



News & Notes

from
Sitterson Hall

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Department of Computer Science
The University of North Carolina at Chapel Hill

In this issue

- [Chairman's corner](#)
 - [Intel award](#)
 - [Welcome](#)
 - [We say thanks and farewell to...](#)
 - [Alumni news](#)
 - [Family matters](#)
 - [Weiss wins teaching awards](#)
 - [Research highlights](#)
 - [New contracts and grants](#)
 - [Recent publications](#)
 - [In the media](#)
 - [Congratulations to...](#)
 - [Special visitors](#)
 - [Computer Services news](#)
 - [About News & Notes](#)
-

Chairman's corner

This has been another exciting year for us. We're doing some great research; several of our faculty have won awards; and we opened our new Hardware Systems Teaching Lab.

We were extremely pleased to receive a \$2.4 million award from Intel Corporation, as part of the company's Technology for Education 2000 program. See the [Intel article](#) for more about this award.

We celebrated our tenth year in Sitterson Hall this summer. All of our personnel and equipment moved under this one roof during the summer of 1987. The anniversary of our building

coincided with the completion of its newest lab, the Hardware Systems Teaching Lab ([see article](#)).

Congratulations to our faculty who continue to win awards and honors. **Fred Brooks**, Kenan professor, received the 1997 Sutherland Award from *CyberEdge Journal* for his contributions to virtual reality research. **Henry Fuchs**, Federico Gil professor, was recently inducted into the American Academy of Arts and Sciences and the National Academy of Engineering. **Ming C. Lin**, assistant professor (1/1/98), was one of only eleven computer scientists and engineers in the U.S. to be awarded a Honda Research Initiation Grant. And finally, I was delighted (actually stunned) to receive the UNC Board of Governor's Award for Excellence in Teaching and the N.C. Professor of the Year Award from the Council for Advancement and Support of Education and the Carnegie Foundation for the Advancement of Teaching. More about these and other honors can be found within.

We also congratulate Ming on her appointment to assistant professor, which begins in January, and **Dinesh Manocha**, who becomes associate professor with tenure in January. Ming and Dinesh have had much to celebrate this year: their first child, Aninda, was born in August.

Congratulations also to **Steve Goddard** (M.S. 1995), this year's Alumni Fellowship recipient ([see article](#)). This fellowship, given to Ph.D. candidates in their final year of study to allow them to work full time on dissertation research, is supported by generous contributions from alumni and friends. You have been so generous in the past, and we hope that you will continue your financial support.

We are very sorry to say goodbye to **Don Stanat**, professor, who retired at the end of June. Don has been a wonderful teacher, scholar, mentor, and friend to all of us. We're happy to see him around the halls still: he continues with us as professor emeritus. We welcome alumnus **Doug L. Hoffman** (Ph.D. 1996) as our newest research assistant professor. Doug is working on the DISCO project ([see article](#)).

We hope that you will visit us if you are in the Chapel Hill area. But, if you can't visit us in reality, please visit us virtually via our ever-expanding Web pages, which provide the latest news and information about us.

Steve Weiss

Intel Corp. gives award worth \$2.4 million

Intel Corporation has given a three-year award that will provide computing equipment worth \$2.4 million to our Department and to our research collaborators in nine other departments and schools at UNC-Chapel Hill.

UNC-Chapel Hill was one of 13 universities selected in the second phase of Intel's Technology for Education 2000 program, a \$90 million program that will donate high-speed multimedia computers, workstations, servers, and networking hardware and software to American universities during the next three years. The program's purpose is to support academic research and curriculum development in a broad spectrum of computationally demanding areas--from the traditional fields of electrical engineering and computer science, to such fields as business, medicine, the physical sciences, communications, multimedia, and digital arts.

The Intel award will supply computers for seven collaborative research projects led by our Department and involving a total of 31 faculty and staff members as well as several dozen graduate students from nine academic and clinical departments. Project areas include the nanoManipulator, a virtual-environment interface to scanned-probed microscopes; multimedia networking; large-area, high-resolution computer displays; 3D image-based medical treatment of cancer; computer simulation studies of the structure, dynamics, and interactions of proteins; modeling, interactive display, and virtual prototyping; and hardware and software for rendering computer-generated environments taken from images of the real world. In addition to these specific research projects, the award will provide computing equipment for two new instructional laboratories focusing on the areas of networking and hardware systems design.

The **Laboratory for Networking and Internet Technologies** is a distributed lab that will be located in both our Department and the School of Information and Library Science (SILS). The two sites will be connected via the UNC-Chapel Hill campus switched-FDDI backbone and will share a common file space. The lab will support a set of undergraduate and graduate courses on the use of the Internet and its underlying technologies that are being created jointly by our two departments. The courses span a range of topics from basic Internet and World Wide Web literacy to high-speed networking, the Integrated Services Architecture for the Internet, and the next generation of Internet protocols.

The recently completed **Hardware Systems Teaching Laboratory** ([see article](#)) is located in 027 Sitterson Hall. The lab builds upon the Microelectronic Systems Laboratory's nearly 15 years of expertise in designing and building computer systems and instrumentation. It will support new course offerings in the design of complete information-processing systems and will give computer science students valuable hands-on experience. Intel computers will provide both the experimental platforms and the CAD tools for the new lab.

Welcome

New faculty appointment

Doug L. Hoffman, research assistant professor (effective 15 August 1997), B.S. 1976 (Florida Institute of Technology), M.S. 1993, Ph.D. 1996 (UNC-Chapel Hill). Parallel algorithms; parallel architecture; distributed systems; bioinformatics; computer-aided protein science. Doug received his Ph.D. from our Department under the direction of Raj K. Singh, adjunct associate

professor, with his dissertation, "3D Protein Structure Comparison Using Dihedral Transformations and 1D Pattern Matching." Currently, Doug is working on the DISCO project ([see article](#)).

Visiting researcher

Jonathan Munson (Ph.D. 1997), visiting researcher (effective 1 September 1997). Jon is working with Prasun Dewan, associate professor, on designing and implementing the Collaboration Bus ([see article](#)). He is also developing the Sync replication system, and is integrating it with the Collaboration Bus.

New students, fall 1997

Brian Blount, Jessica Crawford, Liusong Gao, John Glotzer, Mave Houston, Jeffrey Juliano, Sheila Knight, John Konglathu, Lalit Kumar, Eric Larsen, Bryant Liu, Benjamin Lok, Arun Moorthy, Shyam Mundhra, Arun Neelamkavil, David Ott, Timothy Preston, Yufei Qian, Sadagopan Rajaram, Raymond Ribaric, Daniel Rohrer, Salil Sane, Adam Seeger, Raghavendra Sunku, Sujuan Upshaw, Nicholas Vallidis, Christopher Weigle, Emily West, Andrew Wilson, Chris Wynn, and Paul Yushkevich.

Median credentials for the 31 first-year students who began our program in fall 1997:

Quantitative GRE:	91st percentile
Verbal GRE:	88th percentile
Analytical GRE:	91st percentile
GPA (undergraduate):	3.5/4.0

New staff

Bruce Farley, accounting assistant, joined us in September. He comes to us from UNC-Chapel Hill's Lineberger Cancer Center and has been with the university since May 1996. He graduated from UNC-Asheville in 1994 with a B.S. in business administration.

Jai Glasgow, graphics demo coordinator and secretary to faculty, joined us in May. She has an M.A. in comparative literature from UNC-Chapel Hill and is working on her Ph.D. Jai previously worked part-time with us for a year as assistant to Dinesh Manocha, associate professor (1/1/98).

William Jiang, systems programmer, joined Computer Services in September. He is responsible for the support of our PC systems. William earned a B.S. in Computer Science from Ateneo de Manila University in the Philippines in 1991, and an M.S. in Computer Science from the University of Illinois in 1993. Prior to joining us, he worked in the Anesthesiology Department of UNC Hospitals.

Shelley Poovey, systems administrator, joined Computer Services in September. Her responsibilities include user support in The Support Center (TSC); backups of UNIX, Macintosh,

and PC systems; and systems support of Macintosh and PC systems. Shelley earned a B.S. in Psychology from UNC-Chapel Hill this summer. She previously worked for us in TSC and as a research assistant for Christina Burbeck, research professor.

Duncan Riley, systems programmer/administrator, joined Computer Services in August. He administers SGI systems, provides support for X Window Systems, and manages the contributed software areas. Duncan earned a B.S. in computer science from Montana State University in 1985. Before joining us, he worked at Unisys in Salt Lake City, Utah.

Nicole Williams, administrative secretary to Stephen M. Pizer, Kenan professor, and the Medical Image Presentation project, joined us in October. She recently relocated here from Maplewood, N.J., where she worked with an architectural firm.

We say thanks and farewell to . . .

Debbie Blalock, accounting assistant, who left in August to join UNC-Chapel Hill's Principals' Executive Program as an accounting technician. She had been with us since 1993.

Michael North, systems programmer, who left in July to join Hewlett-Packard's Chapel Hill Graphics Lab. He had been with us since 1994 providing SGI, HP, and UNIX support, and doing special projects. He continues with us as a student.

Sherry Palmer, administrative manager for the Microelectronic Systems Laboratory, who left in November to work in the office of the Associate Vice Chancellor of Human Resources at UNC-Chapel Hill. She had been with us since 1993.

Ernest Parker, systems administrator, who left in July. He had been with us since 1988 working with backups and UNIX accounts, and providing general Macintosh support.

Carolyn Smith, administrative secretary to Stephen M. Pizer and the Medical Image Presentation project, who left in August to take a job as an administrative assistant in the Division of Infectious Diseases in the Department of Medicine at UNC-Chapel Hill. She had been with us since 1988.

Donald F. Stanat, professor, who retired at the end of June after 30 years on our faculty. Don has been a dedicated teacher and mentor to many students.

Ken Weaver, computer network manager, who left in June to work at SAS Institute in Cary, N.C. He had been with us since 1994 managing our data, voice communication, and video networks.

Alumni news

Ron Azuma (Ph.D. 1995) recently published the paper: Azuma, R. T. "A Survey of Augmented Reality," *Presence: Teleoperators and Virtual Environments*, 6(4), August 1997, 355-385. (azuma@isl.hrl.hac.com)

Andrew Bell (M.S. 1991) lives in Laurel, Md., and works for Diehl Graphsoft, helping to develop their MiniCAD software. He and his wife Leslie recently had their second child (see "[Family matters](#)"). (bell@cs.unc.edu)

Edoardo Biagioni (Ph.D. 1992) is now an assistant professor at the University of Hawaii at Manoa. (esb@hawaii.edu)

Andrew Brandt (M.S. 1993), president of Inroads Interactive in Boulder, Colo., was quoted in a March article of the Boulder News about multimedia companies in Boulder. He reports that the company has sold more than 200,000 CD-ROMs worldwide (see <http://www.inroadsint.com/>). (brandt@inroadsint.com)

Jeff Butterworth (M.S. 1992) heads Alien Skin Software, a \$2 million a year company based in Raleigh, N.C. The company sells add-on technology for graphical applications, including Eye Candy, a set of 21 filters compatible with Adobe Photoshop and Adobe After Effects; and Stylist, a plug-in for Adobe Illustrator that allows designers to organize and enhance their illustrations (see <http://www.alienskin.com/>). The company and Jeff's unconventional management style were featured in an article in *The News and Observer* of Raleigh, N.C., on 2 October. (jeffb@alienskin.com)

Michael V. Capps (M.S. 1996) recently published two papers in the proceedings of a workshop he helped to organize ([see article](#)):

Capps, M., and D. Stotts. "Research Issues in Developing Networked Virtual Realities," *Proc. Sixth Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises*, Cambridge, Mass., 18-20 June 1997, 205-211.

Capps, M., and S. Teller. "Communications Visibility in Shared Virtual Worlds," *Proc. Sixth Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises*, Cambridge, Mass., 18-20 June 1997, 187- 192.

Mike is currently pursuing a Ph.D. at MIT. (capps@mit.edu)

Paul Clements (M.S. 1980) and his colleagues, Len Bass and Rick Kazman, at the Software Engineering Institute at Carnegie Mellon University, have a new book, *Software Architecture in Practice*, published by Addison-Wesley. (pclement@sei.cmu.edu)

Stuart Faulk (Ph.D. 1989) is currently a research associate in the Department of Computer and Information Science at the University of Oregon in Eugene, Ore. (faulk@cs.uoregon.edu)

Susan Gauch (Ph.D. 1990), an assistant professor at the University of Kansas, reports that the VISION digital video library system, which she developed with her husband John Gauch (Ph.D. 1989) and Wei Li, also of Kansas, was licensed exclusively to Worldwide Broadcasting Network in Cambridge, Mass. Her ProFusion Web search engine was licensed to a Kansas company, Profusion, L.L.C. (<http://profusion.ittc.ukans.edu/>). (sgauch@ittc.ukans.edu)

Lenwood Heath (Ph.D. 1985) is an associate professor at Virginia Tech. His recent papers include:

Green, E. A., L. S. Heath, and B. J. Keller. "Opal: A System for Computing Noncommutative Groebner Bases (System Description)," *Proc. Eighth International Conference on Rewriting Techniques and Applications*, 1997, 331-334.

Heath, L. S. "Graph Embeddings and Simplicial Maps," *Theory of Computing Systems*, Vol. 30, 1997, 51-65.

Lenny's research interests include graph theory, graph algorithms, and computational geometry. He is collaborating with mathematics colleagues to build a system for doing noncommutative algebra in Hopf algebras and quantum groups. (heath@cs.vt.edu)

Jeff Hultquist (Ph.D. 1995) is a software development manager at Division Ltd. in San Mateo, Calif. He and his wife, Mary, have three sons and live in Cupertino. (jeffh@division.com)

Victoria Interrante (Ph.D. 1996) has several recent papers:

Ma, K.-L., and V. Interrante. "Extracting Feature Lines from 3D Unstructured Grids," *Proc. Visualization '97*, Phoenix, Ariz., 19-24 October 1997, 285-292.

Interrante, V., and C. Grosch. "Strategies for Effectively Visualizing 3D Flow with Volume LIC," *Proc. Visualization '97*, Phoenix, Ariz., 19-24 October 1997, 421-424.

Interrante, V. L. "Illustrating Surface Shape in Volume Data via Principal Direction-Driven 3D Line Integral Convolution," *Computer Graphics: Proc. ACM SIGGRAPH '97*, Los Angeles, Calif., 3-8 August 1997, 109- 116.

Interrante, V., H. Fuchs, and S. Pizer. "Conveying the 3D Shape of Smoothly Curving Transparent Surfaces via Texture," *IEEE Transactions on Visualization and Computer Graphics*, 3(2), April/June 1997, 98-117.

She has been invited to be on the papers committee for IEEE Visualization '98. (interran@icase.edu)

Cezary Z. Janikow (Ph.D. 1991) has been promoted to associate professor with tenure at the University of Missouri at St. Louis. Recently, he organized and chaired the First Workshop on Frontiers of Evolutionary Algorithms. Cezary is also working with the U.S. Army Aviation and

Troop Command on a new project involving automating maintenance messages and compliance (see <http://www.cs.umsl.edu/Faculty/janikow>). (janikow@cs.umsl.edu)

Wm Leler (Ph.D. 1987) has moved back to Portland, Ore., where he is starting a new company to build Internet authoring tools. (wm@concentric.net)

Mark Lumsden (M.S. 1982) is now in the Network Computing Framework group at IBM Corp. in Research Triangle Park, N.C. The Network Computing Framework is a joint undertaking of IBM, Netscape, Oracle, and Sun to enable open application solutions based on Java and Internet standards. (mlumsden@us.ibm.com)

Mark Mine (Ph.D. 1997) is at Disney Imagineering in Glendale, Calif. He and his wife recently had their second child (see "[Family matters](#)"). (mine@wdi.disney.com)

Mark Moir (Ph.D. 1996), an assistant professor at the University of Pittsburgh, won a National Science Foundation CAREER Award in March. (moir@cs.pitt.edu)

Bill Oliver (M.S. 1990) was chosen as one of Federal Computer Week's 100 most influential Federal Information Technology Professionals for 1997 (see <http://www.fcw.com/pubs/fed100/1997/5fed.htm#oliver>). (oliver@cs.unc.edu)

Injong Rhee (Ph.D. 1994) has joined N.C. State's Department of Computer Science as an assistant professor. His primary research area is distributed systems, and he is teaching a special topic course in that area this fall (<http://www.csc.ncsu.edu/eos/users/r/rhee/WWW/>). (rhee@csc.ncsu.edu)

Mary Szymkowski (M.S. 1991) is designing and implementing an electronic medical records system for the College of Veterinary Medicine at N.C. State. She, her husband Lindsey C. Puryear, and Sylvester Price, DVM, are working on an independent Web project to allow North Carolina veterinarians to request current cancer treatment protocols. Mary also is serving on the planning committee for the next convention of the American Veterinary Medical Association's Veterinary Informatics Symposium. During the summer she worked as a consultant for ABB in Raleigh, N.C. (lcpjr@worldnet.att.net)

Raymond Van Dyke (M.S. 1989, J.D. 1990) is a patent attorney in the firm of Jenkins and Gilchrist in Dallas, Texas, where he deals with computer litigation and patent and trademark procurement. He recently presented a paper and spoke at a New York Intellectual Property Law Symposium on software patenting issues. (vandyke@jenkens.com)

Undergraduate alumni news

Cindy Hong (B.S. Math Sciences, 1996) is a software engineer at Tivoli Systems, an independent business unit of IBM Corp. that produces enterprise systems-management software. Currently, she is designing Java user interfaces for development tools. (cindy_hong@tivoli.com)

Elliot Poger (B.S. Applied Sciences 1995) is completing an M.Sc. in Electrical Engineering at Stanford University. He is working with Mary G. Baker on mobile/wireless networking. They have a paper, "Secure Public Internet Access Handler (SPINACH)," appearing at the USENIX Symposium on Internet Technologies and Systems, which takes place 8-11 December 1997, in Monterey, Calif.

Former faculty news

James Foley, former assistant professor, was presented the 1997 Steven A. Coons Award for Outstanding Creative Contributions to Computer Graphics at ACM SIGGRAPH '97 in Los Angeles, Calif., in August. He received the award for his "strong and sustained leadership in computer graphics education and research, and for his dedication to the profession through books and his work with ACM/SIGGRAPH and ACM publications" (*Proc. SIGGRAPH '97*, 10).

Currently, Jim is executive vice president of the Mitsubishi Electric Research Laboratory (MERL) in Cambridge, Mass. He began his academic career in 1970 on our faculty. His reference texts on computer graphics, written with Andries van Dam of Brown University and others, have introduced countless students to the field of computer graphics and have been translated into several languages.

Dan Pitt, former adjunct associate professor, recently left Hewlett-Packard Laboratories where he was a program scientist. He has joined Bay Networks in Santa Clara, Calif., where he is vice president and founding director of the Bay Architecture Lab. The lab, which has facilities in Santa Clara, Boston, and Research Triangle Park, will develop company-wide architectures and future technologies. (pitt@baynetworks.com)

Alumni and friends on line

Visit the Alumni home page at <http://www.cs.unc.edu/People/Alumni/> and check out the Alumni Directory to find out what many of your former classmates are up to now. Please use the on-line registration form to add your own entry!

Our Friends Directory is ready to accept entries. We invite our former faculty, staff, and colleagues to visit the page at <http://www.cs.unc.edu/People/Friends/> and to fill out the registration form.

Family matters

Sophie Hannah Bell was born on 21 May in Columbia, Md., to Andrew Bell (M.S. 1991) and Leslie Bell. She has an older brother, Nathan, who is three.

Jennifer Nirmala Bharrat was born on 12 September at Mountain-side Hospital, N.J., to Shaun Bharrat (M.S. 1994) and D. J. Bharrat. She has an older brother, Michael, who is four.

Trisha Chadha Datta was born on 27 April in New Brunswick, N.J., to Arindam Datta and Ritu Chadha (Ph.D. 1991).

James William McInnes Gallmeister was born on 9 September in Stanford, Calif., to Bill Gallmeister (M.S. 1988) and Eleanor Gallmeister. He has a brother, Ian, who is four.

Eliza Graves (M.S. 1995) and **Chris Tector** were married on 25 October in Pittsboro, N.C.

Duncan Robert Hemminger was born on 14 March in Chapel Hill, N.C., to Brad Hemminger (M.S. 1985) and Pam Hemminger. He has three siblings, Adam, Brian, and Caroline.

Aninda Manocha was born on 21 August in Chapel Hill, N.C., to Dinesh Manocha and Ming C. Lin.

Georgia Ruth McRae was born on 2 July in Chapel Hill, N.C., to Sam and Lori McRae.

Lia Socorro Mine was born on 18 July in Glendale, Calif., to Mark Mine (Ph.D. 1997) and Sandra Mine. She has an older brother, Dylan, who is three.

Andrew Lachlan Nyland was born on 24 April in Chapel Hill, N.C., to Lars Nyland and Lauren Mills.

Daniel Poirier (M.S. 1991) and **Lisa Anne Ripperton** were married on 26 July in Chapel Hill, N.C.

Duncan Reed Yoon-Sang Rheingans-Yoo was born on 28 May in Oxford, Miss., to Terry Yoo (Ph.D. 1996) and Penny Rheingans (Ph.D. 1993). He has an older brother, Ross, who is three.

Hera Lynn Scher-Zagier was born on 25 October in Chapel Hill, N.C., to Alan and Ellen Scher Zagier. She has an older brother, Jonah, who is two.

Justin Scott Stolle was born on 16 July in Chapel Hill, N.C., to Scott and Carrie Stolle.

Kristie Weisner and **Steve Schmidt** were married on 1 March in Chatham Co., N.C.

Katherine Rebekah Westover was born on 8 May in Durham, N.C., to Lee Westover (Ph.D. 1991) and Rebekah Bierly Westover. She has an older brother, James Lee, who is four.



Steve Weiss wins teaching awards

Congratulations to **Steve Weiss**, professor and chairman, who was honored with two prestigious teaching awards this year.

In April, Steve was the UNC-Chapel Hill recipient of the **UNC Board of Governor's Award for Excellence in Teaching**. Sixteen people--one from each of the 16 schools in the University of North Carolina system--are honored with this award each year. The Board of Governors established the award to "underscore the importance of teaching and to encourage, identify, recognize, reward, and support good teaching within the University."

Steve and other winners received their awards on 11 April in an elaborate formal ceremony at the Board of Governors' meeting, held at the George Watts Hill Alumni Center in Chapel Hill. Each received a bronze medal, which was hung around his or her neck by UNC system president C. D. Spangler, Jr., and each received a cash award of \$7,500.

In October, Steve was named **North Carolina's 1997 Professor of the Year** by two prestigious national organizations: the Council for Advancement and Support of Education (CASE) in Washington, D.C., and the Carnegie Foundation for the Advancement of Teaching in Princeton, N.J. Steve is one of 50 award winners; a winner is named for 48 states, the District of Columbia and the Virgin Islands. The Professor of the Year honor recognizes excellence in undergraduate teaching. Winners are chosen for their philosophies of teaching and from testimonials about their teaching from colleagues and students.

Steve became a nominee for the national award when he won the Board of Governors award. CASE and Carnegie chose him from 17 nominees at 14 N.C. colleges and universities. Winners must survive review by deans, professors, education writers, and representatives of government, foundations, and associations assembled by CASE, an international association of colleges, universities, and independent elementary and secondary schools. Also involved in the selection are former professors of the year and other education representatives assembled by the Carnegie Foundation, a policy center devoted to strengthening America's schools and colleges.

Mark Hutchinson of Durham, N.C., a 1981 graduate of UNC-Chapel Hill who took several of Steve's courses, helped to nominate him for the national award. A computer software instructor, Mark considers Steve his teaching role model. "Dr. Weiss infused all his classes with enthusiasm," Mark says. "He was always energetic and eager to present the material. His enthusiasm excited students and imbued them with a desire to learn."

Don Stanat, professor emeritus, who has worked with Steve for 25 years, also helped to nominate him for the award.

"I've always been impressed by how he prepares for class," Don says. "I don't think he ever goes into a class without something up his sleeve."

A former student of Steve's once recalled to Don that Steve taught them how to count in hexadecimal using little Valentine candy hearts--on Valentine's Day.

Steve tries to pique students' curiosity about concepts before he gets to the bottom line. "I try to motivate them to want to know things before I teach them." And besides that, "I'm always looking for analogies," he says. "Things they already know."

Building a bridge from what students already know to complexities they must learn is one of the trademarks of Steve's teaching. He may explain academic concepts with quips from the cartoon characters Rocky and Bullwinkle. "I've always been a big fan of theirs," he says. Or he may come to class in a chef's hat. "There are four basic building blocks of programs," he tells the students. "You know all these from cooking."

"He isn't only a good teacher who works hard at it," Don says. "He's also very concerned for students and how they are being taught."

Steve doesn't see teaching as work at all. "Teaching is one of the most fun things I do," he says. "I figure if they see this guy up front having a good time, then this must be a fun thing to do." He says also, "One of the things I enjoy most is standing up in front of people and making them laugh, and trying to teach them something."

Steve has been recognized for teaching excellence before, by a UNC-Chapel Hill Tanner Award in 1983 and by our Computer Science Students Association teaching award in 1994-1995.

Research highlights

Hardware lab dedicated

On 21 October, we dedicated our newest lab, the Hardware Systems Teaching Laboratory, in a ceremony and reception in Sitterson Hall, attended by more than 100 Department personnel and special guests. **Steve Weiss**, professor and chairman, welcomed the attendees. UNC-Chapel Hill Chancellor **Michael Hooker** praised the Department for its achievements and encouraged us to develop an undergraduate curriculum in computer science. **Risa Palm**, dean of the College of Arts and Sciences, also praised our accomplishments and our award-winning faculty. Associate Professor **Gary Bishop** (Ph.D. 1984), who is leading our effort to develop hardware courses, discussed our past research and future plans, and described the lab's facilities and capabilities. Gary, Steve, and Dean Palm cut the ribbon to declare the lab open. The "ribbon" was actually a piece of ribbon cable with a bow tied around it! Visitors had the opportunity to tour the lab, and to examine chips, boards, and other hardware that our Department has produced during the past 15 years.

Although only just dedicated, the Hardware Systems Teaching Lab has been in use since the start of the semester. Gary and **Vernon Chi**, Microelectronic Systems Lab (MSL) director, and other members of the MSL are teaching our first hardware course, "Elements of Hardware Systems," this fall. The introductory course is designed to acquaint students with little or no previous hardware background with the issues and practice of information processing hardware systems, with the goal of enabling them to be effective members of design teams. Gary and his MSL colleagues will be developing additional hardware courses in the future.

The lab offers specialized utilities, including grounding, static control, compressed air, vacuum, and isolated power, and is equipped with the necessary instruments and tools for hands-on experimentation with components, circuits, transducers, and integration of entire systems. It contains both workbench and conference space, and is intended to accommodate both individual and team experiments, as well as systems design projects. Vern reports that we intend to continue to equip the lab with the latest analytical and fabrication technologies in order for students to have the best reasonable access to current technology.



Chancellor Michael Hooker gets a close-up look at the work of students Tom Hudson (left) and Kori Needham in our new Hardware Systems Teaching Lab. Photo by Ted Richardson.

IBM Corp. gives gifts for Internet research

Three of our faculty received gifts totaling \$120,000 from International Business Machines Corp. (IBM) to conduct research on Internet and World Wide Web technology. **Kevin Jeffay**, associate professor, **Don Smith** (Ph.D. 1978), research professor, and **John B. Smith**, professor, were awarded the funds through IBM's University Partnership Program, whose aim is to encourage collaborations between university researchers and IBM technical professionals. IBM provides the awards of cash and equipment to recognize the quality of the selected research programs and their importance to the computer industry.

Kevin and Don are developing methods to regulate the flow of data traffic through the Internet in order to reduce the effects of congestion. In much the same way that good designs for highway traffic signals and intersections can improve rush-hour travel times, these new methods for controlling data congestion on the Internet can improve the time it takes users to access data. The technology they are developing will help to enable the transmission of time-sensitive media, such as live audio and video, over the Internet for videoconferencing, distributed virtual environments, distance learning, and other applications.

John is working with Don and with graduate students **Qian Li** and **Yufei Qian**, to build a system that is compatible with the Web and that will allow users to create and to modify documents directly, to work collaboratively, and to reorganize their data without breaking Web links among them. The system is written in Java and provides long-term storage of Java objects for different kinds of data.

1997-98 alumni fellow

Steve Goddard (M.S. 1995) is the recipient of the seventh annual Department Alumni fellowship for the 1997-98 academic year. The award is supported by the Alumni Trust Fund and is given to Ph.D. candidates in their final year of study, allowing them to work full time on dissertation research.

Steve is working on his dissertation, "An Analysis of the Real-Time Properties of a Distributed Dataflow Paradigm for Signal Processing Applications," under the guidance of **Kevin Jeffay**. Dataflow models, such as the U.S. Navy's Processing Graph Method (PGM), are frequently used in the description and development of signal processing programs. Although the Navy has spent millions of dollars developing PGM graphs, system engineers have not been able to evaluate analytically the real-time properties of these applications (previous verification techniques consisted of simulation or field testing). Steve is developing the theory necessary to perform system-level analyses of real-time properties such as schedulability, end-to-end latency, and memory requirements of PGM graphs. His research uses PGM as the underlying dataflow model, but his results are not restricted to PGM graphs and can be applied to most other dataflow paradigms. See "[Recent publications](#)" for Steve's recent research papers.

Collaboration Bus

Prasun Dewan, associate professor, **Jonathan Munson** (Ph.D. 1997), visiting researcher, and other colleagues are working on a new software abstraction, called the Collaboration Bus, that makes it easy to compose new collaborative systems from existing single-user and collaborative systems. The bus will be an extensible infrastructure that provides general definitions of collaboration services, default implementations of these services, rules for interconnecting these services, and mechanisms for extending the set of supported services. It will offer both inter- and intra-service interoperability. (<http://www.cs.unc.edu/Research/cb.html>)

DISCO project

Doug L. Hoffman, research assistant professor, **Vernon L. Chi**, MSL director, **Raj K. Singh**, adjunct associate professor, **Lynne Cohen Duncan**, systems programmer, and **Bruce W. Erickson** of the Department of Chemistry at UNC-Chapel Hill are working on the Dihedral Sequence COMparison (DISCO) project. They are working to address the problems molecular biologists and de novo protein designers encounter when comparing protein three-dimensional structures. They plan to build an effective, robust, and fast analysis tool for searching protein primary and tertiary structure databases for similar proteins. The need for such a search engine is motivated by the large and growing sizes of protein sequence and 3D structure databases.

nanoManipulator

Russell M. Taylor, II (Ph.D. 1994), research assistant professor, reports that the nanoWorkbench display ([see photo](#)) has come on-line for the nanoManipulator project. This device adds force feedback to a stereographic, head-tracked display to produce the illusion of objects floating in space that can be both seen and touched. The display comes close to our ideal interface for a scanned-probe microscope by allowing the scientist to forget the technology and to concentrate instead on examining and modifying the surface itself.

(<http://www.cs.unc.edu/Research/nano>)

Honors and praise for young faculty's research

Stephen R. Aylward (Ph.D. 1997), adjunct assistant professor, received an honorable mention for the Francois Erbsmann Award at the 1997 Information Processing and Medical Imaging Conference in June, in Poultney, Vt. Stephen also developed VTree 3D, a semi-automated system for extracting representations of tubular objects such as vessels, bones, or airways, in 3D medical images and displaying those objects from any point of view that the user can choose interactively. The system is useful for neurosurgical planning. One of its strengths is its ability to run on standard PCs rather than on larger, more expensive models.

Ming C. Lin, assistant professor (1/1/98), was one of only eleven computer scientists and engineers in the U.S. to be awarded a Honda Research Initiation Grant this fall for her project, "Interactive Geometric Algorithms for Virtual Prototyping." Ming is developing efficient collision-detection algorithms for use in virtual prototyping applications.

Testimony on telepresence

Henry Fuchs, Federico Gil professor, was one of four university faculty invited to speak at the U.S. Senate Subcommittee Hearing on Telepresence on 30 April in Washington, D.C. The Subcommittee on Science, Technology, and Space, of the Senate Committee on Commerce, Science, and Transportation, requested testimony on the technology and applications of telepresence. Telepresence involves the acquisition of visual information about a real place that is distant or inaccessible, and the presentation of that information using an image-generation computer, a display device, and a head position tracker.

Henry described our current research in telepresence applications to education and medicine, including current augmented-reality work for breast biopsies and laparoscopies, and planned future work in teleconsultation and remote training. He showed the HiBall tracker and a lightweight head-mounted display to the committee. He also discussed some of the technological problems that still need to be solved.

Recent conferences

SIGGRAPH '97

Approximately 55 faculty, students, and staff attended ACM SIGGRAPH '97 in Los Angeles, Calif., from 3-8 August. UNC-Chapel Hill had a booth in the "Electric Garden," the conference's

exhibit of new and emerging technologies. We demonstrated our work in advanced technologies for virtual environments by showing interactive demos of a power plant walk-through and the nanoManipulator. We also exhibited the wide-angle, high-resolution camera cluster image capture device, the HiBall wide area tracker, a PixelFlow board, and the ultralight video see-through head-mounted display.

Mary C. Whitton, research assistant professor and project manager for virtual environments research, who coordinated the booth, reports that our goal was to raise awareness of the breadth and depth of our virtual environments work, and that visitors had a very positive response.

PixelFlow was also represented by the Visualize PxFI graphics system, which was recently developed at Hewlett-Packard Corp.'s (HP) Chapel Hill Graphics Lab. The system, which had its first public showing at HP's booth, is based on PixelFlow technology and is billed as the fastest 3D graphics system in the world. A live feed from HP's booth to our booth showed demos of bump mapping, reflection mapping, shadows, dynamic particle systems, and up to 44 million polygons per second, using a 36-board system.

Our researchers presented four papers (see ["Recent publications"](#)). Authors included **Gary Bishop** (Ph.D. 1984), associate professor, **Frederick P. Brooks, Jr.**, Kenan professor, **Dinesh Manocha**, associate professor (1/1/98), **Gregory F. Welch** (Ph.D. 1997), research assistant professor, and graduate students **Carl Erikson** (M.S. 1996), **Kenneth Hoff, III**, **Tom Hudson** (M.S. 1997), **David Luebke**, **Mark Mine** (Ph.D. 1997), and **Hansong Zhang**. Fred also chaired a paper session on "Virtual Reality and Applications." Greg reports that, as a result of his and Gary's paper, several commercial tracking companies are looking at applying their method to their tracking systems.

Henry Fuchs, Federico Gil professor, **Anselmo Lastra**, research associate professor, **Russell M. Taylor, II** (Ph.D. 1994), research assistant professor, **Hans Weber**, graduate student, and others gave a course on "Programming Virtual Worlds." **Dinesh Manocha**, **Turner Whitted**, research professor, and **Jonathan Cohen** (M.S. 1994), graduate student, and others co-taught a full-day course on "Interactive Walk-Through of Complex Environments." Turner was the conference's papers chair.

Many of our alumni also attended the conference. Those who presented papers, participated in panels, and taught courses include **John Airey** (Ph.D. 1990) of Silicon Graphics; **Ron Azuma** (Ph.D. 1995) of Hughes Research Labs; **Andrew Glassner** (Ph.D. 1988) of Microsoft Research; **Vicky Interrante** (Ph.D. 1996) of the Institute for Computer Applications in Science and Engineering; **Marc Levoy** (Ph.D. 1989) of Stanford University; **Leonard McMillan** (Ph.D. 1997) of MIT; **Pete Litwinowicz** (M.S. 1987) of Mass Illusions; **Penny Rheingans** (Ph.D. 1993) of the University of Mississippi; **Greg Turk** (Ph.D. 1992) of Georgia Tech, and **Amitabh Varshney** (Ph.D. 1994) of SUNY-Stony Brook.

Current and former faculty, staff, and students renewed acquaintances at the annual UNC-Chapel Hill Graphics Reunion. About 140 people attended the event at Ciao Trattoria on 6 August.



Henry Fuchs helps his father Morton to use the nanoWorkbench at SIGGRAPH '97, as physics graduate student Atsuko Negishi looks on. Photo by Sherry Palmer.

1997 Graphics hardware workshop

UNC-Chapel Hill had a strong presence at the SIGGRAPH/Eurographics Workshop on Graphics Hardware, which took place prior to the larger SIGGRAPH conference from 3-4 August in Los Angeles. **Steve Molnar** (Ph.D. 1991), adjunct assistant professor, was co-chair of the program committee, and alumnus **Ulrich Neumann** (Ph.D. 1993) of the University of Southern California was local arrangements chair. **Henry Fuchs** gave the keynote address. Our researchers presented four papers (see "[Recent publications](#)"). Steve reports that the workshop was very successful and had nearly twice the attendance of previous hardware workshops.

RTAS '97

Kevin Jeffay, associate professor, was the general chair and **James Anderson**, associate professor, was treasurer of the Third IEEE Real-time Technology and Applications Symposium held in Montreal, Canada, from 9-11 June. The symposium is a major forum for the discussion and evaluation of emerging principles and practices underlying real-time system development. **Steve Goddard** (M.S. 1995), graduate student, presented a paper he co-wrote with Kevin.

IEEE Sixth Workshop on Enabling Technologies

Michael V. Capps (M.S. 1996), currently a student at MIT, and **David Stotts**, associate professor, co-organized a workshop on distributed system support for shared virtual reality systems at IEEE's Sixth Workshop on Enabling Technologies, held at MIT in Cambridge, Mass., from 18-20 June 1997. Michael co-authored the workshop report with David and a paper with **Seth Teller** of MIT ([see "Alumni news"](#)). **Michael Meehan** (M.S. 1997), graduate student, gave a presentation on "Interoperable Collaborative Virtual Environments." Students **Tom Hudson** (M.S. 1997) and **Brian Ladd** served as additional reviewers.

On the bus . . .

Prasun Dewan, associate professor, was one of 29 faculty at UNC-Chapel Hill to travel on the first week-long Tar Heel Bus Tour in May. UNC-Chapel Hill Chancellor **Michael Hooker** organized the bus tour to give professors who are new to North Carolina some insight into the

state's history, culture, business, politics, and traditions, so they may better understand the environment from which many of their undergraduate students come. Tour stops included schools, a correctional facility, a mountain craft center, a barbecue restaurant, hog and tobacco farms, and high-tech companies.

Internet 2

This spring a partnership of industry, government, and educational institutions in the Triangle launched an OC-48 (2.4-gigabits/second) network to serve as a platform for the nation's first implementation of Internet 2 architecture. Internet 2 is designed to provide research and educational institutions with next-generation inter-networking and to better serve traffic requirements by creating a high capacity point-of-presence (GigaPOP). MCNC and three Triangle universities (Duke, N.C. State, and UNC-Chapel Hill) are now connected via the network. Our Multimedia Networking Lab is the network's UNC-Chapel Hill point of presence.

Swiss sabbatical for Jan Prins

Jan F. Prins, associate professor spent the 1996-97 academic year at ETH in Zurich, Switzerland. Jan worked to implement techniques for the efficient execution of irregular parallel computations. He was able to achieve world-record performance using the NEC SX-4, and ETH's other parallel super-computers. He also taught a class on parallel computing. Jan was hosted by **Jay Nievergelt**, a former professor and chair of our Department.

Successful STC site visit

At the end of July, representatives from all five universities in the National Science Foundation's (NSF) Science and Technology Center for Computer Graphics and Scientific Visualization (STC) gathered at the University of Utah in Salt Lake City for a site visit to determine future funding. The event went extremely well: the review panel recommended that NSF should continue to fund the STC and to grant the modest increases the sites requested. The universities that comprise the STC are Brown, Caltech, Cornell, UNC-Chapel Hill, and Utah.

1997-98 Distinguished lecturer series

The Triangle Computer Science Distinguished Lecturer Series is organized and hosted by the computer science departments at UNC-Chapel Hill, Duke, and N.C. State, and is made possible by a grant from the U.S. Army Research Office. The speakers are:

20 October 1997

Host: Duke

Seth Teller, Massachusetts Institute of Technology
"City Scanning: Automatic Acquisition of Textured 3D Geometric Models of Urban Environments"

3 November 1997

Host: Duke

Avi Silberschatz, Bell Laboratories
"Next Generation Information Systems"

17 November 1997

Host: N.C. State

John Reynolds, Carnegie Mellon University
"Can Programs be both Correct and Efficient? Typing and Specification for Low-level Programming"

Languages"

- 2 February 1998
Host: UNC-CH **James W. Demme**¹, University of California at Berkeley
"Recent Advances in High Performance Linear Algebra"
- 16 February 1998
Host: N.C. State **Krithi Ramamritham**, University of Massachusetts
"Building Virtual Warehouses using Workflows and the Web"
- 30 March 1998
Host: UNC-CH **Ken Kennedy**, Rice University
"Interprocedural Compilation: Algorithms and Applications"
- 13 April 1998
Host: Duke **Jean-Claude Latombe**, Stanford University
"Randomized Path Planning: Algorithms, Analysis, and Applications"
- 27 April 1998
Host: UNC-CH **Pat Hanrahan**, Stanford University
Title to be announced

All talks take place at 4:00 p.m. on Mondays on the dates indicated, and can be viewed in 011 Sitterson Hall, UNC-Chapel Hill. For directions, abstracts, and biographies, please see <http://www.cs.unc.edu/Info/Events/DistLectures/>

New contracts and grants

Gary Bishop, associate professor, and **Vernon L. Chi**, MSL director, jointly with Hughes Defense Systems, Hughes Research Labs, and the University of Southern California. "Geospatial Registration of Information for Dismounted Soldiers (GRIDS)," Defense Advanced Research Projects Agency (DARPA).

Siddhartha Chatterjee, assistant professor. "Irregular Parallel Algorithms: Expression, Compilation, and Performance," National Science Foundation (NSF).

Siddhartha Chatterjee, jointly with **Kishor S. Trivedi**, **John A. Board, Jr.**, **Alvin R. Lebeck**, and **Xiaobai Sun** of Duke University. "TUNE: System Support for Memory-Friendly Programming," NSF.

Vernon L. Chi. "Finding Similar Folds Between Three-Dimensional Protein Structures by Dihedral Sequence Comparison," NSF.

Henry Fuchs, Federico Gil professor, and **Nick England**, research professor. "Three Applications of Digital Light Projection for Tiled Display and 3-D Scene Capture," Office of Naval Research (ONR) and DARPA.

Ming C. Lin, assistant professor (1/1/98). "Interactive Geometric Algorithms for Virtual Prototyping," Honda.

Ming C. Lin. "Dynamic Simulation and Navigation for Virtual Environments," U.S. Army Research Office.

Dinesh Manocha, associate professor (1/1/98). "Virtual Reality Stations," ONR.

Recent publications

Aliaga, D. G. "Virtual Objects in the Real World," *Communications of the ACM*, 40(3), March 1997, 49-54.

Anderson, B., R. MacAulay, A. Stewart, and T. Whitted. "Accommodating Memory Latency in a Low-Cost Rasterizer," *Proc. 1997 ACM SIGGRAPH/Eurographics Workshop on Graphics Hardware*, Los Angeles, Calif., 3-4 August 1997, 97-102.

Anderson, J., R. Jain, and S. Ramamurthy. "Implementing Hard Real-Time Transactions on Multiprocessors," *Real-Time Database and Information Systems: Research Advances*, A. Bestavros and V. Fay-Wolfe, eds., Kluwer Academic Publishers: Norwell, Mass., September 1997, 247- 260.

Anderson, J., S. Ramamurthy, and R. Jain. "Implementing Wait-Free Objects on Priority-Based Systems," *Proc. 16th Annual ACM Symposium on Principles of Distributed Computing*, August 1997, 229-238.

Anderson, J. H., S. Ramamurthy, and K. Jeffay. "Real-Time Computing with Lock-Free Shared Objects," *ACM Transactions on Computer Systems*, 15(2), May 1997, 134-165.

Aylward, S., and S. M. Pizer. "Continuous Gaussian Mixture Modeling," *Proc. 1997 Conference on Information Processing in Medical Imaging*, June 1997, 176-189. (Honorable Mention, Erbsmann Award).

Baruah, S., S. Goddard, and K. Jeffay. "Feasibility Concerns in PGM Graphs with Bounded Buffers," *Proc. Third IEEE International Conference on Engineering of Complex Computer Systems*, Como, Italy, September 1997, 130-139.

Bastos, R., M. Goslin, and H. Zhang. "Efficient Radiosity Rendering using Textures and Bicubic Reconstruction," *Proc. 1997 ACM Symposium on Interactive 3D Graphics*, April 1997, 71-74.

Bullitt, E., A. Liu, S. Aylward, M. Soltys, J. R. Rosenman, and S. M. Pizer. "Methods for Displaying Intracerebral Vascular Anatomy," *Journal of Neuroscience Methods*, Vol. 18, 1997, 417-420.

Chatterjee, S., M. Paramasivam, and W. J. Yakowenko. "Architecture for a Web-Accessible Simulation Environment," *IEEE Computer*, 30(6), June 1997, 88-91.

Cutts, M. "An Introduction to the GIMP," *Crossroads: The ACM Student Magazine*, Summer 1997, 28-30.

Dally, W. J., and J. Poulton. "Transmitter Equalization for 4-GBPS Signaling," *IEEE Micro*, January/February 1997, 48-56.

Eyles, J., S. Molnar, J. Poulton, T. Greer, A. Lastra, N. England, and L. Westover. "PixelFlow: The Realization," *Proc. 1997 ACM SIGGRAPH/Eurographics Workshop on Graphics Hardware*, Los Angeles, Calif., 3-4 August 1997, 57-68.

Falvo, M. R., G. J. Clary, R. M. Taylor, II, V. Chi, F. P. Brooks, Jr., S. Washburn, and R. Superfine. "Bending and Buckling of Carbon Nanotubes Under Large Strain," *Nature*, Vol. 389, October 1997, 582-584 (cover story).

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Goddard, S., and K. Jeffay. "Analyzing the Real-Time Properties of a Dataflow Execution Paradigm Using a Synthetic Aperture Radar Application," *Proc. Third IEEE Real-Time Technology and Applications Symposium*, Montreal, Canada, June 1997, 60-71.

Goddard, S., S. Kumar, and J. Prins. "Connected Components Algorithms for Mesh-connected Parallel Computers," *Parallel Algorithms, Third DIMACS Implementation Challenge*, S. Bhatt, ed., DIMACS: Series in Discrete Mathematics and Theoretical Computer Science, Vol. 30, American Mathematical Society: Providence, R.I., 1997, 43-58.

Hoff, III, K. E. "Faster 3D Game Graphics by Not Drawing What is Not Seen," *Crossroads: The ACM Student Magazine*, Summer 1997, 20-23. Hudson, T., M. Lin, J. Cohen, S. Gottschalk, and

- D. Manocha. "V- COLLIDE: Accelerated Collision Detection for VRML," *Proc. VRML Conference*, 1997, 119-125.
- Hudson, T., D. Manocha, J. Cohen, M. Lin, K. Hoff, and H. Zhang. "Accelerated Occlusion Culling using Shadow Frusta," *Proc. ACM Symposium on Computational Geometry*, 1997, 1-10.
- Jeffay, K. "Technical and Educational Challenges For Real-Time Computing," *ACM Computing Surveys*, 28A(4), Dec. 1996 (<http://www.acm.org/pubs/contents/journals/surveys/1996-28/#4es>).
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- Krishnan, S., and D. Manocha. "An Efficient Surface Intersection Algorithm Based on the Lower Dimensional Formulation," *ACM Transactions on Graphics*, 16(1), 1997, 74-106.
- Kumar, S., D. Manocha, H. Zhang, and K. Hoff. "Accelerated Walkthrough of Large Spline Models," *Proc. 1997 ACM Symposium on Interactive 3D Graphics*, Providence, R.I., 27-30 April 1997, 91-102.
- Lake, A. "Introduction," *Crossroads: The ACM Student Magazine*, Summer 1997, 2.
- Lin, M. C. "Building Simulations for Virtual Environments and Prototyping," *Army Sciences and Technology* (Special Issue), July 1997. Also in *Proc. 20th Army Science Conference*, Virginia Beach, Va., June 1996, 331-335 (Best Paper Award).
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- Maly, K., H. Abdel-Wahab, C. M. Overstreet, C. Wild, A. Gupta, A. Youssef, E. Stoica, and E. Al-Shaer. "Distance Learning and Training Over Intranets," *IEEE Internet Computing*, 1(1), 1997, 60-71.
- Manocha, D., and S. Krishnan. "Algebraic Pruning: A Fast Technique for Curve and Surface Intersections," *Computer Aided Geometric Design*, Vol. 20, 1997, 1-23.
- Mark, W., L. McMillan, and G. Bishop. "Post-Rendering 3D Warping," *Proc. 1997 ACM Symposium on Interactive 3D Graphics*, Providence, R.I., 27-30 April 1997, 7-16.

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Munson, J., and P. Dewan. "Sync: A System for Mobile Collaborative Applications," *IEEE Computer*, 30(6), June 1997, 59-66.

Munson, P., and R. K. Singh. "Statistical Significance of Hierarchical Multi-body Potentials Based on Delaunay Tessellation and their Application in Sequence-Structure Alignment," *Protein Science*, 6(7), 1997, 1467-1481.

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Ponamgi, M., D. Manocha, and M. Lin. "Incremental Algorithms for Collision Detection Between Polygonal Models," *IEEE Trans. on Visualization and Computer Graphics*, 3(1), 1997, 51-67.

Poulton, J., W. Dally, and S. Tell. "A Tracking Clock Recovery Receiver for 4Gb/s Signalling," *Proc. IEEE Hot Interconnects V*, 21-23 August 1997, 157-169.

Rademacher, P. "Ray Tracing: Graphics for the Masses," *Crossroads: The ACM Student Magazine*, Summer 1997, 3-7.

Scher Zagier, E. J. "A Human's Eye View: Motion Blur and Frameless Rendering," *Crossroads: The ACM Student Magazine*, Summer 1997, 8-12.

Stankovic, J. A., A. Burns, K. Jeffay, M. Jones, G. Koob, I. Lee, J. Lehoczky, J. Liu, A. Mok, K. Ramamritham, J. Ready, L. Sha, and A. van Tilborg. "Strategic Directions in Real-Time and Embedded Systems," *ACM Computing Surveys*, 28(4), Dec. 1996, 751-763.

Sturzlinger, W., and R. Bastos. "Interactive Rendering of Globally Illuminated Glossy Scenes," *Proc. Eurographics Workshop on Rendering*, St. Etienne, France, June 1997, 93-102.

Welch, G., and G. Bishop. "SCAAT: Incremental Tracking with Incomplete Information," *Computer Graphics: Proc. ACM SIGGRAPH '97*, Los Angeles, Calif., 3-8 August 1997, 333-344.

Zhang, H., D. Manocha, T. Hudson, and K. E. Hoff, III. "Visibility Culling Using Hierarchical Occlusion Maps," *Computer Graphics: Proc. ACM SIGGRAPH '97*, Los Angeles, Calif., 3-8 August 1997, 77-88. Also Department of Computer Science technical report TR97-004, University of North Carolina, 1997.

In the media

The 23 June 1997 issue of *Business Week* lists our Graphics and Image lab among the best research labs in the information technology field. In "UNC: Tools to Manipulate Virtual Worlds" (p. 102), John Carey gives an overview of our graphics research. In the same issue, the article, "Stanford: Eggheads and Entrepreneurs" (p. 92) discusses research by alumnus **Marc Levoy** (Ph.D. 1989) and his colleagues.

"What's on the Frontier of 3-D Graphics?" *Electronic Engineering Times*, 16 June 1997 (p. 85-88), is an interview with **Steven Molnar** (Ph.D. 1991), adjunct assistant professor, about his view of 3D technology's future. Also mentioned are PixelFlow and its predecessors.

An article about SIGGRAPH '97, "Hand It to Them: University Labs are Taking the Lead in Applying Computer Graphics in Diverse Fields," by Karen Kaplan, *Los Angeles Times* (Monday, August 4, 1997): D1, D4, mentions the nanoManipulator.

In April, the Brazilian television show "Scientia" aired a feature on our augmented reality research.

A nanoManipulator image appears on the cover of *Schrodinger's Machines* by Gerard Milburn (Allen & Unwin Pty. Ltd., 1997).

"Actualité du Virtuel," a CD-ROM from the Centre Georges Pompidou, Musée National D'Art Moderne/Centre de Création Industrielle, includes footage of our nanoManipulator and 3D Modeler.

Congratulations to . . .

Frederick P. Brooks, Jr., Kenan professor, who was awarded the 1997 Sutherland Award by *CyberEdge Journal*, for his contributions to virtual reality research.

Siddhartha Chatterjee, assistant professor, who was appointed as associate editor for *ACM Transactions on Programming Languages and Systems* for a three-year term beginning in June.

James Coggins, associate professor and associate chair for academic affairs, who recently was presented with a citation for service and commitment to the Carolina Teaching Fellows Program.

Prasun Dewan, associate professor, and **Gyula Mago**, professor, winners of the 1996-97 Computer Science Students Association Teaching Award.

Henry Fuchs, Federico Gil professor, who recently was inducted into the American Academy of Arts and Sciences and the National Academy of Engineering.

Lori McRae, who was promoted to Computing Consultant I, effective 4 August.

David Plaisted, professor, who was listed in this year's *American Men and Women of Science*.

Jane Stine, who was promoted to Systems Programmer/Administrator II, effective 30 June.

Gregory F. Welch (Ph.D. 1997), who was reappointed as research assistant professor, effective 1 September.

Stephen F. Weiss, professor and chairman, who recently won two teaching awards ([see article](#)).

To those faculty whose appointments were renewed or who were promoted (effective date is in parenthesis):

John G. Eyles, adjunct assistant professor (1 September 1997).

Anselmo Lastra, research associate professor (1 May 1997).

Ming C. Lin, assistant professor (1 January 1998).

Dinesh Manocha, associate professor with tenure (1 January 1998).

Steven Molnar (Ph.D. 1991), adjunct assistant professor (1 September 1997).

Lars S. Nyland, research associate professor (1 May 1997).

Raj Singh, adjunct associate professor (1 October 1997).

Donald Stanat, professor emeritus (1 July 1997).

To those faculty and staff who attained the following level of State service between May and October:

30 years: Stephen M. Pizer, Donald F. Stanat
15 years: Katrina Coble, David Harrison,
Kye Hedlund, Frederic R. Jordan
10 years: Jan F. Prins, Brian White
5 years: Kurtis Keller, Dinesh Manocha, David Stotts

And to our recent graduates:

May 1997

Ph.D.: Stephen R. Aylward, Michael A. Bajura, Leonard McMillan, Jr., Terry M. Talley, Gregory F. Welch

M.S.: Sumedh Barde, Rui Bastos*, Jun Chen, Robert Grant, Thomas Hudson*, Hye Chung Kum*, Noel Llopis-Artime, Peter McMurry, Michael Meehan*, Bryon Nordquist, Shoji Okimoto, Andrew Thall*, Lei Wang, Kyle Wilson

(*on to Ph.D. at UNC-Chapel Hill)

B.S. (Math Sci. with C.S. Option): Matthew Abadie, Samuel Brodtkin, David Brown, Peter Carrubba, Steven Cotton, Joseph Dougherty, Henry Fu, John Greeson, II, Suzanne Mulzet, Todd Taft, Jeffrey Weiss, Dugald Wilson, Nan Xie

August 1997

Ph.D.: Mark R. Mine

Recent Ph.D. dissertation titles

Stephen R. Aylward. "Continuous Gaussian Mixture Modeling via Gaussian Goodness-of-Fit Cores" (advisor: James M. Coggins).

Michael A. Bajura. "Merging Real and Virtual Environments with Video See-Through Head-Mounted Displays" (Henry Fuchs).

Leonard McMillan, Jr. "An Image-Based Approach to Three-Dimensional Computer Graphics" (Gary Bishop).

Mark R. Mine. "Exploiting Proprioception in Virtual-Environment Interaction" (Frederick P. Brooks, Jr.).

Terry M. Talley. "A Transmission Control Framework for Continuous Media" (Kevin Jeffay).

Gregory F. Welch. "SCAAT: Incremental Tracking with Incomplete Information" (Gary Bishop).

Fellowships and special assistantships

These students received the following special awards during the 1997-98 academic year:

Alexandra Bokinsky	National Science Foundation (NSF) Fellowship
Jessica Crawford	Lucent Technologies Fellowship
Stephen Goddard	Department Alumni Fellowship
Mave Houston	Lucent Technologies Grant
Rohit Jain	Graduate School, Board of Governors Fellowship
Eric Larsen	Graduate School, Allocated Merit Assistantship
Mark Livingston	LINK Fellowship
Benjamin Lok	NSF Fellowship
David Ott	Graduate School, Board of Governors Fellowship
Mark Parris	Intel Fellowship
Sujuan Upshaw	National Physical Sciences Consortium (NPSC) Fellowship
Nicholas Vallidis	Graduate School, Competitive Merit Assistantship
Hans Weber	Graduate School, Doctoral Dissertation Fellowship
Andrew Wilson	Humphreys Fellowship
Chris Wynn	National Consortium for Graduate Degrees for Minorities in Engineering Fellowship
Hansong Zhang	Silicon Graphics Fellowship

These awards were renewed:

Rui Bastos	Brazilian Government Fellowship (4th year)
Eric Baker	NPSC Fellowship (2nd year)
Dennis Brown	NSF Fellowship (2nd year)
Michele Clark	NSF Fellowship (2nd year)
George Greene	Ford Fellowship (3rd year)
John Keyser	Office of Naval Research Fellowship (3rd year)
Luiz Lima	PETROBRAS Fellowship (2nd year)
David Luebke	IBM Fellowship (3rd year)
Kori Needham	AT&T/Bell Labs Fellowship and Ford Fellowship (2nd year)
Manuel Oliveira-Neto	Brazilian Government Fellowship (3rd year)
Anshu Sharma	Graduate School, Board of Governors Fellowship (2nd year)

Special visitors

We continue to receive many visitors from the general public and research communities. More than 600 people visited us between January and October for lab tours and demos. Many others visited to present talks or to meet with our researchers. Some of our recent special visitors include:

Several European journalists and researchers from Hewlett-Packard Corp. visited on 13 June for lab tours and demos of graphics and distributed systems research.

Kamal Abdali of the National Science Foundation visited on 25 September. Dinesh Manocha was his host.

Ruzena Bajcsy of the University of Pennsylvania visited on 21 April and gave a talk as part of the Triangle Computer Science Distinguished Lecturer Series. Henry Fuchs was her host.

Tim Berg of Sandia International Labs visited the Graphics and Image Lab on 19 June. Fred Brooks was his host.

Fausto Bernardini of IBM Corp.'s T. J. Watson Research Center gave a talk on 8 September. Dave Luebke was his host.

Randolph Blake of Vanderbilt University visited at the end of March and gave two talks for the Cognitive Science Lecture Series. Jonathan Marshall was his host.

John Canny of the University of California at Berkeley spent a short sabbatical here in April. He gave a colloquium and spoke at Graphics Lunch. Dinesh Manocha was his host.

Luca Cardelli of the Systems Research Center at Digital Equipment Corp. visited on 29 April as part of the Triangle Computer Science Distinguished Lecturer Series. He presented a talk at N.C. State on 28 April.

Gunner Danneels of Intel Corp.'s Architecture Labs in Hillsboro, Ore., visited the DiRT group on 30 June to discuss the ProShare on the Internet project. Kevin Jeffay was his host.

Representatives from **Engineering Animation, Inc.**, visited on 27 March and spoke at Graphics Lunch about their company's work.

John R. Gilbert of Xerox Palo Alto Research Center visited us from 31 March to 4 April as a Hanes-Willis visiting professor. He taught a short course on "Sparse Matrix Computation" and presented a talk. Siddhartha Chatterjee was his host.

Ephraim Katzir, internationally-known chemist (now retired) and former president of Israel, visited on 25 September for a tour and demos.

Doug Kubel of Interactive Magic visited on 31 March and gave a lecture on PC-based flight simulation for entertainment. Gregory F. Welch was his host.

Bryan Morse (Ph.D. 1995) of Brigham Young University met with the image analysis group and presented a talk on 6 August.

Ethan V. Munson of the University of Wisconsin-Milwaukee visited on 23 April and gave a talk. Dinesh Manocha was his host.

Risa Palm, the new dean of the College of Arts and Sciences at UNC-Chapel Hill, visited us on 15 September for a tour and demos. She also was our guest at Faculty Lunch on 31 October. Steve Weiss was her host.

Jerry Pechanek, **Nikos Pitsianis**, and **David Strube** of BOPS, Inc. visited on 4 September and displayed some 3D graphics on their Manifold Array architecture at Graphics Lunch.

George Rouskas of N.C. State University gave a colloquium on 12 May as part of the Triangle Collaborative Seminar series. Don Smith was his host.

W. Brent Seales of the University of Kentucky visited on 23 June and gave a colloquium. Henry Fuchs and Gregory F. Welch were his hosts.

Shinji Uchiyama and **Hiroyuki Yamamoto** of Mixed Reality Systems Laboratory, Inc. in Yokohama, Japan visited on 8 September. Henry Fuchs and Gregory F. Welch were their hosts.

David Zeltzer of Sarnoff Corp. visited on 29 September to present a talk. He was given a tour and demos in the Graphics and Image Lab. Henry Fuchs and Gregory F. Welch were his hosts.

Computer Services news

Migrating software off DEC's

During spring and summer 1997, **John Sopko**, systems programmer, continued migrating software off of our old DEC Ultrix servers and onto new Sun servers running the latest version of Sun's Solaris operating system and Transarc's AFS software. At this point, all AFS file systems have been moved off departmental DEC servers, and only a few NFS partitions remain. These moves will take place before the spring. Once the remaining NFS file systems have been moved, the only function the DEC servers will handle is file service for DEC workstation clients.

HP computers upgraded

In summer 1997, we upgraded the Department's HP systems to HP/UX version 10.20. This version of the operating system, which requires more space on the local disk, was needed for PixelFlow research and to get the HPs up to the manufacturer's current operating system level.

Mac lab becomes PC lab

Frederic R. Jordan, electronic shop supervisor, and **Mike Stone**, electronics technician, recently sent to surplus much old equipment, including the Macintosh Classic II systems, printers, and carrels that were in the Macintosh Lab. **David Musick**, network coordinator, handled rewiring the lab and connecting it to the building's FDDI ring. Fred and others worked to get the room recarpeted, and refurnished to accommodate the new top-end Intel PCs that will arrive soon.

About News & Notes

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Jeannie M. Walsh, editor, walsh@cs.unc.edu
Claire L. Stone, co-editor, stonec@cs.unc.edu

Keep in touch!

Let us know where you are and what you are doing so that we can include you in our next issue! Send us information via e-mail to pubs@cs.unc.edu; fax it to 919-962- 1799; or mail it to the address below, c/o *News & Notes*. Please include your e-mail address.

Department of Computer Science
UNC-Chapel Hill
CB#3175, Sitterson Hall
Chapel Hill, NC 27599-3175

General information:

Voice: 919/962-1700
Fax: 919/962-1799
Internet mail: info@cs.unc.edu
World Wide Web: <http://www.cs.unc.edu>

Address corrections, submissions, and for information about our publications:
pubs@cs.unc.edu

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Page maintained by: Department of Computer Science, UNC-Chapel Hill
Server Manager: webmaster@cs.unc.edu

Content Manager: pubs@cs.unc.edu
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