffery A. Kuehn, NCAR

### 4:00 Multi-CPU Pools in an NQS Environment

M. Armstrong, Cray UK  
R. G. Evans, CLRC Rutherford Appleton Lab  
G. T. Folkes, CLRC Rutherford Appleton Lab

Utilising the resources of a J932 with a wide range of batch work is very difficult using only the standard NQS controls. Jobs that need most of the system resources in memory or temporary disk should be able to access most of the cpu's when needed without holding on to idle processors at other times. Dedicated run times and overnight

queues are not popular with users who wish to develop applications throughout the day.

Our new multiple cpu job classes use the Unicos real time scheduling features to create pools of typically 8 or 16 cpu's for parallel jobs. The parallel jobs have a very high probability of finding all the processors they need while returning under used processors to the normal scheduling mechanisms. We will report on the initial use of these queues on a J932 with a very variable workload and show the percentage of cpu time that is delivered to the parallel queues under different conditions

### 4:30 Automatic Performance Monitoring on YMP Family, Application at CNRS/IDRIS

Etienne Gondet, CNRS-IDRIS

How to register vectorial performances of all the user programs executed on your YMP computer? We have developed a tool based on hpmflop that has been used on our C90 at CNRS/IDRIS (French National Supercomputing Center for Research). We will discuss the

implementation, pros and cons, and added value that such a tool can bring. Mean C90 performance graphics and statistics on users' programs will be presented.

### 5:00 GigaRing Channel Modeling

Tomasz Kaczynski, CRI

The GigaRing Channel is a new, supercomputer class interconnect and I/O channel developed by CRI based on IEEE Scalable Coherent Interface (SCI) Standard. The ring-based architecture of GigaRing channel facilitates inexpensive bandwidth sharing by allowing more than 2 nodes on the ring (multi-node configurations). The properties and performance of such multi-node configurations will be simulated and analyzed using detailed, parameter-driven model of GigaRing channel.





# Abstracts of Papers, Panels, and Meetings

Friday October 18, 1996

## 15A MSS: User Designs II

Chair: Robert Silvia, NCSC

9:00

### Cray Connectivity to ESCON-Attached Storage Devices at NCAR

John Merrill, NCAR

With the advent of ESCON-attached storage devices, capable of much higher transfer rates than the older FIPS-60 devices, the Mass Storage Group at the National Center for Atmospheric Research (NCAR) was faced with the problem of how to incorporate these devices into the MSS. The new devices were going to have to be accessible from all MSS host machines, which included several Crays. Since all MSS hosts were already Hippi-attached, the solution was to bring in a special adapter from Network Systems Corporation which would provide Hippi to ESCON connectivity. This paper examines some of the problems encountered in the initial testing of the new data path, and looks at some of the results and data rates achieved using several different Cray machines.

9:30

### Experience with Redwood/D3 Tapes

Hartmut Fichtel, DKRZ

DKRZ currently operates its data management system with the UniTree product. Archival technology in parallel use comprises Metrum/VHS and STK robotic systems equipped with 3480, 3490, and Redwood/D3 tape devices. Since installation, early in 1996, the new D3 tape drives have been systematically tested for functionality, performance, and reliable operation by continuous stress tests both under the native operating system and the UniTree product. These test results will be presented together with first operational experiences in production use which started in May 1996.

10:00

### Update on the CRI Shared File System

Paul Anderson, DoD

One year ago, we presented a paper on CRI's Shared File System product (SFS) and how our site had learned to use SFS to take advantage of its strong points. A year later, we have numerous SFS

experiences to share—some of them better than others. A number of hardware and software issues have been resolved, but reliability continues to be a problem. This paper will address the problems we have seen over the year and how to try to avoid them. We will also evaluate SFS as a product in its current implementation.

## 15B Joint: J90 MIG and Operating Systems

Chair: Virginia Sotler, CEWES

9:00

### J90 I/O Issues and Performance

Donald Lee, Instrumental, Inc.  
Chris Brady, CRI

The Cray J90 system is now common at CRI customer sites, but has not always received the attention that has been given to its more powerful siblings. This paper examines the entire J90 I/O system from a performance perspective. Using direct description and some illustrative comparisons with both the SGI Power Challenge and the J90's larger relatives, the J90 hardware and soft-

ware is described at a level of detail that will shed light on its performance characteristics.

9:30

### Integrating a Cray T3E into KFA's Supercomputer Complex

Jutta Docter, KFA

With the addition of a 512 node Cray T3E to the existing Cray T916/12-512 and Cray M94 PVM platforms, KFA will offer a unique supercomputer complex for scientific computing. The presentation will describe KFA's plans to implement a single system image (unique userids, consistent view of data, etc.) for the Cray supercomputers and early experiences with the brand new UNICOS/mk operating system.

10:00

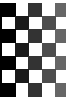
### Building a J90 Cluster

Nicholas Cardo, NASA AMES

The J90 systems have the potential to provide cost effective computing. By harnessing the processing power of several J90 systems with a parallel application, a potential for greater processing power can be achieved with one application.



# Abstracts of Papers, Panels, and Meetings



Friday October 18, 1996 (continued)

The Numerical Aerodynamic Simulation Facility (NAS) at NASA Ames Research Center (AMES) has installed 4 J90 systems in order to construct a J90 cluster. The Portable Batch System (PBS), has been installed to harness the processing potential of all 4 systems in the cluster. This paper will discuss the hardware and software configurations of the cluster as well as its operational aspects and capabilities.

## 15C Graphics

Chair: Eric Greenwade, INEL

9:00

### Visualization Theater

Supercomputers generate data that, via scientific visualization, can be transformed into pictures that provide a way for scientists to understand the information more fully and quickly.

Although the primary purpose of visualization is to facilitate the discovery process, scientists are increasingly coming to rely on it to also present their research conclusions. This session showcases the latest in sci-

entific/engineering visualization. It promises to be both educational and entertaining.

10:00

### Creating A Visualization Power Wall

Barbara Horner-Miller, JPL  
James L. Lambert, JPL  
and Kathya G. Zamora, JPL

Caltech's Jet Propulsion Laboratory has recently undergone a series of procurements within the Supercomputing Project to create a Power Wall (4 panels) such as the ones at Supercomputing 94 and Supercomputing 95. We are working closely with the University of Minnesota to guarantee a successful and functional product. The University of Minnesota's goal is to provide as much resolution as possible in each image while JPL's goal is to produce quality images at animation speeds.

This talk addresses the configuration of the visualization system, options we explored and the rationale behind our choices. It addresses how the system will interface with our CRAY T3D and be used in conjunction with two

other proposed Walls within the JPL campus. Descriptions of pilot projects will be presented.



# Abstracts of Papers, Panels, and Meetings

Friday October 18, 1996 (continued)

## 16 General Session

Chair: CUG Vice President

11:00  
SIC/MIG Committee  
Reports

11:10  
Computational Chemistry:  
Two Success Stories  
Dr. Lee Bartolotti, NCSC

The availability of a CRAY super-computer has allowed North Carolina researchers to use computational chemistry as a tool for exploring and elucidating complex chemical phenomena. The current talk will discuss how computational chemistry has enhanced our knowledge of two challenging chemical problems. Both of these investigations are similar in that computational chemistry was not used to support experimental data, but to explore and elucidate information as yet unobtainable experimentally. First, we will discuss how quantum mechanical calculations have led to the discovery of a possible mechanism for the oxidation of toluene in the atmosphere, a major contributor to urban pollu-

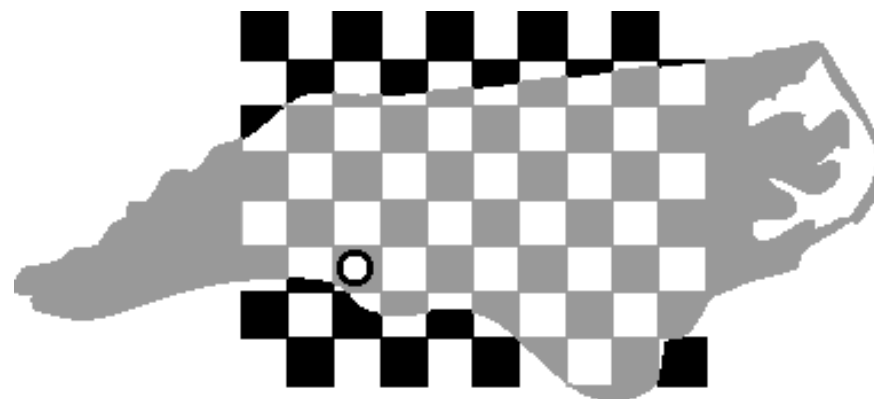
tion. Toluene is a major volatile aromatic constituent of gasoline. The combustion of gasoline releases toluene into the atmosphere, which reacts with the hydroxyl radical, initiating a complex series of chemical reactions, which have not, until now, been clearly delineated. Second, we will discuss how molecular dynamic simulations have aided in the prediction of a three dimensional structure for the beta-amyloid peptide and its insoluble fibrillar aggregate. Beta-amyloid peptide is a major component of neuritic plaques found in Alzheimer's disease. The amino acid sequence is known, but the geometrical structure has not yet been elucidated through experimental procedures.

11:40  
SGI/Cray Next  
Generation  
Rick Bahr, SGI  
Karl Freund, CRI

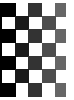
This talk will focus on a new generation, distributed shared memory scalable multiprocessor in development at SGI/Cray. Specifics of this system will be presented regarding architecture, implementation technology, and motivation.

12:20  
The Silicon Valley CUG  
David Robertson, Sterling Software

12:30  
Closing Remarks  
CUG President



# Cray Demonstrations



## UNICOS Under UNICOS

Jay Blakeborough, CRI Software Division

UNICOS Under UNICOS (UUU) has been shown to be a useful feature in enabling customers to perform operating system upgrades with a significant reduction in the amount of dedicated time required. For those customers that may be interested in using UUU, but uncertain as to its applicability at their site, this demo will provide an opportunity to see UUU and engage in a discussion of the feature with a UUU developer. Discussion topics will include hardware configuration issues, system administration, host resiliency and any other subjects of interest to participants.

## CrayTools: PVP Performance Tools

Koushik Ghosh

CRI's Parallel Vector line of computer systems offers a suite of "view" tools to assist you in analyzing and improving the performance of your codes. This set of tools now look and function very similarly. Demos will highlight the most commonly used tools from this suite.

## CRInform 5.0

Michael Sand, CRI

The Cray Research Customer Information System (CRInform) is an online information and problem-reporting service for CRI customers. CRInform 5.0 is scheduled for release in October, 1996. This demonstration will cover the main components of the CRInform application, including:

- Requests for Technical Assistance (RTAs)
- Software Problem Reports (SPRs)
- Software Ordering
- Access to General Service Related Information

In addition, the new CRInform features that are becoming available in version 5.0 will be demonstrated. These include:

- UNICOS Wish List
- Software Fix Ordering
- Software FLEXIm Key Ordering

## CrayTools: TotalView

Koushik Ghosh

In the last major release of TotalView, developers have responded directly to user requests, and in so doing provided significant enhancements to the user interface and enhanced the functionality. TotalView has strong new support for moving between differ-

ent processing elements within one process or data window.

The most recent revision, 2.0.1, adds an integrated capability for visualizing parallel and serial data arrays, the ability to input commands into the command pane, as well as other features. This demo will highlight these and other new features.

## CrayTools: MPP Performance Tools

Koushik Ghosh

Recently, the MPPApprentice has added support for C++, a new command line option to get a textual report, and other features. This demo will highlight these and other new features of the Apprentice.

## The Cray World Wide Web Document Server

Greg Matthews, CRI Software Publications

This demonstration presents the recently released Cray World Wide Web (WWW) document server. The server is shipped with all CRI software products and provides electronic books to be viewed with industry client browsers such as Netscape and Mosaic. The CRI document server dynamically converts existing SGML source into HTML. This demonstration shows the server features and will show collections of our publications on the Web.

### Demonstration Schedule

#### Wednesday

UNICOS Under UNICOS	8:30
CrayTools: PVP Performance Tools	5:30
CRInform 5.0	6:00

#### Thursday

CrayTools: Total View	8:30
CrayTools: MPP Performance Tools	5:30
The Cray World Wide Web Document Server	6:00





# Contacts

## Special Interest Committee (SIC) Chairs

### Applications and Algorithms

Chair: Richard Shaginaw  
Bristol-Myers Squibb  
Pharmaceutical Research Institute  
P.O. Box 4000  
Princeton, NJ 08543-4000  
USA  
Phone: (1-609) 252-5184  
Fax: (1-609) 252-6163  
shaginaw@bms.com

Deputy: Larry Eversole  
Jet Propulsion Laboratory  
California Institute of Technology  
4800 Oak Grove Drive  
M/S 126-147  
Pasadena, CA 91109-8099  
USA  
Phone: (1-818) 354-2786  
Fax: (1-818) 393-1187  
larry.c.eversole@jpl.nasa.gov

CRI Contact: David Caliga  
Phone: (1-612) 683-3682  
Fax: (1-612) 683-3699  
caliga@appsdiv.cray.com

### Graphics

Chair: Eric Greenwade  
Idaho National Engineering Lab.  
P.O. Box 1625, MS-3605  
Idaho Falls, ID 83404  
USA  
Phone: (1-208) 526-1276  
Fax: (1-208) 526-4017  
leg@inel.gov

Deputy: Open

CRI Contact: Cal Kirchhof  
Visualization Program Mgr.  
Phone: (1-612) 683-5245  
Fax: (1-612) 683-5599  
cal@cray.com

### Mass Storage Systems

Chair: Helene Kulsrud  
CCR-P/IDA  
Thanet Road  
Princeton, NJ 08540  
USA  
Phone: (1-609) 924-4600  
Fax: (1-609) 924-3061  
laney@ccr-p.ida.org

Deputy: Robert J. Silvia  
North Carolina Supercomputing Ctr  
3021 Cornwallis Road  
P.O. Box 12889  
Research Triangle Park, NC 27709

USA  
Phone: (1-919) 248-1132  
Fax: (1-919) 248-1101  
rjs@ncsc.org

European Deputy: Hartmut  
Fichtel

DKRZ  
Bundesstrasse 55  
D-20146 Hamburg 13 Germany  
Phone: (49-40) 41-173-220  
Fax: (49-40) 41-173-270  
fichtel@dkrz.de

CRI Contact: Brian Gaffey  
Section Leader, File Systems  
Phone: (1-612) 683-3522  
Fax: (1-612) 683-3599  
btg@cray.com

### Networking

Chair: Hans Mandt  
Boeing Advanced Systems  
Laboratory  
P.O. Box 24346, MS 7L-48  
Seattle, WA 98124-0346  
USA  
Phone: (1-206) 865-3252  
Fax: (1-206) 865-2965  
hmandt@redwood.rt.cs.boeing.com

Deputy: Dieter Raith  
Computer Center  
University of Stuttgart

Allmandring 30  
D-70550 Stuttgart  
Germany  
Phone: (49-711) 685-4516  
Fax: (49-711) 682357  
raith@rus.uni-stuttgart.edu

CRI Contact: Dave Thompson  
Group Leader, I/O Group  
Phone: (1-715) 726-6680  
Fax: (1-715) 726-6113  
ddt@comulus.cray.com

### Operating Systems

Chair: Terry Jones  
Northrop Grumman Data Systems  
Bldg 1001, Room 101  
Stennis Space Center, MS 39522  
USA  
Phone: (1-601) 688-5289  
Fax: (1-601) 689-0400  
jonestl@nz8c.msnavo.navy.mil

Deputy: Virginia Sotler  
United States Army Corps of  
Engineers  
3909 Halls Ferry Road  
MS CEWES-IM-H  
Vicksburg, MS 39180-6199  
Phone: (1-601) 634-4418  
Fax: (1-601) 634-2331  
sotler@wes.army.mil

# Contacts



CRI Contact: Dave Wallace  
Phone: (1-612) 683-5504  
Fax: (1-612) 683-5599  
wallace@cray.com

## Operations

Chair: Daniel Drobnis  
San Diego Supercomputing  
Center  
P.O. Box 85608  
SDSC-103  
San Diego, CA92186-9784  
USA  
Phone: (1-619) 534-5020  
Fax: (1-619) 534-5152  
drobnisd@sdsc.edu

Deputy: Virginia Bedford  
Arctic Region Supercomputing  
Center  
University of Alaska  
PO Box 756020  
Fairbanks, AK 99775-6020  
USA  
Phone: (1-907) 474-5426  
Fax: (1-907) 474-5494  
bedford@arsc.edu

European Deputy: Mike Brown  
Edinburgh Parallel Computing  
Centre  
University of Edinburgh, JCMB

King's Buildings, Mayfield Road  
Edinburgh, Scotland EH9 3JZ  
UK  
Phone: (44-1) 316-505-031  
Fax: (44-1) 316-506-555  
m.w.brown@ed.ac.uk

CRI Contact: Roger Dagitz  
Phone: (1-715) 726-5269  
Fax: (1-715) 726-4343  
roger.dagitz@cray.com

## Performance Evaluation

Chair: Jeff Kuehn  
NCAR  
P.O. Box 3000  
Boulder, CO 80307-3000  
USA  
Phone: (1-303) 497-1311  
Fax: (1-303) 497-1804  
kuehn@ncar.ucar.edu

Deputy: Jean Shuler  
Lawrence Livermore National  
Laboratory  
P.O. Box 808, L-67  
Livermore, CA94551  
USA  
Phone: (1-510) 423-1909  
Fax: (1-510) 422-1592  
jshuler@llnl.gov

CRI Contact: Bill Harrod  
Phone: (1-612) 683-5249  
Fax: (1-612) 683-5276  
harrod@cray.com

## Software Tools

Chair: Hans-Hermann Frese  
ZIB  
Heilbronner Strasse 10  
D-10771 Berlin-Wilmersd  
Germany  
Phone: (49-30) 89604-145  
Fax: (49-30) 89604-125  
frese@sc.zib-berlin.de

Deputy: Mike Ess  
Arctic Region Supercomputing  
Center  
910 Yukon Drive  
Fairbanks, Alaska 99775-6020  
USA  
Phone: (1-907) 474-5405  
Fax: (1-907) 474-1849  
ess@arsc.edu

CRI Contact: John Wilson  
Section Leader  
Programming Environment  
Integration  
Phone: (1-612) 683-3522  
Fax: (1-612) 683-5076  
jcw@cray.com

## User Services

Chair: Barbara Horner-Miller  
Jet Propulsion Laboratory  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, CA91101  
USA  
Phone: (1-818) 354-3434  
Fax: (1-818) 393-1187  
horner@cosmos.jpl.nasa.gov

Deputy: Open

CRI Contact: Barbara Brunzell  
Director, Software Education  
Services  
Phone: (1-612) 683-3823  
Fax: (1-612) 683-3599  
bjb@tngstar.cray.com





# Contacts

## Mutual Interest Group (MIG) Chairs

### J90

Chair: Jean Shuler  
Lawrence Livermore National  
Laboratory  
P.O. Box 808, L-67  
Livermore, CA94551  
USA  
Phone: (1-510) 423-1909  
Fax: (1-510) 422-1592  
jshuler@llnl.gov

CRI Contact: Michelle Webster  
Phone: (1-612) 683-5301  
Fax: (1-612) 683-5307  
maw@cray.com

### Security

Chair: Bonnie Hall  
Exxon Upstream Technical  
Computing Company  
ST-967  
P.O. Box 4449  
Houston, TX 77210-4449  
USA  
Phone: (1-713) 966-6031  
Fax: (1-713) 965-7477  
blhall1@exxon.com

Deputy: Philippe Martinez  
IDRIS-CNRS  
Batiment 506-BP 167-Campus  
F-91403 Orsay CEDEX  
France  
Phone: (33-1) 69-82-41-89  
Fax: (33-1) 69-28-52-73  
martinez@idris.fr

CRI Contact: Jim Grindle  
Phone: (1-612) 683-5435  
Fax: (1-612) 683-5599  
jsg@sdiv.cray.com

## Program Steering Committee

Chair: Sally Haerer  
NCAR  
P.O. Box 3000  
Boulder, CO 80307-3000  
USA  
Phone: (1-303) 497-1283  
Fax: (1-303) 497-1804  
haerer@ncar.ucar.edu

Mary Kay Bunde  
Cray Research, Inc.  
655F Lone Oak drive  
Eagan, MN 55121  
USA  
Phone: (1-612) 683-5655  
Fax: (1-612) 683-5098  
mkay@cray.com

Eric Greenwade  
Idaho National Engineering Lab.  
P.O. Box 1625, MS-3605  
Idaho Falls, ID 83404  
USA  
Phone: (1-208) 526-1276  
Fax: (1-208) 526-4017  
leg@inel.gov

Barbara Horner-Miller  
Jet Propulsion Laboratory  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, CA91101  
USA  
Phone: (1-818) 354-3434  
Fax: (1-818) 393-1187  
horner@cosmos.jpl.nasa.gov

Fred Johnson  
National Institute of Standards  
and Technology  
Bldg. 225, Rm. B122  
Gaithersburg, MD 20899  
USA  
Phone: (1-301) 975-2700  
Fax: (1-301) 216-2075  
fjohnson@nist.gov

Helene Kulsrud  
Institute for Defense Analysis  
CCR-P/IDA  
Thanet Road  
Princeton, NJ 08540  
USA

Phone: (1-609) 924-4600  
Fax: (1-609) 924-3061  
laney@ccr-p.ida.org

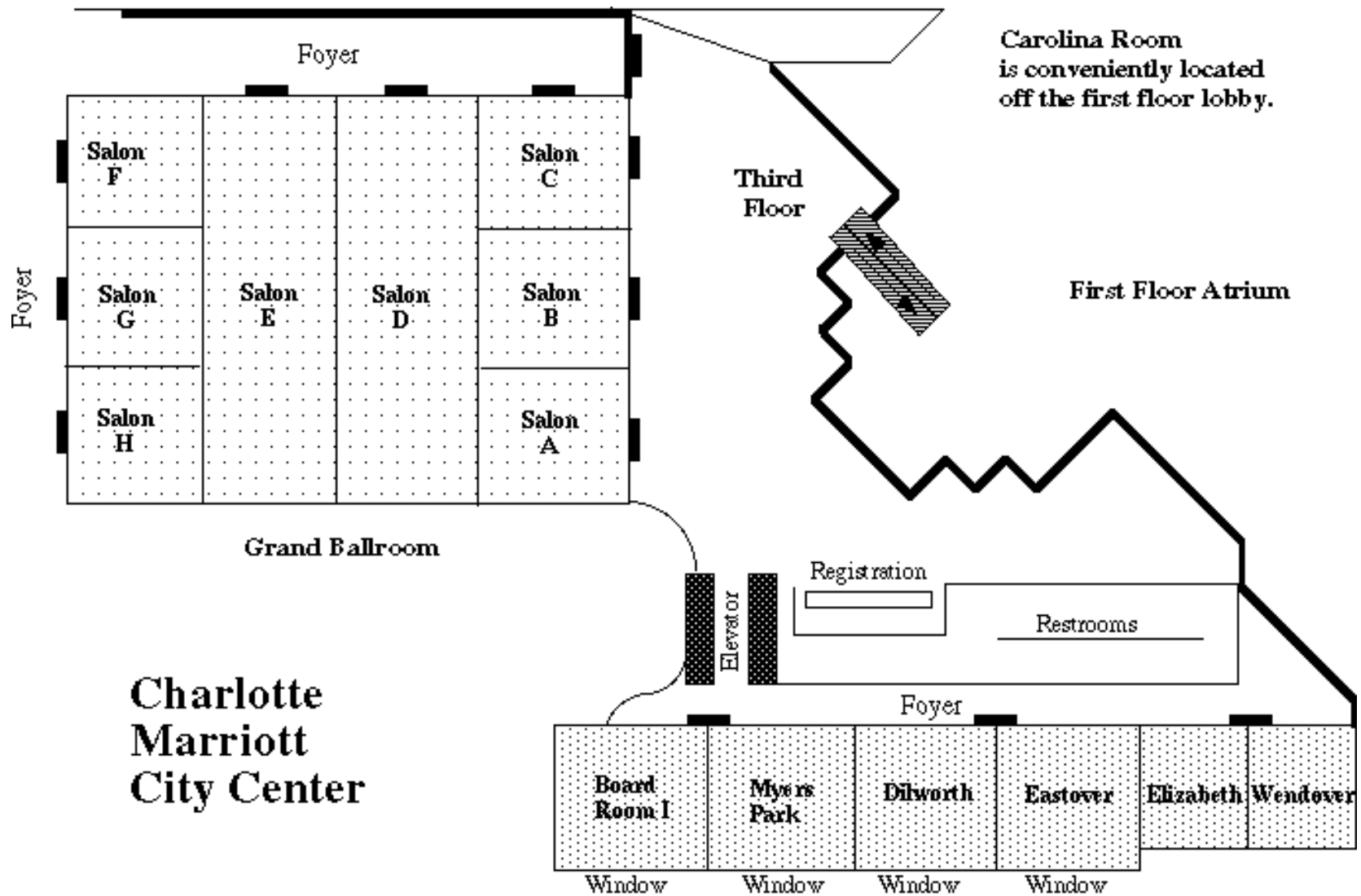
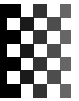
## Conference Chair

Robert Silvia  
North Carolina Supercomputing  
Center  
3021 Cornwallis Road  
PO Box 12889  
Research Triangle Park, NC 27709-  
2889  
USA  
Phone: (1-919) 248-1132  
Fax: (1-919) 248-1101  
rjs@mcnc.org

## CUG Office

Bob Winget  
2991 Knoll Road  
Shepherdstown, WV 25443  
USA  
Phone: (1-304) 263-1756  
Fax: (1-304) 263-4841  
cug@cug.org





# Charlotte Marriott City Center

