

News & Notes

Spring 2009 ♦ Issue Forty-three

CompSci @ Carolina



Dear Friends,

The academic year is drawing to a close. Soon we will award degrees to another set of graduates and send them on their way into a challenging economy. We have also recently extended our graduate admissions deadline for fall 2009 to May 31. It is our hope that this will give Triangle locals in the technology industry the option of getting an advanced degree should they find themselves out of work.

The number of undergraduate students we are teaching is growing rapidly, up 30 per cent over the last three years. This comes at a time when we're losing faculty to retirement, making it challenging to meet our undergraduate teaching demands. We said farewell to Jeannie Walsh, Senior Lecturer and Director of General Studies, at the end of the fall 2008 semester.

This spring we welcomed Assistant Professor Ron Alterovitz to the department. Ron is part of our expanding robotics group and joins us from UC Berkely and the UCSF Comprehensive Cancer Center where he was an NIH Postdoctoral Research Fellow. You can read more about Ron on page 2, and more about our robotics research below.

We were very proud to learn that our own Michael Reiter had been named a fellow of the Association for Computing Machinery last fall. Mike was recognized for his innovations in the field of computer security.

In this issue of *News & Notes*, we're introducing a new feature - an extended alumni profile. Be sure to check out the story about B.S. alum Aaron Fulkerson on page 4. Interested in being the subject of the alumni profile in a future *News & Notes*? Send an email to pubs@cs.unc.edu.

On a final note, this is the last edition of *News & Notes* for me as department chairman. I am happy to announce that Anselmo Lastra will be named chairman effective July 1, 2009. Many great things have happened in the past five years and it has been a pleasure to serve the department as chair. I know that Anselmo will do a fine job leading the department.

Have a great summer!

The Rise of Robotics

Robot algorithms have been studied in the Computer Science Department for a decade, but they've developed a higher profile recently. "We've been paying more attention to robotics in the last three to four years," says Dr. Dinesh Manocha. The triad of Dr. Ming Lin, Dr. Ron Alterovitz and Manocha form the core of the Robotics research group.

"Robot Algorithms refer to a broad set of computational methods that has been designed for physical objects in the real world. They primarily deal with issues related to spatial arrangement of objects, task planning, and geometric reasoning, and they're characterized by their physical complexity," he explains. "We've worked on collision checking, motion planning, robotic simulation, and multi-robot coordination. We're also working in multi-agent and crowd simulations and now traffic simulation,

which are emerging applications of robot algorithms. Along with a postdoc, Jur van den Berg, many graduate students, and the addition of Ron, we have reached a critical mass to start a new robotics lab for both research and educational purposes." Many graduate students, including Liangjun Zhang and Russell Gayle, have developed new robot motion-planning algorithms as part of their PhD dissertations.

Alterovitz, whose work is focused on linking medical image analysis to medical robots, is setting up a work station in the western half of the Sitterson graphics lab, as the new robotics lab will be shared by multiple faculty members. The remaining area is being freshly deployed as a large area for multiple-robot coordination, which will include several cameras mounted for tracking their movements. Graduate stu-

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The Rise of Robotics, continued from page 1

dents Stephen Guy and Jamie Snape have been studying the use of disc-shaped Roombas robotics toolkits for teaching courses in robotics and performing research in multi-robot coordination and planning.

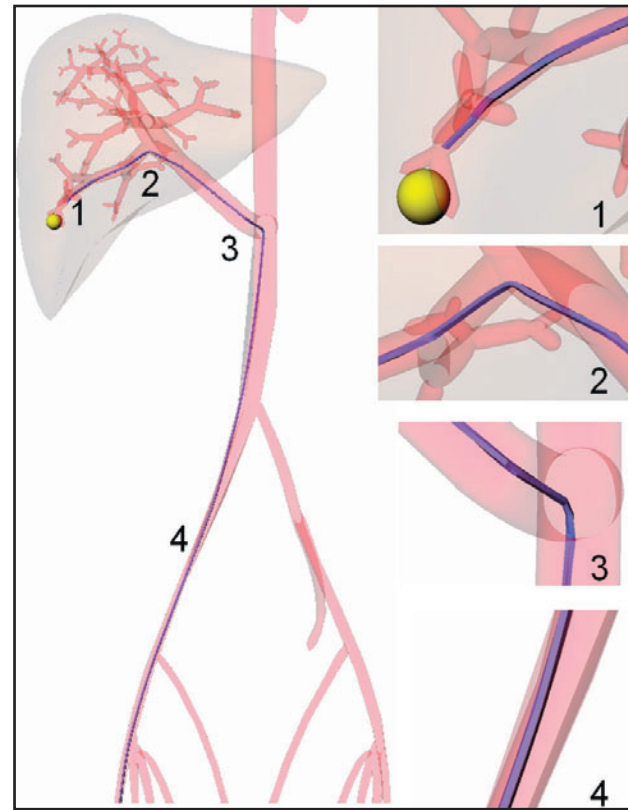
“More research projects are possible because of this new robotics lab,” says Manocha. “And it will be used both for research and teaching, as well as showing various demonstrations.”

The current offerings in robotics include two graduate courses, An Introduction to Robotics and Robot Motion Planning, which are taught at different times by Lin and Manocha. Alterovitz is currently teaching a new graduate class, Medical Robotics and Simulation. They intend to add an undergraduate class for junior and senior computer science majors.

Manocha’s primary research is in broad-area robotic algorithms for simulation projects funded by National Science Foundation (NSF), U.S. Army Research Office, and RDECOM. Lin currently also has an NSF grant jointly with the University of Maryland, University of Wisconsin, and Drexel University. This project proposes to use current Cyber-Infrastructure

with a focused domain on bio-inspired robotics to implement a multi-disciplinary educational program in Engineering Informatics, which refers to the science of representation, simulation, archiving, and reuse of engineering knowledge in transformative ways. The design and realization of bio-inspired robots require knowledge from multiple domains (e.g., software, algorithms, mechanical structure, electronics); different types of individual engineering models and simulations need to be integrated together to support the design process.

“Based on our early results, the excitement associated with bio-inspired robots has attracted students of different backgrounds to use information technology for better engineering design,” says Lin. “In addition to its tremendous potential for a wide range of services to the society, we believe robotics can also provide some



The image above shows the use of motion planning for medical applications: path computation for liver chemoembolization.

engaging hands-on experiences and a fascinating physical context to attract more bright students into studying computer science and advancing the field of computing.”

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Ron Alterovitz: A Link Between Medical Imaging and Robotics



Dr. Ron Alterovitz, who joined the faculty in January, brings a new strength to the department, linking medical imaging more closely to robotic hardware through physically based simulations and motion planning.

“Medical imaging is more precise than it’s ever been,” he explains. “We often can see quite clearly where the goal is, plus the obstacles, such as small vessels and nerves. In parallel, there have been a lot of developments in robotic hardware. My work is in the middle, the

challenge has been how to implant the seeds accurately in deformable tissue. “Brachytherapy has a fairly high success rate, but there are side effects if the seeds are misplaced,” he says. He writes programs for physically based simulations, and then develops planners to improve the quality of the procedure.

Alterovitz earned his PhD at Berkeley in 2006 in Industrial Engineering and Operations Research. He spent a year in Toulouse, France, with the Robotics and AI group at LAAS-CNRS (National Center for Scientific Research) before returning to Berkeley as an NIH Postdoctoral Research Fellow, conducting research in conjunction with the UCSF Comprehensive Cancer Center.

One of the primary medical applications he has focused on is brachytherapy, a treatment for prostate cancer that involves inserting radioactive “seeds” near the cancer in the prostate. The

challenge has been how to implant the seeds accurately in deformable tissue. “Brachytherapy has a fairly high success rate, but there are side effects if the seeds are misplaced,” he says. He writes programs for physically based simulations, and then develops planners to improve the quality of the procedure.

In addition, Alterovitz has been addressing the problem from the hardware side. His work at Berkeley included research leading to a group patent application for a “steerable needle,” a highly flexible needle made of Nitinol, an alloy of nickel and titanium. Its beveled tip causes it to curve when penetrating soft tissue, enabling the placement of seeds in previously unreachable locations. The steerable

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LITMUS^{RT} - Linux Testbed for MULTiprocessor Scheduling in Real-Time systems



LITMUS^{RT} is one of the latest projects being worked on by the Real-Time Systems group, led by Professors Jim Anderson and Sanjoy Baruah.

LITMUS^{RT} is an extension of the Linux kernel produced at UNC. Currently maintained by graduate student Bjoern Brandenburg, LITMUS^{RT}’s purpose is to serve as a testbed for prototyping advanced multiprocessor real-time scheduling and synchronization algorithms. It allows researchers to investigate real-world limitations and the impact of overheads on system performance, which is difficult to do with just theory.

The Rise of Robotics, continued from page 2

In addition to innovative curriculum development using the state-of-art research in robotics, Lin and Manocha have also received support from Intel and Microsoft for some of the applications areas such as crowd simulation. For example, as part of a joint collaboration, UNC and Intel researchers have developed a new approach that can exploit the capabilities of many-core processors to develop a highly parallel multi-agent simulation algorithm.

Alterovitz, in his first semester at Carolina, is working on making connections in the UNC Hospital network to establish collaborations with which he can build on his previous research (see his profile on page 2).

Ron Alterovitz, continued from page 2

needle was developed with mechanical engineers at Johns Hopkins University.

Alterovitz expects to build on that research at UNC with new collaborations. He’s making connections with Drs. Edward Chaney and Julian Rosenmann in Radiation Oncology to explore new applications for the steerable needle and other minimally invasive devices. “We’re looking at prostate cancer and other types of cancer,” he says. “Breast and pancreatic cancer might be next.” He’s also met with engineers at N.C. State to discuss ideas on the robotic hardware

For example, in a case study on the scalability of real-time scheduling algorithms on large multicore platforms such as SUN’s UltraSPARC, it was found that “staggering” timer interrupts across cores can greatly help to reduce bus contention. In experiments using LITMUS^{RT} on an 2x4 core Intel Nehalem system, it was shown that cache-aware real-time schedulers can significantly reduce cache-thrashing in a video player.

Work on LITMUS^{RT} started in 2006, and a number of graduate students have contributed to the project over the years. So far, nine papers have been published that report on LITMUS^{RT}-related research. Anderson is also supervising an undergraduate honors thesis that is related to the project.

Robotics is a serious field with a multitude of critical functions in medicine and industry. But because of its long history in science fiction, it also engenders a sense of fun. This mood can be found in Robotics Club, which is led by Lin and usually attracts a dozen or so undergraduate students in a semester. In their informal gatherings, they have built wall-climbing robots and programmed them to navigate around obstacles.

New faces, new ideas, and the sound of a herd of Roombas will soon attract even more students into this fascinating discipline within computer science. The new robotics lab has room for them.

side. “The next step would be extensions of the steerable needle. A key challenge is to develop a device for which all electrical components are outside the body, but that is capable of following curved paths inside the body.”

Inside the Department are more paths of collaboration. Alterovitz sees a natural hardware collaborator in the Applied Engineering Lab, and looks forward to new research in physically based simulations and motion planning with Drs. Ming Lin and Dinesh Manocha.

LITMUS^{RT} is publicly available at www.cs.unc.edu/~anderson/litmus-rt/. The published code has been used by researchers in Asia, Europe and North America.

Research funding for LITMUS^{RT} comes from IBM, SUN, Intel Corporation, the National Science Foundation and the Army Research Office.

Real-Time Systems Update

A primary area of research for the department’s Real-Time Systems group is the development of operating-systems infrastructure for supporting real-time applications on multicore platforms. Such applications might be found, for example, in gaming systems, multimedia systems and control systems in aircraft.

The group is currently working with global security company Northrop Grumman Corporation to determine the viability of using multicore platforms in real-time control systems in unmanned aerial vehicles. The major challenge in this effort lies in devising techniques for “isolating” different system components so that the real-time correctness of different components can be validated independently. Validating real-time correctness is a key part of the overall process of certifying an aircraft design. Certification becomes much simpler if smaller sub-systems can be analyzed independently.

This semester, he’s teaching COMP 790-099, Medical Robotics and Simulation, and learning about Chapel Hill. He and his wife, Sheyna, arrived from Berkeley in December. She is finishing her thesis for a master’s degree in gerontology from San Francisco State University and intends to pursue advocacy on behalf of older adults.

“Both Sheyna and I have liked it here a lot so far. Everyone is friendly—we’re used to the brusque atmosphere of California. Chapel Hill has a nice balance that I’m appreciating.”

Alumni Profile - MindTouch Deki: A Blockbuster Built on Open Source Software

Aaron Fulkerson (BS 2004) says he was delusional when he thought he could get a computer science degree at UNC. He had a high school GPA of 1.67 and had been backpacking for nearly four years. He wasn't an admissions office dream, but the ideal candidate rarely succeeds the way Fulkerson has. His company, MindTouch, has 28 employees and clients that include Intel, UCLA Law School and the U.S. Department of Defense, and it's been featured in the New York Times, Wall Street Journal and "every tech publication that matters."

Fulkerson's travels had brought him to Minnesota and a series of short-term technology jobs. He decided he wanted a computer science degree and he concluded he wanted to study in the program Fred Brooks had created. That's when a level of effort and creativity not indicated by a 1.67 GPA kicked in.

"I told my wife to look for a job in North Carolina and we'd move there and I'd go to UNC," says Fulkerson. "She went to a teaching job fair in Durham the next weekend and was hired on the spot. We moved and I started at Durham Tech." The new student buckled down and simultaneously launched community-service non-profits in public housing areas of Durham, using refurbished computers to teach with technology. His service work and his A.S. degree attracted a recruiter from N.C. State, but Fulkerson heard only the siren song of UNC's CS Dept. He liked its focus on mathematics and theory. "Lots of people can program," Fulkerson says, "but not everyone knows why they can do it." His persistence garnered him a champion in the admissions office and a \$30,000/year Jack Kent Cook scholarship, and he became a Carolina student in 2002 without ever taking an SAT.

Fulkerson concentrated on web development and software engineering "because I wanted to focus on what I could make a business out of." His academic mentor was Kevin Jeffay, Gillian Cell Distinguished Professor and Director

of Undergraduate Studies. "I adopted Kevin as my advisor," he says. "He had a big impact on my success in school." The success of his business he credits in great part to Professor Diane Pozefsky (PhD 1979). "During my last year, she was helping me plan it and avoid potential pitfalls. She'd say, 'What's the problem we're solving?' 'How are we differentiating this product?'

I often bounced ideas off her and she gave me a lot historical perspective, input on how to position a company and market it. She has a lot to do with the success of it."

So what's the problem MindTouch (www.mindtouch.com) is solving? "Any modern organization has a difficult time getting access to information, sharing and collaborating. We all are too familiar with the many different media types and formats and disconnected systems that creates a snarl of data silos we're forced to tediously navigate daily at work," explains Fulkerson. "So, at MindTouch we developed an easy-to-use, web-based application that is a lot like a simple word processor, but rather than just text, you can add images, video, audio, feeds, database queries, web services, etc. Everything is versioned, the content is updated real-time from other systems and databases and, most importantly, anyone can edit. MindTouch is the glue that bridges common application and data silos and if you're familiar with wikis, you'll recognize this as something very wiki-like in its ease of use."

Fulkerson met his partner, Steve Bjorg, during a 2003 internship at Microsoft, where they worked in the office of the CTO on distributed systems research. After he graduated from UNC in 2004, Fulkerson and his wife moved back to Minnesota, and he worked steadily with Bjorg and two programmers, each of whom was in a different



state. "We were a distributed system. We talked at midnight every Monday." They went live in January 2005.

Fulkerson defines his company as "an open-source enterprise collaboration and community platform that enables users to connect and remix enterprise applications, data sources and web services." They give away the open-source software, making money when users of the free version come back for the more stable, licensed version that is further tested and offers more features. An example is whorun.gov, a product of the Washington Post. "It's a moderated wiki that journalists at the paper use and you can contribute to—and all content is being pulled in from outside sources."

Now based in San Diego, MindTouch is on a strong upward trajectory. "The product is not yet three years old," Fulkerson says, "and we have hundreds of thousands of installations and many millions of users." The client list includes high tech, government and university customers such as Mozilla, Microsoft, NIH and the Harvard Law School.

Has Fulkerson any advice for others starting businesses? "It's what I learned from Diane Pozefsky: The team is critically important. You've got to have resonance with your team from day zero. Also, seek out smart people and learn as much as you can from them."

M.S. AND PH.D. ALUMNI

J. Michael Fitzpatrick (MS 1982), professor of computer science, computer engineering and electrical engineering at the Vanderbilt School of Engineering, was named a Fellow of SPIE, the International Society for Optical Engineering, in 2008. In addition to his position in the School of Engineering, Mike is co-director of the Electrical Engineering and Computer Science Medical Image Processing Laboratory at Vanderbilt. His current work focuses on medical imaging and image processing, image registration, magnetic resonance imaging, and image guidance for ear surgery and neurosurgery. (jmf@eecs.vanderbilt.edu)

Yen-Ping Shan's (PhD 1990) company, iSource Technologies, provided substantial consulting services to the Beijing Olympics. Experts in a wide variety of fields (e.g. Water treatment, traffic management) were brought in from all over the world to help. (ypshan@bizwoh.rr.com)

Ritu Chadha (PhD 1991) was elected a Telcordia fellow in 2008 and is currently leading a large contract awarded to Telcordia by the US Army related to ad hoc network management. A podcast about this work can be heard at: telephonyonline.com/podcasts/ad-hoc-mobile-network-1114/. Ritu has also recently published several papers, including:

Chiang, C.-Y. J., R. Chadha, S. Newman, R. Orlando, K. Jakubowski, and R. Lo. "Building a versatile testbed for supporting testing and tactical network management tools and their interoperability," *Proc. of IEEE MIL-COM 2008*, San Diego, CA, November 17-19, 2008.

Kant, L., and R. Chadha. "MANET Management: Industry Challenges & Potential Solutions," *Proc of the 9th International Symposium on a World of Wireless, Mobile and Multimedia Networks*, Newport Beach CA, June 2008. (chadha@research.telcordia.com)

After living in the RTP area for more than 12 years, **Kah-Chan (KC) Low** (MS 1991) moved to Marshalls Creek, Penn., right across from New Jersey, in December 2007 so that his two boys (thelowbrothers.com) can further their music education at the Pre-College Division of The Juilliard School.

He says he badly misses the nice and mild non-winters of North Carolina! (kahchanlow@yahoo.com)

Ronald Azuma (PhD 1995) is now a Research Leader at a new laboratory: the Nokia Research Center Hollywood, in Santa Monica, Calif. He will be building and leading a team to develop novel compelling Mixed Reality experiences on mobile platforms. (azuma@acm.org)

Rich Holloway (PhD 1995) has joined numerous other UNC CS folks at Morphormics, Inc. (www.morphormics.com) He is taking over the job of VP of Product Development from **Lee Nackman** (PhD 1982), who has been serving as the interim VP-PD since mid-2008 (as mentioned in the fall 2008 *News & Notes*). Rich and his wife Barbara still live in Chapel Hill with their 4 children (Alexa-15, Bergen-12, Lizzie-10, and Cole-5), a dog, 2 cats, and a green snake. (richard.l.holloway@gmail.com)

Jeff Hultquist (MS 1986, PhD 1995) is now writing games for the iPhone. Demonstration videos are on his web site, NotebookPress.com. (jhultquist@mac.com)

Megan Dunigan (MS 2004) was named to the inaugural Southern Conference Hall of Fame for her success in women's tennis. She was also named to the Furman University Athletics Hall of Fame in 2007 as the most decorated women's tennis player in Southern Conference history, having received four league Player of the Year awards.

Brad Davis (PhD 2008) received the 2009 Linda Dykstra Distinguished Dissertation Award in Math, Physical Sciences & Engineering, which recognizes the scholarly contributions of UNC-Chapel Hill doctoral students as revealed through their dissertation projects and highlights the timely completion of doctoral training. Brad's dissertation was on Medical Image Analysis via Fréchet Means of Diffeomorphisms. (brad.davis@kitware.com)

Kyle Moore (MS 2008) is working for SportsMEDIA Technology Corporation in Durham, NC. (kylejessemore@gmail.com)

Sashi Kumar Penta (MS 2008) is working for the Visual Computing Group at Intel Corporation on the Larabee project. (sashikumarm@gmail.com)

UNDERGRADUATE ALUMNI

Mark Hutchinson (BSMS 1981) was "promoted" to a Zone Advisor at experts-exchange.com, and wrote an article, Getting a Better Answer, that appeared in the October 1, 2008, Experts-Exchange newsletter: www.ee-stuff.com/Newsletter/100108newsletter.htm (aikimark@aol.com)

Courtney McCarthy Ramey (BSMS 2002) recently accepted a position as a Director with Jabian Consulting in Atlanta, Ga. (courtney.ramey@gmail.com)

Jaime Vega (BS 2005) works with Lulu.com as a Software Engineer. (jvega@lulu.com)

FORMER FACULTY

In April 2008, former faculty member **Akira Nakamura** was decorated with the Order of the Sacred Treasure from the Emperor for his longtime teaching work in the university and outstanding research. (an1206@ad.cyberhome.ne.jp)

FAMILY MATTERS

Alan Forrest, Windows Systems Administrator, married Julie Serdensky on December 24, 2008, in Hillsborough, NC. (forrest@cs.unc.edu)

David Gotz (PhD 2005) and his wife, Anne, welcomed Sarah Paige Gotz on December 28, 2009, in Mount Kisco, NY. (dave@gotzfamil.org)

Christopher Sheldahl, graduate student, and his wife, Angela, welcomed Alexander John Sheldahl on January 2, 2009, in Chapel Hill, NC. (csheldahl@earthlink.net)

Kyle Moore (MS 2008) married Kimberly Williams on January 31, 2009, in Columbus, Ohio. (kylejessemore@gmail.com)

Professor **Steve Weiss** and his wife, Iris, welcomed a grandchild, Kyle Aaron Weiss, on February 1, 2009, in Fairfax, Va. Kyle's parents are Heather and Jeremy Weiss. (weiss@cs.unc.edu)

RECENT PUBLICATIONS

Ballard, L., S. Kamara, F. Monrose and M.K. Reiter. "Towards practical biometric key generation with randomized biometric templates," *Proc. of the 15th ACM Conference on Computer and Communications Security*, October 2008, 235–244.

Bauer, L., S. Garriss and M.K. Reiter. "Detecting and resolving policy misconfigurations in access-control systems," *Proc. of the 13th ACM Symposium on Access Control Models and Technologies*, June 2008, 185–194.

Brandenburg, B., and J. Anderson. "A Comparison of the M-PCP, D-PCP, and FMLP on LITMUS-RT," *Proc. of the 12th International Conference on Principles of Distributed Systems*, Luxor, Egypt, Springer Verlag, December 2008, 105–124.

Brandenburg, B., J. Calandrino, and J. Anderson. "On the Scalability of Real-Time Scheduling Algorithms on Multicore Platforms: A Case Study," *Proc. of the 29th IEEE Real-Time Systems Symposium*, Barcelona, Spain, IEEE Computer Society Press, December 2008, 157–169.

Desai, K.V., T.G. Bishop, L. Vicci, E.T. O'Brien, R.M. Taylor, and R. Superfine. "Agnostic particle tracking for three-dimensional motion of cellular granules and membrane-tethered bead dynamics," *Biophysical Journal*, 2008, 94 (6): 2374–84.

Dinan, J., S. Olivier, G. Sabin, J. Prins, P. Sadayappan, and C.-W. Tseng. "A Message Passing Benchmark for Unbalanced Applications," *Simulation Modelling Practice and Theory*, October 2008, 16 (9): 1177–1189.

Feasel, J., M.C. Whitton, and J.D. Wendt. "LLCM-WIP: Low Latency, Continuous-Motion Walking-In-Place," *Proc. of IEEE Symposium on 3D User Interfaces*, 2008, 97–104.

Feng, D., Y. Lee, L. Kwock, and R.M. Taylor. "Multivariate Scalar Volume Visualization for Relationship and Value Estimation," *Transactions on Visualization and Computer Graphics*, 2008.

Galoppo, N., M.A. Otaduy, W. Moss, J. Sewall, S. Curtis, M.C. Lin. "Controlling Deformable Material with Dynamic Morph Targets," *ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games*, 2009.

Gao, D., M.K. Reiter and D. Song. "BinHunt: Automatically finding semantic differences in binary programs," *Information and Communications Security*, 10th International Conference, ICICS 2008 (*Lecture Notes in Computer Science*, Vol. 5308), October 2008, 238–255.

Gayle, R., W. Moss, M.C. Lin, and D. Manocha. "Multi-Robot Coordination using Generalized Social Potential Fields," *IEEE Conference on Robotics and Automation*, 2009.

Jerald, J., T.M. Peck, F. Steinicke, and M.C. Whitton. "Sensitivity to Scene Motion for Phases of Head Yaws," *Proc. of Applied Perception in Graphics and Visualization*, 2008.

Lauterbach, C., M.C. Lin, D. Manocha, S. Borkman, E. LaFave, and M. Bauer. "Accelerating Line-of-Sight Computations in Large OneSAF Terrains with Dynamic Events," *I/ITSEC 2008*, 2008.

Lauterbach, C., M. Garland, S. Sengupta, D. Lubke, and D. Manocha. "Fast BVH construction on GPUs," *Eurographics 2009*, 2009.

Leontyev, H., and J. Anderson. "A Unified Hard/Soft Real-Time Schedulability Test for Global EDF Multiprocessor Scheduling," *Proc. of the 29th IEEE Real-Time Systems Symposium*, Barcelona, Spain, IEEE Computer Society Press, December 2008, 375–384.

Li, Z., X. Wang, Z. Liang, and M.K. Reiter. "AGIS: Towards automatic generation of infection signatures," *Proc. of the 38th IEEE/IFIP International Conference on Dependable Systems and Networks*, June 2008, 237–246.

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van den Berg, J., J. Sewall, M.C. Lin, and D. Manocha. "Virtualized Traffic: Reconstructing Traffic Flows from Discrete Spatio-Temporal Data," *IEEE VR*, 2009.

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Zhang, L., S.M. LaValle, and D. Manocha. "Global Vector Field Computation for Feedback Motion Planning," *IEEE International Conference on Robotics and Automation (ICRA)*, 2009.

Kenan-Flagler Entrepreneurs Invited into COMP 918

Tim Quigg's Research Administration for Scientists class has made an entrance into the Kenan-Flagler Business School. The Center for Entrepreneurial Studies offers an enterprise-creation track in its Graduate Certificate program, and Quigg's class opens a window into the world of science research and lab management for those students.

Currently aimed at science PhD students, post-doctoral researchers and young professors, COMP 918 gives a thorough introduction to writing grant proposals. It goes on to cover management of research grants and contracts, as well as intellectual property, technology transfer, and conflict-of-interest policies. Guest lecturers in Quigg's previous classes have included Hamilton Brown, Proposal Management Director in the Office

of Sponsored Research, Trude Amick, Assistant Director for the Office of Technology Development, and patent lawyer Greg Hunt. Graduate students in various sciences have been represented in earlier classes, and he looks forward to the questions that business entrepreneurs will bring.

The Graduate Certificate program can last 18 months or two years. Students must take a semester-long Introduction to Entrepreneurship class in Artistic, Life Science, Science or Social Entrepreneurship. COMP 918 will serve as the Science option. Certificate students then can choose one of three tracks: the Commercial sequence, the Enterprise-creation sequence, which involves labs and hands-on experience, or the Literacy sequence, which is more classroom based and requires a capstone paper or business plan.

Department News

NEW FACULTY APPOINTMENTS

Ron Alterovitz is an Assistant Professor who joins us from UC Berkeley and the UCSF Comprehensive Cancer Center where he was an NIH Postdoctoral Research Fellow. You can read more about Ron on page 2.

Dinggang Shen is an Adjunct Associate Professor. Dinggang is an Associate Professor in Radiology and the Biomedical Research Imaging Center (BRIC) at UNC.

VISITING RESEARCHERS

Kenneth Manly is a Visiting Research Professor working with Leonard McMillan. Kenneth is a Professor of Biostatistics at the State University of New York at Buffalo.

John McHugh is a Visiting Professor working with the computer security research group. John is Professor and Canada Research Chair in Privacy and Security and Director of the Privacy and Security Laboratory at Dalhousie University in Halifax, Nova Scotia, Canada. He previously worked in our department in the early 1990s.

THANKS AND FAREWELL

Charlie Bauserman, Systems Manager, left the department in March 2009.

Jeanie M. Walsh, Senior Lecturer and Director of General Studies, retired at the end of the fall 2008 semester. Jeanie had been with the department since 1986, when she started as a research associate and publications director.

CONGRATULATIONS

Martin Styner, Research Assistant Professor, was recently promoted to Assistant Professor, tenure-track, in the Department of Psychiatry, in the UNC School of Medicine.

Michael Reiter (B.S.M.Sci. 1989), Lawrence M. Slifkin Distinguished Professor, was named a fellow of the Association for Computing Machinery (ACM) in fall 2008. Michael was recognized for his innovations in computer security.

James Anderson, Professor, received an IBM Real-Time Innovation Award titled Supporting Real-Time Containers on Multicore Platforms in Linux.

NEW PATENTS

Pat. No.: 7,385,708 - Methods and systems for laser based real-time struc-

Each sequence requires two additional graduate electives. Students in the certificate program have included undergraduates, graduates and several MD-PhD students.

MaryAnn O'Neill, program director for the Center for Entrepreneurial Studies, was intrigued by the syllabus. "This will give students from all fields a serious look into science management," she says. "It calls for a different kind of thinking, and it will help our Launching the Venture students be more prepared if their enterprises need research funding or if they head toward patent applications."

Quigg is pleased with the cross-department connection. "I'm delighted that we'll have business students adding to our class discussions. The more viewpoints, the better."

tured light depth extraction. Inventors: Jeremy D. Ackerman, Kurtis P. Keller.

Pat. No.: 7,447,209 - Methods, systems, and computer program products for modeling and simulating application-level traffic characteristics in a network based on transport and network layer header information. Inventors: Kevin Jeffay, Felix Hernandez-Campos, F. Donelson Smith, Andrew B. Nobel

RECENT GRANTS

CAREER: Similarity-based Representation of Large-scale Image Collections. PI: Svetlana Lazebnik. National Science Foundation.

CAREER: Towards Effective Identification of Application Behaviors in Encrypted Traffic. PI: Fabian Monrose. National Science Foundation. (Transferred from Johns Hopkins University)

New Frameworks for Detecting and Minimizing Information Leakage in Anonymized Network Data. PI: Fabian Monrose. Co-PI: Michael Reiter. Johns Hopkins University (Prime: US Department of Homeland Security).

Morphormics Research Grant. PI: Stephen Pizer. Morphormics.

News&Notes

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Throughout News & Notes, we list degree information for all our B.S., M.S., and Ph.D. Computer Science and Math Sciences alumni.

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Professor Anselmo Lastra attended the SIGGRAPH Asia 2008 conference in Singapore and met up with a few alums and old friends there. Pictured from left to right: Jason Yang, Justin Hensley (Ph.D. 2007), Mark Harris (Ph.D. 2003), Professor Anselmo Lastra, and Sung-Eui Yoon (Ph.D. 2005).



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