

News & Notes

Fall 2015 ♦ Issue Fifty-Three

CompSci @ Carolina



Dear Friends,

Warm greetings from Chapel Hill! It's been yet another busy year on the Hill. We culminated the Department's 50th Anniversary Celebration with a Gala Symposium and banquet in May. It was a real treat to see so many of our alumni and friends back in Chapel Hill and listen to their talks, reconnect, and reminisce. If you were unable to attend the events of the weekend, you can read a recap on page 10. Also note that nearly all of the alumni symposium talks can be found on our departmental YouTube page (cs.unc.edu/youtube).

Shortly after the anniversary Gala, the Department passed another milestone as we graduated our largest ever undergraduate cohort—nearly 120 B.S. and B.A. graduates.

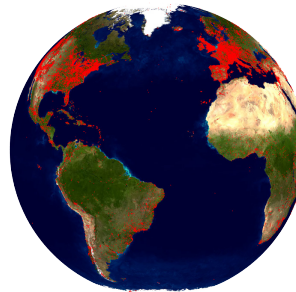
Amidst these festivities, we also congratulated our founder, Fred Brooks, who officially retired in June. Since the Department's founding over 50 years ago, Fred has been one of the few constants. That the Department has consistently been a nationally ranked top-25 computer science department is a testament to the foundation laid by Fred as well as his capability as a teacher, researcher, and leader. Fred's impact on this Department is second to none, and he will always be part of the UNC Computer Science family. We are deeply grateful for his remarkable service, and we wish him all the best in retirement.

Congratulations are also in order for two of our senior faculty members, Henry Fuchs and Steve Pizer. In addition to being named an IEEE Fellow, Henry received the 2015 Coons Award at SIGGRAPH this summer. Steve was recognized by his students, collaborators, and friends with a campaign to name a conference room in Sitterson Hall in his honor. You can read about these and other awards and honors in this edition of the News & Notes.

Chair of the Department

Rebuilding the World's Landmarks in Six Days

The Department of Computer Science and URC Ventures have built a 3D reconstruction of the world's landmarks using computer vision and 3D modeling techniques. Using Yahoo's publically available collection of 100 million crowd-sourced photos and a single PC, the 3D Computer Vision research group and URCV created a new software process able to build 12,903 3D models of some of the world's greatest landmarks in just six days. Unlike maps and aerial images, these models can be directly used for VR applications such as virtual tourism. A demonstration was presented during the 2015 CVPR Computer Vision Conference in Boston, Massachusetts.



Graduate students Jared Heinly and Johannes L. Schönberger and professors Enrique Dunn and Jan-Michael Frahm of the 3D Computer Vision Group created software that improves upon earlier projects, including Building Rome on a Cloudless Day.

continued on page 6

In this issue

- 2 Department Awards
- 4 Creating Magic from Code
- 5 Pearl Hacks Brings Women into Computer Science
- 7 Computer Science Tour Guide
- 10 50th Anniversary Celebration Recap and Faculty Launch CV²R
- 11 Farewell to a Researcher, Teacher, and Mentor
- 11 Department News
- 13 Alumni News

Baruah Earns Award For Technical Achievement and Leadership



Professor Sanjoy Baruah of the UNC Department of Computer Science was recognized by the IEEE Technical Committee on Real-Time Systems (TCRTS) with the Outstanding Technical Achievement and Leadership Award for 2014.

The award, which was presented this year to Baruah in Rome, Italy, is given to recognize individuals for their outstanding long-term technical achievement and leadership in the field of real-time and embedded systems. It is the highest recognition bestowed on an individual by the IEEE TCRTS. The first award was made in 1999.

Steve Goddard, chair of the IEEE Technical Committee on Real-Time Systems and associate vice chancellor for research at the University of Nebraska, said, “Dr. Sanjoy Baruah is

widely recognized within the real-time research community as possessing one of the sharpest and most creative minds tackling scheduling problems today. His modesty with regard to his research accomplishments is genuine but misplaced. Throughout his career, Dr. Baruah has consistently developed new seminal theoretical results and opened new research avenues in real-time systems research for others to follow. He is widely respected and admired for this technical accomplishments, while also being sought out for his friendly demeanor and good company.”

The Institute of Electrical and Electronics Engineers (IEEE) is the world’s largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through IEEE’s highly cited publications, conferences, technology standards, and professional and educational activities.

Mahaney Receives Catherine G. Perry Staff Excellence Award



Jim Mahaney was named the recipient of the Catherine G. Perry Staff Excellence Award for 2015.

The Catherine G. Perry Staff Excellence Award is given annually to recognize outstanding performance by a staff member during the previous year. The award was established in 2011 and designed to honor a

department staff member for excellence in performing his/her job duties.

Mahaney is a senior research associate in the Department of Computer Science, and he has served as interim director of the Applied Engineering Laboratory since April 2015. Mahaney supports a number of research grants in the Department, providing a range of services from logistics to engineering. Mahaney carries out his job with professionalism as well as humor, and he can often be found in the building after hours.

The Catherine G. Perry Staff Excellence Award comes with an honorarium of \$1,000, placement of the honoree’s name on the permanent plaque in the Sitterson lobby, and recognition at the annual Department Awards luncheon.

Mehra Earns Recognition for Dissertation



Doctoral student Ravish Mehra received the 2015 Dean’s Distinguished Dissertation Award in Mathematics, Physical Sciences and Engineering for his dissertation titled Efficient Techniques for Wave-Based Sound Propagation in Interactive Applications.

Mehra completed his dissertation under the supervision of Dr. Dinesh Manocha, who leads the GAMMA research group with Dr. Ming Lin.

The Distinguished Dissertation Award recognizes the scholarly contributions of UNC Chapel Hill doctoral students in their dissertation projects. The award highlights original and innovative work. One award is granted annually in each of four subject areas: Mathematics, Physical Sciences, and Engineering; Biological and Life Sciences; Social Sciences; and Humanities and Fine Arts.

Awardees receive a \$1,000 cash award and a plaque and are recognized at the Annual Graduate Student Recognition Celebration.

Fuchs Named IEEE Fellow, Given Steven A. Coons Award



Dr. Henry Fuchs, Federico Gil Distinguished Professor of Computer Science, has been named an IEEE Fellow. He is being recognized for contributions to computer graphics, virtual and augmented reality.

The IEEE Grade of Fellow is conferred by the IEEE Board of Directors upon a person with an

outstanding record of accomplishments in any of the IEEE fields of interest. IEEE Fellow is the highest grade of membership and is recognized by the technical community as a prestigious honor and an important career achievement.

Fuchs was further honored at ACM SIGGRAPH this summer, where he was awarded the 2015 Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics. The award recognized his contributions in augmented and virtual reality, telepresence, and graphics hardware, and his lifetime of contributions in leading and educating the leaders in the field of computer graphics.

“In his earliest work, Henry described one of the first 3D digitizing technologies, and went on to contribute much of the foundational work on visibility computation. From there, he developed some of the earliest specialized hardware for computer graphics. The multiple Pixel-Planes and Pixel Flow systems developed at UNC introduced novel architecture and algorithms, influencing the evolution of graphics hardware and systems for interactive graphics that is now ubiquitous today.”

Fuchs is co-director of the NTU-ETH-UNC “BeingThere” International Research Centre for Tele-Presence and Tele-Collaboration. He is a member of the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences, a fellow of the Association for Computing Machinery and a recipient of both the 1992 ACM-SIGGRAPH Achievement Award and the IEEE VGTC 2013 Virtual Reality Career Award.

Clawges Honored with University Award for Advancement of Women



The University of North Carolina at Chapel Hill has recognized senior Maegan Clawges with a University Award for the Advancement of Women for 2015.

The award is presented to three recipients annually, one faculty member, one staff member, and one student. The award recognizes

contributions to the advancement of women at the University of North Carolina at Chapel Hill and, in particular, for women and men who have elevated the status of women on campus in sustainable ways; helped to improve campus policies affecting women; promoted and advanced the recruitment, retention, and upward mobility of women; participated in and assisted in the establishment of professional development opportunities for women; and/or participated in and assisted in the establishment of academic monitoring for women.

Clawges, a computer science and graphic design double-major, was recognized for her work as founder of Pearl Hacks, a coding competition (known as a hackathon) aimed at increasing the number of women in computer science and

other STEM fields. Pearl Hacks invites women with any level of coding experience to develop skills by attending workshops and working on projects with fellow students. Mentors from technology companies are also on hand to help educate and inspire attendees. The second Pearl Hacks event drew more than 400 high school- and college-aged women from across the mid-Atlantic region on March 21 and 22, 2015.

“University-wide recognition for Pearl Hacks means a lot, especially for female students at UNC. The event focuses on building community in a field that can be lonely. Support from the university community will be essential in continuing the mission of Pearl Hacks in the years to come. I am honored to represent the computer science department, journalism school, and my organizing and volunteer teams in receiving this award.”

Clawges was selected to receive the award by a committee made up of faculty, staff, and students from across campus. She was honored by Chancellor Carol Folt during the Carolina Women’s Center’s annual Gender Week Celebration on March 23, 2015, where she received a check for \$2,500 and a framed certificate.

Creating Magic From Code

A degree from UNC Computer Science can lead to some magical careers.

Just ask Mark Mine (PhD 1997), executive in the Creative Technology Group at Walt Disney Imagineering (WDI) and the head of WDI's Creative Technology Studio.

Mine (pronounced min-AY) and the Creative Technology Studio help Imagineers build better theme parks by creating new ways to design, evaluate, and present concepts and ideas. During his 17 years at WDI, Mine has worked on some incredible projects, including the online multiplayer games Toontown Online and Pirates of the Caribbean Online as well as the attractions DisneyQuest at Disney Springs; the Finding Nemo Submarine Voyage at Disneyland; the Radiator Springs Racers at Disneyland California Adventure; Toy Story Midway Mania at multiple parks; and the new Ratatouille: The Adventure at Disneyland Paris.

Before becoming an Imagineer or coming to UNC, Mine started his career at NASA's Jet Propulsion Laboratory (JPL). After receiving a bachelor's degree in aerospace engineering from the University of Michigan and a master's degree in computer science and electrical engineering from the University of Southern California, Mine started as a Spacecraft Systems Engineer working on the Voyager Missions to other planets. Mine began experimenting with virtual environments at NASA. When the Voyager Missions were coming to a close, Mine decided to enroll in the UNC Department of Computer Science to work with Fred Brooks, a decision that he attributes in large part to a NASA research article.

"It was an article in a magazine called

NASA Tech Briefs about the virtual reality research at NASA Ames Research Center being conducted by Scott Fisher and Warren Robinett. It seemed like amazing, exciting work that I really wanted to pursue," said Mine. "I eventually got in touch with Warren, who was a researcher at UNC at the time, and he convinced me to come down to Chapel Hill. My life has never been the same since that article!"

Mine's dissertation focused on creating a unified framework for virtual-environment interaction based on proprioception, a person's sense of the position and orientation of his/her body and limbs through direct manipulation, physical mnemonics, and gestural actions.

Mine was truly impressed with the work that Walt Disney Imagineering was doing in virtual environments. After initial work in online games and DisneyQuest attractions, his work on the Finding Nemo Submarine Voyage opened doors to build the Creative Technology Studio.

The Finding Nemo Submarine Voyage replaced Submarine Voyage, which ran from 1959 until 1998 but closed for seven years while Imagineers sought ways to re-theme the ride rather than demolish it. When Disney decided to tie the ride into the new movie Finding Nemo, Mine worked on technology to pre-visualize how the animated characters from the movie would look when viewed from portholes in the ride's submarines.

"At first it was only me, then I was able to hire a couple of programmers and artists. The group probably officially got started around 2007 and has grown steadily since that time and now consists of about 20 people."

Under Mine's leadership, the Creative



Technology Studio has expanded to create 3D pre-visualization tools, including the Digital Immersive Showroom (DISH), that allow developers to experience planned Disney attractions in a virtual environment before construction even begins (to see a video of the DISH in action, check out the online edition of the News & Notes). These 3D pre-visualization tools have completely changed the way Imagineers plan, design, evaluate, and present projects, and they were even used in the preparations for the new luxury bungalows at Disney's Polynesian Resort that opened earlier this year.

While Mine could not tell us much about the projects he and his team are currently working on, the excitement in his voice is obvious when he talks about some of the upcoming Avatar and Star Wars expansions that are underway at Walt Disney World.

His advice for students or for those interested in joining his team is that Disney is always looking for candidates who are not only qualified, but really show they are passionate about the work. He recommends that students get involved in projects outside of class to show interest and enthusiasm for developing new technology.

Pearl Hacks Brings Women into Computer Science

The UNC Department of Computer Science and the UNC School of Media and Journalism (formerly the School of Journalism and Mass Communication) hosted one of the largest all-female hackathons in the nation in March. More than 400 college- and high-school-aged women from 15 states attended Pearl Hacks on March 21-22. Approximately one-third of the Pearl Hacks participants had never coded before, and 60 percent were attending a hackathon for the very first time.

Pearl Hacks was founded by Maegan Clawges, a May 2015 graduate who double-majored in computer science and journalism, to help address the gender gap in the computer science field.

"I chose to study computer science because I wanted to learn a skill that would be relevant no matter what type of work I ended up doing," Clawges said. "And I stayed in the field because of the amazing community that I developed through hackathons, conferences and internships that I was fortunate to have. It's essential that all women interested in tech experience that same kind of community support."



According to the National Science Foundation, the percentage of women computer science majors has been decreasing since the mid-1980s despite increases in the percentage of women

in medical schools, law schools and physical science fields. Pearl Hacks aims to help more women engage with computer science by building community and self-esteem among students and debunking some of the misconceptions about what it means to be a computer scientist.

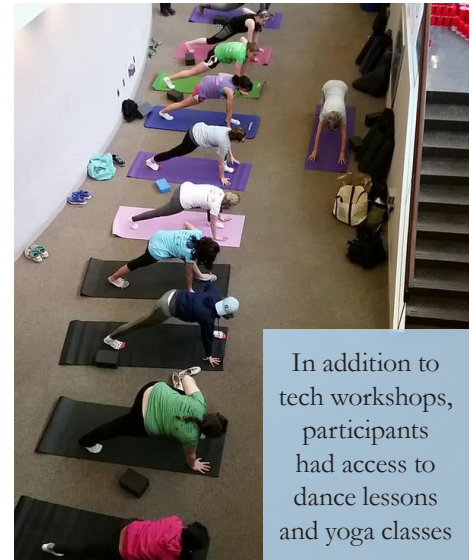


"Pearl Hacks is all about marketing to my female friends who absolutely can do this, and if given the right resources, can make amazing things," Clawges said.

"They would refuse to come because they didn't identify with this concept of being a 'hacker,' even though I knew they had the skills. I wanted to create an atmosphere they couldn't say no to."

During the 36-hour hackathon, attendees participated in workshops geared toward all levels of coding experience and covering topics including building websites, basic software development, working with big data and an introduction to computer hardware. Participants then broke into teams and developed projects using what they learned earlier during the workshops.

Industry professionals from companies such as Capital One, Cisco, and Google were on hand to educate and mentor the participants.



In addition to tech workshops, participants had access to dance lessons and yoga classes

Dona Sarkar, a novelist, fashion designer and principal program manager lead at Microsoft, delivered the Pearl Hacks keynote address this year. Sarkar shared career advice based on her own professional and personal experiences.

In addition to support by the UNC Department of Computer Science and the UNC School of Media and Journalism, Pearl Hacks has received corporate sponsorship from Amazon Web Services, Capital One, Cisco, Credit Suisse, EMC, Fidelity, Google, IBM, Infusion, Innovate@Carolina, Interactive Intelligence, Major League Hacking, Microsoft, Pebble, Premier, Qualcomm, Red Hat, RENCI, SAS, Sparkfun Electronics, Tata Consultancy Services, The Vanguard Group, and WillowTree Apps.

If you are interested in learning more about Pearl Hacks or becoming involved as a sponsor or a mentor, please visit pearlhacks.com.

Rebuilding the World's Landmarks in Six Days (continued from page 1)

The group's previous projects have built 3D models of landmarks from entire cities based on datasets of up to a few million images, but reconstructing the 3D models of the landmarks of the entire world requires the ability to process orders of magnitude more data.

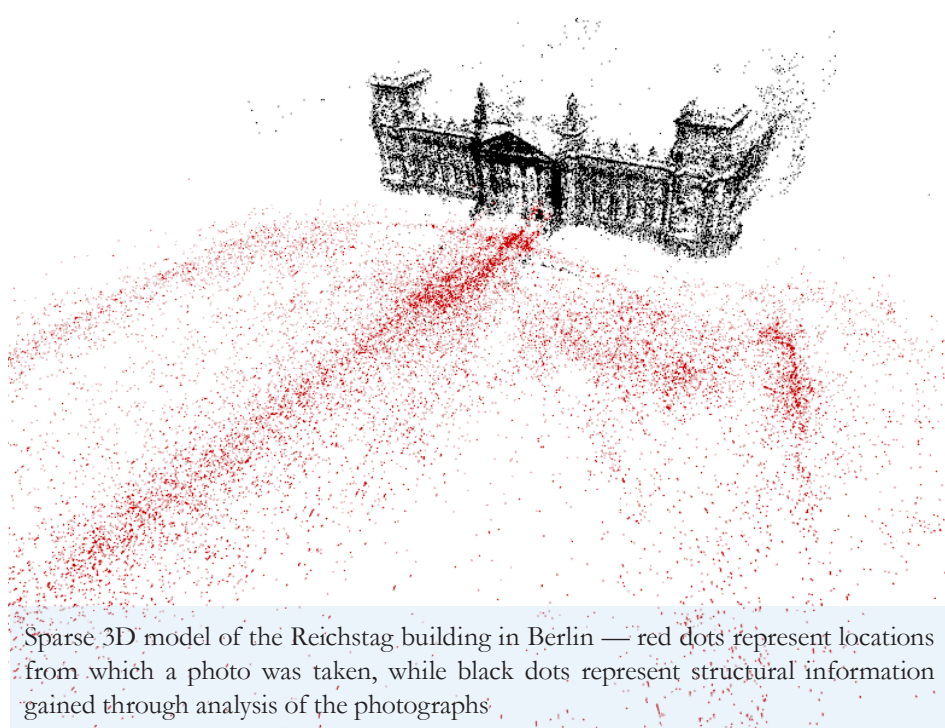
The focus of the new framework is to enable processing on datasets of arbitrary size. The software streams each image consecutively, assigning it to a cluster of related images. The streaming process provides for greater scalability by analyzing each image only once. The key of the new algorithm is to efficiently decide which images to remember and which to discard as their information is already represented.

To test this method, the researchers applied the framework to Yahoo's Flickr dataset of 100 million crowd-sourced photos, containing images geographically distributed throughout the entire world. The program took 4.4 days to stream and cluster the entire 14-terabyte dataset on a single computer before building the 3D models of each of those sites.

Stacked on top of each other, Frahm says, these photos would reach into the middle of the stratosphere of the earth (twice as high as airplane cruising altitude).

After the data association process is complete, sparse 3D models are built using the images. This process takes less than a day, bringing the total process to slightly more than five days for 100 million images.

The 3D Computer Vision Group partnered with URCV to turn the data into ultra-high resolution reconstructions, which are made public



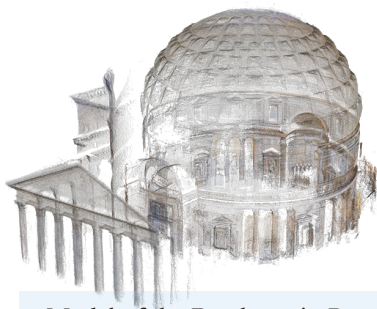
Sparse 3D model of the Reichstag building in Berlin — red dots represent locations from which a photo was taken, while black dots represent structural information gained through analysis of the photographs

as creative commons licensed images. URCV used the algorithm's output to construct the 3D models via world-scale stereo modeling technology. Model results are based on URCV's novel accuracy-driven view selection for precision scene reconstruction. To further improve the realism of the 3D scene models, a robust consensus-based depth map fusion is leveraged, along with an appearance correction. The world-scale stereo leverages a scalable, efficient, multi-threaded implementation for faster modeling.

David Boardman, CEO of URCV, described industry applications: "For example, imagine imagery streaming

in from UAV, planes, cell phones, truck mounted cameras, and hard hat cameras enabling the reconstruction of a construction and mining at any point in time. Or imagine imagery from the millions of self-driving cars in the future being leveraged to create up-to-the-second street maps. Think of the lives that would be saved if First Responders could see an up-to-the-minute model of an emergency scene before arriving."

Heinly said that the 3D Computer Vision Group is planning an open-source release of the streaming software to the research community later this year.



Model of the Pantheon in Rome

The 3D Computer Vision Group research material is based in part upon work supported by the National Science Foundation under Grant No. IIS-1252921, No. IIS-1349074 and No. CNS-1405847, as well as by the US Army Research, Development and Engineering Command Grant No. 911NF-14-1-0438.

Computer Science Tour Guide

The faculty of the Department of Computer Science has seen a tremendous increase in computer science interest among undergraduate students. Since 2010, the number of majors has increased by more than four hundred percent. That number has increased by more than 250 in just the last year. To help address the sudden rise in demand for seats in COMP 110 (Introduction to Programming), the Department was provided additional funding to hire a lecturer for the 2015-2016 academic year.

After reviewing many applicants, the hiring committee selected alumnus Kris Jordan (B.S. 2007). Jordan joined the faculty little more than a week before the start of the fall semester. By all accounts, he has hit the ground running, and he attributes that fact to the framework laid by the faculty prior to his arrival.

“Dr. [Jay] Aikat has done an amazing job over the past three to four years of making COMP 110 a very accepting and realistic course for folks with no prior programming experience,” Jordan said. “It’s been a really valuable experience for me going at the pace that this course has gone, because I would have probably done it way too fast.”

“The way I look at it is that I’ve been handed this known good implementation of curriculum, so I’m able to spend most of my idle cycles think about how I can dial it up to 11 by making it more absurd or more fun.”

Calling on his experience with New Media Campaigns, a full-service web design, development, and marketing agency of which he is a co-founder, Jordan says that one of his main goals is to make the course enjoyable and impactful. To illustrate his approach, he likens his role to that of a tour guide.

“What I try to bring to it are the traits of a really good tour guide, which I learned a few years ago while traveling through Italy with an excellent guide. What I learned from [the guide] is that you can make any experience as good or as bad as what you want just based on the attitude and the energy you bring to it and the shape that you give to it.”

“Often in intro classes, the problems you can actually solve are very small, and sometimes it can be hard to see the forest for the trees when you’re doing simple ‘if’ statements and looping.”

“With the right examples, these very simple tools can go from, ‘this seems trivial’ to, ‘Oh wow, that’s how the Instagram filter works on my phone. It’s processing a million pixels and running an image filter over it, and it turns out that the image filter is just a big array of three values: red, green, and blue. When I get out of COMP 110 I could write an image filter if I have the right set-up for it.”

Jordan looks to provide information and experiences that will make every stop on his tour relatable and interesting to his undergraduate tourists. He wants the products of his in-class exercises to be shown proudly by his students to their roommates, prompting interesting takes on classic assignments, such as a two-truths-and-a-lie game where students hard-code true or false statements and have the user attempt to select which of three presented statements is false.

One of Jordan’s COMP 110 sections was featured in the UNC Campus Story on Snapchat when a lesson on ‘while’ loops using the lyrics to Silentó’s “Watch Me (Whip/Nae Nae)” turned into what Jordan thinks may be the first dance party ever to break out in



COMP 110 (to see a video clip, check out the online version of the News & Notes).

Jordan wants to make COMP 110 a “destination course” for undergraduates coming to UNC.

As of this fall, COMP 110 has become the tenth-most popular course at UNC in terms of total undergraduate enrollment. He hopes to see that climb continue to seventh or eighth by the Fall 2016 semester, which would place Introduction to Programming equal or comparable to BIOL 101 (Principles of Biology) and CHEM 101 (General Descriptive Chemistry).

The growing interest in computer science presents some challenges, but Jordan points out that it is, above all else, an opportunity.

“I think within the next 10 years--and 10 years might be generous--we’re going to see a day where more students graduate from Carolina knowing how to write a program than do not.”

“And to me, that’s insane.”

To read about Jordan’s work with New Media Campaigns, check out the online edition of the News & Notes.

Thank you very much for your generous support!

The Department of Computer Science is very grateful for the generous support of our alumni and friends. Your gifts help us to maintain and grow our standard of excellence in education and research.

As many of you know, the Toolsmith Endowment fund was created last year to honor the Department's 50th Anniversary and the retirement of our founder, Fred Brooks. We would like to express deep gratitude to the founders of the Toolsmith Endowment fund: Mike and Julianne Capps, Eric and Mimi Carlson, Cynthia and Matt Cutts, Dick Sites and Lucey Bowen, and Russ and Debbi Tuck.

Many of you were also involved in a successful campaign to name a conference room in Sitterson Hall after Professor Steve Pizer. Room 284 was officially dedicated as the Stephen M. Pizer Conference Room on November 13, 2015 (photo on back cover). We would like to thank Brad Davis and Ross Whitaker for their effort in leading this fantastic campaign.

Each and every gift to the Department enhances our ability to serve our mission, and we thank you all for your generous contributions. At this time, we would like to recognize all of our alumni and friends who have given to the Department over the past year.

Mr. Matthew John Abadie[†]

Mr. David Steven Adler[†]

Dr. Jayashree Aikat and Dr. Deb Aikat^{‡*}

Mr. William George Allen IV[†]

Ms. Elizabeth Rose Allen[†]

Mr. Lavar Abraham Askew[†]

Dr. Joseph Harold Austin Jr.[†]

Mr. Benjamin Franklin Aycock V and

Ms. Heidi Eli Aycock[†]

Dr. Stephen Ronald Aylward and

Mrs. Ann M. Aylward^{*}

Dr. Ronald Tadao Azuma[‡]

Mr. Frederic M. Ball Jr. and

Ms. Ellen Simmons Ball[†]

Ms. Joan Nancy Bardez[†]

Mr. James Lesley Begley[‡]

Mr. Alexander C. Berg and

Mrs. Tamara Lee Berg^{*}

Dr. Sylvia Sloan Black and

Mr. Frederick H. Black[†]

Mr. Rodger Charles Blair and

Ms. Charlene Glassell Blair[†]

Mr. Tony Bo[†]

Dr. Gregory Bollella[‡]

Mr. J. Forrest Boozer[†]

Mr. James William Boughton[†]

Mr. Nicholas L. Brenner[†]

Dr. Edward Glen Britton and

Ms. Kathryn Heninger Britton[†]

Dr. Robert Elijah Broadhurst^{*}

Dr. Frederick P. Brooks Jr. and

Ms. Nancy Brooks^{*}

Mr. Allan Friedman and Dr. Elizabeth

Bullitt^{*}

Dr. Michael Vincent Capps and

Ms. Julianne Peeler Capps[‡]

Dr. Eric Daniel Carlson and

Ms. Marilyn Garbisch Carlson[‡]

Mr. Nicholas George Carr[†]

Mr. T. Andrew Certain and

Ms. Margaret Ayscue Certain[‡]

Ms. Deniese May Chaney and

Dr. Edward Larrette Chaney^{*}

Mr. Sean Vincent Chaney[†]

Dr. David Taiwie Chen^{*}

Dr. Gregory James Clary^{*}

Mr. John Alan Colotta[†]

Mr. Patrick Daniel Conroy and

Dr. Maria Manta Conroy[‡]

Mr. Donald Thomas Coughlin[†]

Mr. Richard S. Craddock Jr. and

Ms. Trina K. Chow[†]

Mr. Reginald Darrell Crosby[†]

Ms. Cynthia Weeks Cutts and

Mr. Matthew Daniell Cutts[‡]

Dr. Bradley Charles Davis^{*}

Ms. Kay Carpenter DiBianca[‡]

Mr. Walter Charles Dietrich Jr.^{†*}

Mr. Nicholas William Dillon[†]

Ms. Maeva Djofack Djoumessi[‡]

Mr. Stephen Edward Duncan[‡]

Ms. Janelle J. Dunigan and

Dr. Thomas Heber Dunigan Jr.^{†*}

Mr. Patrick Allon Dutch[†]

Dr. Jeremy Paul Erickson[†]

Dr. Rickard Edward Faith and

Ms. Melissa R. Clepper-Faith[‡]

Dr. John Michael Fitzpatrick^{*}

Dr. Tom Fletcher IV and Dr. Erin Parker^{*}

Ms. L. Annette Foster[‡]

Dr. Geoffrey Alson Frank[†]

Dr. Yoni Fridman^{*}

Dr. Daniel Scott Fritsch and

Mrs. Jacqueline Fritsch^{*}

Dr. Henry Fuchs[†]

Dr. Jacob David Furst^{*}

Mr. Prathamesh Dilip Gaikwad[‡]

Mr. David Gao[†]

Mr. Wayne Gao and Mrs. Ting Zhou[†]

Dr. John M. Gauch and Dr. Susan E. Gauch^{*}

Mr. Guido Gerig^{*}

Dr. Gennette Delaine Gill[‡]

Mr. John Mark Glotzer[†]

Ms. Dianne Paradise Goff[†]

Mr. Casey B. Goodlett^{*}

Mr. James Mayo Gullett[†]

Mr. Matthew Hara[†]

Mr. J. William Hays[†]

Ms. Sheila Rodenhizer Heath[‡]

Dr. Lenwood Scott Heath[‡]

Dr. Henry Christian Hoffmann[†]

Mr. Ralph Hayes Hofler IV and

Ms. Jenny Strong Hofler[†]

Ms. Barbara Jarmon Holloway and

Dr. Richard Lee Holloway^{*}

Mr. Daniel Thomas Holmgren[†]

Mr. Gregory Allen Hunt[†]

Mrs. Ioana M. Iacob and Mr. Vasile Bud[‡]

Mr. Robert David Idol[†]

Dr. Truman Matthews Jolley Jr. and

Dr. Sandra Negus Jolley^{*}

Mr. Eric Diemer Jones[†]

- Mrs. Sara Moore Jones[†]
 Dr. Sarang C. Joshi*
 Mrs. Karen R. Joyce and Mr. Paul Joyce[†]
 Dr. George Joseph Kalarickal*
 Dr. Robert Alan Katz[‡]
 Ms. Megan Dunigan Klein*
 Ms. Wendy D. Knight[†]
 Ms. Ritu Kochhar Kohnke[†]
 Mr. Eric Jason Kuker[†]
 Mr. James Wesley Kunkle[†]
 Dr. Jan A. Kylstra and Dr. Etta D. Pisano*
 Ms. Susan Barkalow Lambeth and
 Mr. Dan Allen Lambeth[‡]
 Mr. Kenneth William Langley and
 Ms. Ashley Richardson Langley[‡]
 Mr. Thomas A. Lassanske[†]
 Dr. Wei-Jyh Lin^{†*}
 Dr. Xiaoxiao Liu*
 Dr. Yi Liu[†]
 Mr. Max Steven Lloyd[†]
 Dr. D. Brandon Lloyd and Ms. Amy Lloyd[‡]
 Mr. Jameson Fitzpatrick Lopp[†]
 Mr. William Love and Ms. Cheryl Love[†]
 Dr. Gikas Mageras and Ms. Christl Mageras*
 Mr. Matthew Wade Manlove and
 Ms. Mary-Margaret Maynard Manlove[†]
 Dr. Muthiah Manoharan and
 Ms. Pynthamizh Selvi Manoharan[‡]
 Dr. J. Stephen Marron and
 Mrs. Lina Sue Marron*
 Mr. James L. Martin[†]
 Mr. Robert Dean McAfee[†]
 Mr. Omer Fields McCoy III and
 Ms. Elizabeth Hughes McCoy[†]
 Mr. Terence James McDevitt[‡]
 Lt. Col. Leslie Edwin McKenzie Jr.[†]
 Ms. Pamela Lynn McLean[‡]
 Dr. Derek L. Merck and Dr. Lisa Merck*
 Mr. Terence Bernard Messmer and
 Ms. Catherine Campani Messmer[†]
 Dr. David John Middleton and
 Ms. Michele McGrail Middleton[†]
 Dr. David L. Millman[‡]
 Mr. Vernon Boyd Mir and
 Ms. Carol Loeb Mir[†]
 Mr. Nathan James Moon[†]
 Mr. Mark Lee Moore[†]
 Mr. Malcolm Preston Mullen Jr.^{†‡}
- Dr. Lee Richard Nackman and
 Mrs. Ava Hartman Nackman[†]
 Mr. Sunil S. Nagara[‡]
 Dr. Rahul Narain^{†‡}
 Mr. Dong-Young Oh and Ms. Grace Choi[‡]
 Dr. Paul Oliver and Ms. Sheila Barry-Oliver[†]
 Dr. Ming Ouh-Young[‡]
 Ms. Nicole Owens[†]
 Dr. Peter J. Parente and
 Ms. Jacqueline Parente[†]
 Mr. Aaron Thomas Peronto[†]
 Mr. Chad Taylor Petty*
 Mr. David Plaisted and
 Ms. Anne Elizabeth Plaisted*
 Dr. John Wood Poulton and
 Mrs. Susan H.M. Poulton[†]
 Dr. Marcelinus Widita Prastawa*
 Dr. Jan F. Prins*
 Dr. Nikunj Raghuvanshi[†]
 Mr. Rahul Ramkumar*
 Ms. Renee Maheshwari Rashid[†]
 Ms. Paulette Bush Recktenwald[†]
 Dr. Penny Lynne Rheingans and
 Dr. Terry Seung-Won Yoo^{†*}
 Mr. Americo Rodriguez[‡]
 Mr. Bennett Lee Rogers and
 Mrs. Sally DeJoseph Rogers[‡]
 Dr. Bart ter Haar Romeny*
 Dr. Julian G. Rosenman and
 Mrs. Mary Anne Rosenman*
 Dr. Michael Hayden Rosenthal^{†*}
 Mr. Michael Steven Schmidt[†]
 Mr. David Steele Scott[†]
 Mr. R. James Scott Jr.[†]
 Dr. Adam Alexander Seeger and
 Dr. Su-Kyung Chung*
 Mr. Steven Edward Sevcik[†]
 Mr. Chong Shao*
 Dr. Sudipta Narayan Sinha[†]
 Dr. Dick Sites and Dr. Lucey Bowen[‡]
 Dr. Jamie Robert Snape[†]
 Ms. Katherine Soule[†]
 Dr. Jennifer Marie Staab[†]
 Mr. James Robert Stanfield[†]
 Ms. Melanie Anne Stecker[†]
 Dr. George DeWitt Stetten*
 Dr. Joshua V. Stough and
 Dr. Mia R. Lowden^{†*}
- Dr. Maya Shalev Styner and
 Dr. Martin Andreas Styner*
 Mr. William Sutton[†]
 Ms. Kristine K. Taylor[†]
 Mr. Christopher Scott Thompson[†]
 Mr. Jesse Lee Thrall[†]
 Ms. Irena U. Tlalka and Mr. Eric B. Scott[†]
 Mr. Luis Guillermo Torres and
 Ms. Maria Catalina Cuervo[†]
 Mr. Michael Wisely Trinh[‡]
 Mr. Dale I. Troutman and
 Ms. Aimee Dunn Troutman[‡]
 Mr. Russell R. Tuck III and
 Mrs. Debbi T. Tuck[‡]
 Dr. Robert Lindsay Varner Jr. and
 Ms. Marian Sweeton Varner[‡]
 Mr. Jared Vicory*
 Mr. Pritvinath Obla[†]
 Dr. Yihui Wang and Mr. Ping Lu[‡]
 Mr. Kevin Owen Warren[†]
 Mr. Jack Rogers Waters II[†]
 Dr. Michele Clark Weigle and
 Dr. Christopher Charles Weigle[‡]
 Dr. Iris Roshfeld Weiss and
 Dr. Stephen Fredrick Weiss[†]
 Mrs. Carrie Davis West and
 Mr. Braxton Deams West[‡]
 Dr. Ross T. Whitaker and
 Ms. Kerry Kelly Whitaker*
 Mr. Eric Arild Widgren[†]
 Dr. E. Hollins Williams Jr.[†]
 Ms. Kylie Vanhoy Williams[‡]
 Dr. William Vaughn Wright and
 Mrs. Anne Marie Wright[†]
 Mr. Tao Xie[†]
 Ms. Lynda Liwen Yang[‡]
 Ms. Wai Man Yau[†]
 Mr. Calvin W. Young[‡]
 Mr. Liyun Yu*
 Dr. Paul Alexander Yushkevich*
 Mr. Andrew G. Zaferakis[†]
 Mr. James R. Zarfoss III and
 Mrs. Stefanie R. Zarfoss[†]
 Mr. Qingyu Zenyo Zhao*
 Mr. Randall Alan Zielsdorf[†]

[†] Department Trust

[‡] Toolsmith Endowment Fund

* Pizer Conference Room Dedication

50th Anniversary Celebration and Gala

As many of you know, the Department of Computer Science celebrated its 50th Anniversary during the 2014-2015 academic year. The year-long celebration culminated in a Celebration Weekend spanning May 1-3, 2015.

The weekend began with a social event at the Carolina Inn on Friday evening. The alumni symposium on Saturday featured 36 alumni speakers and utilized six different rooms in Sitterson Hall, Brooks Building, and Chapman Hall. Keynotes were given by Marc Levoy, Ramesh Raskar, and Ivan Sutherland. On Saturday evening, we gathered for a Gala Banquet in the Hill Ballroom at the Carolina Inn, where we heard from professors Fred Brooks, Stephen Pizer, and Mike Reiter. Sunday featured an Open House with research demos and a preview of the now-dedicated Stephen M. Pizer Conference Room, ending with a keynote by professor Henry Fuchs and a Carolina BBQ lunch.

For a full list of the alumni symposium lectures with links to video recordings of each talk, please visit cs.unc.edu/50th/celebration/symposium. Remember that the Department now posts recordings of our hosted talks on Youtube. Visit cs.unc.edu/youtube to see all of our videos.

To see more photos from the weekend, visit our departmental Flickr page at flickr.com/photos/uncompsc/albums. If you took your own photos and would like to share them with us, please email pubs@cs.unc.edu.



photos by alumnus Liyun Yu

Faculty launch Consortium for Vision and Virtual Reality (CV²R)



Earlier this year, professors Alex Berg, Tamara Berg, Jan-Michael Frahm, Henry Fuchs, Ming Lin, and Dinesh Manocha launched the Consortium for Vision and Virtual Reality (CV²R), which brings government and industry to partner with UNC in advancing computer vision and virtual reality research and technologies. Consortium members engage with each other and with CV²R faculty and students via an Annual Retreat, networking opportunities, advisory board participation, and focused research collaborations (membership is discounted for UNC alumni).

The Consortium held its inaugural retreat at the Aqueduct Conference Center just outside Chapel Hill on October 14-16, 2015. The retreat featured presentations and demonstrations by researchers at AMD, Dolby, Google, Intel, Microsoft, NVIDIA, Oculus, PhaseSpace, Sony, and Wearality as well as by faculty and students from UNC. To learn more, visit cv2r.web.unc.edu.

Farewell to a Researcher, Teacher, and Mentor



Visitors to the Department of Computer Science will see a slide that is perpetually rotating through the digital displays in the Sitterson Hall and Brooks Building lobbies. It says:

“The programmer, like the poet, works only slightly removed from pure thought-stuff. He builds his castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures.”

Though this quote by Dr. Fred Brooks was written to reflect the process by which a programmer uses code to build a tool with broad and effective utility, building a castle from air is not too different from what he accomplished when he had the ambitious vision to establish one of the nation’s first academic departments focusing on the discipline of computer science--a discipline which at that time had not even settled on the name “computer science”!

Brooks retired in June 2015, 51 years after the Department’s founding, and what was once a fledgling department with offices strewn across six different buildings on campus looks quite different today. The truth, however, is that the differences are superficial. The tenets established by Brooks during the founding of the department remain its pillars today. The Department remains a faculty of teachers and researchers who look outside of computer science in search of ways to improve the lives and experiences of others. The Department is frequently described using words like “collaborative” and “collegial”, and the ideas of an undergraduate student are treated with the same respect as those of a Turing Award winner.

Brooks chaired the Department of Computer Science for the first 20 years of its existence. He has advised at least 40 doctoral dissertations. He has received dozens of awards and founded multiple centers, but the lives he has enriched will be his legacy.

The moniker FREDERICK P. BROOKS JR. COMPUTER SCIENCE BUILDING will remain above the porticoes and planters of the Department’s home as a lasting testament of Dr. Brooks’ service to the University and of the impact that he has had on our Department--an impact which cannot be equaled. Undoubtedly more important to Brooks, however, is the impact that he has had on the lives of the students, faculty, and staff with whom he has worked over the last 50 years. He may have retired from the Department, but he will forever be part of the UNC Computer Science family. Indeed, as Dr. Brooks himself has said many times of his pending retirement, he’s just going off the payroll.

Thank you very much, Dr. Brooks, and enjoy your retirement!

DEPARTMENT NEWS

New Faculty and Staff

Crystal Daniel joined the Department in November 2015 as a proposal specialist. Crystal earned a master’s degree in public administration from UNC in 2006 and came from the Department of Epidemiology.

Jamey Holland is a workstation support technician with the Facilities group. He joined the Department in April 2015, and he previously worked as an information technology administrator for Haugen Consulting.

Kris Jordan joined the Department as a lecturer in August 2015. Kris earned a bachelor of science with honors from

the Department of Computer Science in 2006. He currently serves as technology director for New Media Campaigns, a web design, development, and marketing agency that he co-founded in 2006.

Beth Mayo joined as a human resources specialist in July 2015. She came to the Department from Biltmore Estate in Asheville, where she worked for six years. Beth holds a bachelor’s degree in English from UNC, which she received in 2003.

Shahriar Nirjon (goes by Nirjon) joined the Department faculty as an assistant professor in July 2015. Nirjon received a doctorate in computer science from the University of Virginia in 2014, and his research areas include mobile computing, embedded sensor systems,

wireless networks, and data analytics for mobile systems.

Missy Wood became the Department Business Officer in August 2015. Missy previously served as Manager of the Research Support and Communications group, and she has been with the Department for 13 years.

Hope Woodhouse joined the Department in August 2015 as an events and outreach specialist working with the Research Support and Communications group. Hope earned a bachelor of arts in journalism and mass communication from UNC in 2014.

continued on page 12

Thanks and Farewell

Fred Brooks retired in June 2015 after an incredible 51 years of service to the University and to the Department of Computer Science. Fred was responsible for founding the Department of Computer Science (originally the Department of Information Science) and for instilling the values and ideology that remain central to its mission today. One of our two buildings bears his name.

Latasha Mingo left the Department in May 2015 after serving as the Department's Business Manager for two years. She now supports implementation and training for financial and grant management software at IT Works.

Kristen Palmer was a proposal and outreach coordinator in the Department until January 2015, when she left to take a new job at Georgetown University. Kristen was a member of the Research Support and Communications group for two years.

Alden Sharpe left Chapel Hill in October 2015 for Johnson City, Tennessee. Alden served two and a half years as a member of the Research Support and Communications group, handling faculty support, events, outreach, alumni relations, and many other responsibilities.

Russ Taylor retired in February 2015. Before his retirement, Russ was a research professor of computer science, physics and astronomy, and applied physical sciences, and he was recognized with the UNC Inventor of the Year Award for 2014. Russ has been a faculty member in the department for 21 years after completing his undergraduate and graduate work at UNC. Russ remains an adjunct professor with the Department.

Leandra Vicci retired in September 2015 after 35 years of service. Leandra joined the Department in 1981 to found and direct the Microelectronic

Systems Laboratory, which later became the Applied Engineering Laboratory. She is the inventor of Salphasic Clock distribution, a method for circumventing the limitations of the speed of light on the distribution of clock signals to globally synchronous systems, and a recipient of both the UNC-Chapel Hill Chancellor's Award and the North Carolina Governor's Award for innovation.

Jordan Wolf left the Department in June 2015 for a position in the School of Nursing. Jordan served the Department for two years as a human resources specialist.

CONGRATULATIONS

Faculty and Staff

Sanjoy Baruah was honored by the Technical Committee on Real-Time Systems with the Outstanding Technical Achievement and Leadership Award. More information about this award can be found on page 2.

Alex Berg received a National Science Foundation Early Career Development (CAREER) Award, which carries a \$500k grant for his work titled "Situating Recognition: Learning to understand our local visual environment." The project aims to develop computer vision technologies for recognizing objects in our daily lives. For recognizing visual content around us, where cameras can record multiple images over a period of time, there is an opportunity to take advantage of context that is not available for internet images.

Tamara Berg has been promoted to the rank of associate professor beginning January 1, 2016.

Henry Fuchs was named an IEEE Fellow for 2015 and received the 2015 Steven Anson Coons Award for Outstanding Creative Contributions to Computer Graphics at SIGGRAPH 2015. Read about both awards on page 3.

Kevin Jeffay was recognized by University of Washington Computer Science & Engineering with a 2015 UW CSE Alumni Achievement Award.

Jim Mahaney was recognized with the 2015 Catherine G. Perry Staff Excellence Award. More information can be found on page 2.

Steve Pizer was recognized by his former students, collaborators, and colleagues, who raised the funds necessary to rename a conference room in Sitterson Hall in his honor. A ceremony was held in November 2015 to dedicate the Stephen M. Pizer Conference Room in 284 Sitterson Hall.

Alumnus **Jeff Terrell** (Ph.D. 2009), professors **Kevin Jeffay** and **Don Smith**, and School of Medicine professor Rob Broadhurst were granted a patent, titled Methods, Systems, and Computer Program Products for Network Server Performance Anomaly Detection, in January 2015.

Graduate Students

Ravish Mehra earned a 2015 Dean's Distinguished Dissertation Award for his dissertation *Efficient Techniques for Wave-Based Sound Propagation in Interactive Applications*. Read more about his award on page 2.

Qingyu Zhao's paper "Surface registration in the presence of missing patches and topology change" won the Best Paper Award at the Medical Image Understanding and Analysis conference in July 2015. Co-authors on the paper were fellow graduate student **True Price** and professors **Stephen Pizer**, **Marc Niethammer**, **Ron Alterovitz**, and **Julian Rosenman**.

Undergraduate Students

Maegan Clawges was honored with a University Award for the Advancement of Women for her work as the founder of Pearl Hacks, an annual all-female

hackathon at UNC. You can read more about Maegan and her award on page 3, and you can read about Pearl Hacks on page 5.

SPONSORED RESEARCH

Adaptive and Scalable Network Policy Enforcement. PI: Michael Reiter. U.S. Office of Naval Research.

Aggregate formation under turbulence: small-scale biophysical interactions driving carbon flux in the ocean. Co-PI: Leandra Vicci. National Science Foundation.

“CC-NIE Network Infrastructure: Enabling data-driven research. PI: Jay Aikat. National Science Foundation.”

CGV: Small: Interactive Sound Rendering for Virtual Environments. PI: Ming Lin. National Science Foundation.

Clarity Evaluation. PI: Russell Taylor. Molecular Devices LLC.

Collaborative Research: CyberSEES: Type 2: A New Framework for Crowd-Sourced Green Infrastructure Design. Co-PI: Jack Snoeyink. National Science Foundation.

CPS: Breakthrough: Collaborative Research: Bringing the Multicore Revolution to Safety-Critical Cyber-Physical Systems. PI: James Anderson. National Science Foundation.

CSR: Small: Real-time Computing Using GPUs. PI: Sanjoy Baruah, Co-PI: James Anderson. National Science Foundation.

Dense Crowd Simulation and Applications. PI: Dinesh Manocha, Co-PI: Ming Lin. The Boeing Corporation.

EAGER: Automatic Classification of Programming Difficulties by Mining Programming Events. PI: Prasun Dewan. National Science Foundation.

EAGER: Data Association and Exploitation for Large Scale 3-D Modeling from Visual Imagery. PI: Jan-Michael Frahm, Co-PI: Enrique Dunn. National Science Foundation.

EAGER: Interactive Reconstruction and Visualization of Metropolitan-Scale Traffic. PI: Ming Lin. National Science Foundation.

EAGER: Leveraging 3D structure estimates for photo collection based geo-localization and semantic indexing. PI: Jan-Michael Frahm, Co-PI: Enrique Dunn. National Science Foundation.

Efficient Tracking, Logging, and Blocking of Accesses to Digital Objects. PI: Fabian Monrose. Department of Homeland Security Advanced Projects Research Agency.

GENI in the classroom: Course Modules for Teaching Networking Concepts. PI: Jay Aikat. Raytheon BBN Technologies Corporation.

HCC: CGV: Small: Eyeglass-Style Multi-Layer Optical See-Through Displays for Augmented Reality. PI: Henry Fuchs. National Science Foundation.

II-NEW: A Robot Testbed for Real-time Motion Strategies and Autonomous Personal Assistants. PI: Dinesh Manocha, Co-Inv: Ron Alterovitz, Jan-Michael Frahm, Henry Fuchs, Ming Lin. National Science Foundation.

Integration of Endoscopic and CT data for Radiation Therapy Treatment Planning. PI: Julian Rosenman, Co-PI: Stephen Pizer, Ron Alterovitz, Jan-Michael Frahm. NIH National Cancer Institute.

Mechanisms of Risk and Resilience in ASD: Ontogeny, Phylogeny and Gene Disruption. PI: Martin Styner, Co-Inv: Marc Niethammer. Emory University.

MRI: Development of Pneumatic water wave genesis: a versatile wavemaking instrument for the UNC Joint Fluids Lab. Co-PI: Leandra Vicci. National Science Foundation.

Multi-lumen steerable needles for transoral access to lung nodules. PI: Ron Alterovitz. NIH National Institute of Biomedical Imaging and Bioengineering.

NSF Support for the 2014 USENIX Security Symposium. PI: Fabian Monrose. National Science Foundation.

Poisson. PI: Dinesh Manocha. Sandia National Laboratory.

Privacy on the Line: Next-Generation Defenses for Securing VoIP Communications. PI: Fabian Monrose. U.S. Army Research Office.

REU supplement for UNC GENI. PI: Kevin Jeffay, Co-Inv: Jay Aikat. Raytheon Company.

Robotic Natural Orifice Skull Base Surgery. PI: Ron Alterovitz. Vanderbilt University.

SBIR-Approach-specific, multi-GPU, multi-tool, high-realism neurosurgery simulation. PI: Dinesh Manocha. Kitware Inc.

STTR-Interactive Acoustic Simulation in Urban and Complex Environments (Phase II). PI: Dinesh Manocha. Impulsonic Inc.

STTR-Image-Based Quantification and Analysis of Longitudinal Lung Nodule Deformations. PI: Marc Niethammer. Kitware Inc.

STTR-Scalable Communication and Scheduling for Many-Core Systems. PI: James Anderson. Real-Time Innovations.

Travel Subsidies for 2013 CPS PI Meeting. PI: James Anderson. National Science Foundation - Research.

TWC SBES: Medium: Collaborative: Crowdsourcing Security. PI: Michael Reiter. National Science Foundation.

TWC: Frontier: Collaborative: Rethinking Security in the Era of Cloud Computing. PI: Michael Reiter, Co-PI: Jay Aikat. National Science Foundation.

TWC: Small: Toward Pronounceable Authentication Strings. PI: Fabian Monrose. National Science Foundation.

Unlocking transcript diversity via differential analyses of splice graphs. PI: Jan Prins. NIH National Human Genome Research Institute.

Viewpoint Tracking via Acceleration Stabilized with Computer Vision. PI: Fred Brooks. National Science Foundation.

Workshop: Robot Planning in the Real World: Challenges and Unsolved Problems. PI: Ron Alterovitz. National Science Foundation.

ALUMNI NEWS

M.S. and Ph.D. Alumni

Robert Lewis (M.S. 1981) has had his website on academia ranked among the top 2% in the world: (fordham.academia.edu/RobertLewis).

Ray Van Dyke (B.A. 1985, M.S. 1989), a patent practitioner in Washington, DC, is teaching a course on the basics of intellectual property for the Bar Association of Montgomery County, Maryland, where he is Chair of the intellectual Property Section; continues as Chair of the Greater Washington, DC Chapter of the Licensing Executives Society; and is an officer in the Patent Lawyers' Club of Washington, DC.

Mary Szymkowski (M.S. 1991) purchased The Cat Hospital of Durham and Chapel Hill in August 2015, realizing her dream of owning a veterinary practice.

Ronald Azuma (M.S. 1990, Ph.D. 1995) was named an IEEE Fellow for 2016, and was a panelist at SIGGRAPH 2015 on the panel “The Renaissance of VR: Are We Going to Do it Right This Time?”

Sixth Sense was purchased by Evolving Systems for \$10 million. **Don Stone** (Ph.D. 1995), who had served as Chief Technology Officer for Sixth Sense, assumed the position of Vice President of Research & Development.

continued on page 14

Dan Palmer (Ph.D. 1996), Russell Eberhart, co-inventor of Particle Swarm Optimization, and Marc Kirschenbaum hosted the Swarm/Human Blended Intelligence Workshop (SHBI 2015) in September 2015. This IEEE and ACM sponsored workshop featured research on the interaction between human and machine intelligence. It also featured a particle swarm simulation in which humans on a large field played the role of particles.

FAMILY MATTERS

Joshua Kon (B.S. 2010) and **Caitlyn Losee Kon** (B.S. 2010, M.S. 2012) welcomed their first child, Michael Robert in June 2015.

Tabitha Peck (Ph.D. 2010) and **David Borland** (M.S. 2003, Ph.D. 2007) welcomed twins, Ewen Harrison and Fiona Ruth in November 2014.

IN MEMORIAM

Andrea Bunn lost her battle with cancer in September 2015. Andrea worked as an accounting tech in the Department for more than 13 years. Her attention to detail kept the Department in compliance with the requirements for many research projects. Andrea will be remembered for being quick to smile and to offer support or words of encouragement to anyone that she came into contact with. Her love for her computer science family was evident in all that she did. She was and always will be part of the fabric of this Department.

Robert Liverman (M.S. 1990) passed away in May 2015. Bob loved computers, reading, movies, photography, and traveling and was a veteran of the US Naval Reserves.

Mark Mine (M.S. 1994, Ph.D. 1997) was recognized in February 2015 by the 13th Annual Visual Effects Society Awards in Los Angeles with an award for Outstanding Visual Effects in a Special Venue Project. Mine, along with Tony Apodaca, Marianne McLean, Gilles Martin, and Edwin Chang, worked on *Ratatouille: L'Aventure Totalement Toquée de Rémy* (English: *Ratatouille: The Adventure*), the new trackless ride in La Place de Rémy at Walt Disney Studios Park in Disneyland Paris. Read more about Mark's work with Disney on page 4, and check the online edition of the News & Notes to see a video of the ride.

Miguel Otaduy (Ph.D. 2004) was elected to the 2015 Eurographics Association Executive Committee.

"First," a real estate startup co-founded by **Jess Martin** (M.S. 2007), received investments totaling \$750k during the summer of 2015.

Tabitha Peck (Ph.D. 2010) was hired as an assistant professor of mathematics and computer science at Davidson College in August 2014.

Undergraduate Alumni

Mark Hutchinson (B.S. 1981) participated in the NC Data4Good event in November 2015 to help the United Way and Foodbank of Central and Eastern NC feed the hungry. He plans to work with culinary schools, university and high school nutrition programs, grocery stores, Campbell Law School, UNC-Chapel Hill School of Government, and transportation companies to help tackle the huge problem of hunger in our state.

Andrew Certain (B.S. 1992) was recently promoted to senior principal engineer at Amazon Web Services.

In Fall 2015, **Amy Rae Fox** (B.S. 2004) entered the doctoral program in Cognitive Science at University of California at San Diego, advised by Professor Jim Hollan. Amy joined the

Design Lab, where she will research how human conceptualization of space, time, and number informs the design of information visualizations.

Kris Jordan (B.S. 2007) was hired by the Department of Computer Science as a lecturer. You can read about his experience teaching COMP 110 on page 7, and additional content about his work with New Media Campaigns can be found in the online edition of the News & Notes.

Calvin Young (B.S. 2010) was named to Forbes' 30 Under 30 in Consumer Technology for 2015. Calvin and his company Twice were recently featured in issue 52 of the News & Notes, which is available online at cs.unc.edu/news-and-notes.

RECENT PUBLICATIONS

Yuval S. Boger, Ryan A. Pavlik, and Russell M. Taylor II, "OSVR: An Open-Source Virtual Reality Framework for both Industry and Academia," IEEE VR 2015, March 2015. p. 383-384.

Jeremy Cribb, Lukas Osborne, Joe Hsiao, Leandra Vicci, Alok Meshram, E. Tim O'Brien III, Russel Taylor, II, and Richard Superfine, "A High Throughput Array Microscope for the Mechanical Characterization of Biomaterials," Review of Scientific Instruments 86, 2015.

Robert M. Judith, Jay K. Fisher, Richard Chasen Spero, Briana L. Fiser, Adam Turner, Bruce Oberhardt, R.M. Taylor, Michael R. Falvo, and Richard Superfine, "Micro-elastometry on whole blood clots using actuated surface-attached posts (ASAPs)," Lab on a Chip, 10.1039/C4LC01478B, 2015.

Richard J. Kelly, M.B., Ch.B., Ph.D., Britta Höchsmann, M.D., Jeff Szer, M.B., B.S., Austin Kulasekararaj, F.R.C.Path., Sophie de Guibert, M.D., Alexander Röth, M.D., Ilene C. Weitz, M.D., Elina Armstrong, M.D., Ph.D., Antonio M. Risitano, M.D., Ph.D., Christopher J. Patriquin, M.D., Louis Terriou, M.D., Petra Muus, M.D., Ph.D., Anita Hill, M.B., Ch.B., Ph.D., Michelle P. Turner, M.S., Hubert Schrezenmeier, M.D., and Regis Peffault de Latour, M.D., Ph.D. "Eculizumab in Pregnant Patients with Paroxysmal Nocturnal Hemoglobinuria." New England Journal of Medicine. 373(11), Sep 2015. p. 1032-1039.

Josh Lawrimore, Mr. Joseph Aicher, Mr. Patrick Hahn, Alyona Fulp, Mr. Ben Kompa, Dr. Leandra Vicci, Dr. Michael Falvo, Dr. Russell Taylor II, "ChromoShake: a chromosome dynamics simulator reveals chromatin loops stiffen centromeric chromatin," *Molecular Biology of the Cell* (in press).

Josh G. Lawrimore, Paula A. Vasquez, Michael R. Falvo, Russell M. Taylor II, Leandra Vicci, Elaine Yeh, M. Greg Forest, Kerry Bloom, "DNA loops generate intra-centromere tension in mitosis," *Journal of Cell Biology* 210 (4), 2015.

Robert H. Lewis, E. Coutsias. "Flexibility of Bricard's Linkages and Other Structures Via Resultants and Computer Algebra." *Mathematics and Computers in Simulation*. Nov 2014.

Amy L. Oldenburg, Xiao Yu, Thomas Gilliss, Oluwafemi Alabi, Russell M. Taylor II Melissa A. Troester, "Inverse power-law behavior of cellular motility reveals stromal-epithelial cell interactions in 3D co-culture by OCT fluctuation spectroscopy," *Optica* 2(10), p. 877-885. 2015.

Chong Shao, Alfred Zhong, Jeremy Cribb, Lukas D. Osborne, E. Timothy O'Brien III, Richard Superfine, Ketan Mayer-Patel, Russell M. Taylor II, "Analysis-preserving video microscopy compression via correlation and mathematical morphology," *Microscopy Research and Technique*, October 15th, 2015. (in press).

Ronald Azuma. Location-Based Mixed and Augmented Reality Storytelling. In: Woodrow Barfield. *Fundamentals of Wearable*

Computers and Augmented Reality. 2nd ed. 2015, CRC Press. p. 259-276.

Steven M. Bellovin. 2015. *Thinking Security: Stopping Next Year's Hackers*. Addison-Wesley Professional. 400 pages.

Jason Jerald. 2015. *The VR Book*. Morgan & Claypool and ACM Books. 599 pages.

Toolsmith Endowment Fund

The Toolsmith Endowment fund was created last year to honor the Department's 50th Anniversary and the retirement of our founder, Dr. Fred Brooks. The fund is named after a paradigm of computer science research developed by Brooks, and it looks to build a sustainable discretionary funding base for Computer Science at UNC-Chapel Hill.

The computer scientist as toolsmith refers to the idea that successful computer scientists create tools and solutions to address the needs and enhance the work of others. In the words of Dr. Brooks, "A toolmaker succeeds as, and only as, the users of his tool succeed with his aid. However shining the blade, however jeweled the hilt, however perfect the heft, a sword is tested only by cutting. That swordsmith is successful whose clients die of old age."

To honor the Carolina way of computer science, the Toolsmith Endowment Fund supports undergraduate student projects, graduate student fellowships, course development, and other important and urgent departmental needs.

For your convenience, there are multiple ways to contribute to the Toolsmith Endowment Fund. To make a gift online, go to <http://giving.unc.edu/gift/comp> and select it from the dropdown menu. If you would prefer to give by mail, please make checks out to "UNC-CH Computer Science" with the Toolsmith Endowment Fund indicated in the memo section and mail to the address below.

Please address checks to:

Missy Wood
Campus Box #3175
Department of Computer Science
UNC – Chapel Hill
Chapel Hill, NC 27599-3175

If you have questions about giving to UNC Computer Science, please contact:

Michael J. Fern, PhD
Associate Chair
Department of Computer Science
919.590.6077 | fern@cs.unc.edu

Kiley Moorefield
Associate Director of Development
The Arts & Sciences Foundation
919.843.4454 | kileyann@email.unc.edu



News & Notes

DEPARTMENT OF COMPUTER SCIENCE
COLLEGE OF ARTS & SCIENCES
THE UNIVERSITY OF NORTH CAROLINA
CB 3175, BROOKS COMPUTER SCIENCE BUILDING
CHAPEL HILL, NC 27599-3175

EDITORS

BRETT PIPER
ALDEN SHARPE
HOPE WOODHOUSE
pubs@cs.unc.edu

GENERAL INFORMATION

VOICE: (919) 590-6000
FAX: (919) 590-6105
E-MAIL: info@cs.unc.edu
WEB: www.cs.unc.edu

ADDRESS CORRECTIONS, SUBMISSIONS, AND FOR
INFORMATION ABOUT OUR PUBLICATIONS: pubs@cs.unc.edu

UNC IS AN EQUAL OPPORTUNITY/
AFFIRMATIVE ACTION INSTITUTION

Let us know where you are and what you are doing so that we can include you in our next issue! Email pubs@cs.unc.edu; fax to (919) 590-6105; or mail to the address above, c/o News & Notes. If you fax or mail your information, please include your e-mail address.

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

Support UNC CS

We greatly appreciate the ongoing support that our community provides. Your gifts allow the department to focus on the needs of our students and our contributions to the field of computer science. To make a donation, please visit our secure portal at giving.unc.edu/gift/comp.



UNC
COLLEGE OF
ARTS & SCIENCES



Professor Steve Pizer was recognized on Friday, November 13, when 284 Sitterson Hall was officially dedicated as the Stephen M. Pizer Conference Room. Brad Davis and Ross Whitaker led the campaign to name the room, raising money from Pizer's former students, collaborators, co-workers, and friends.