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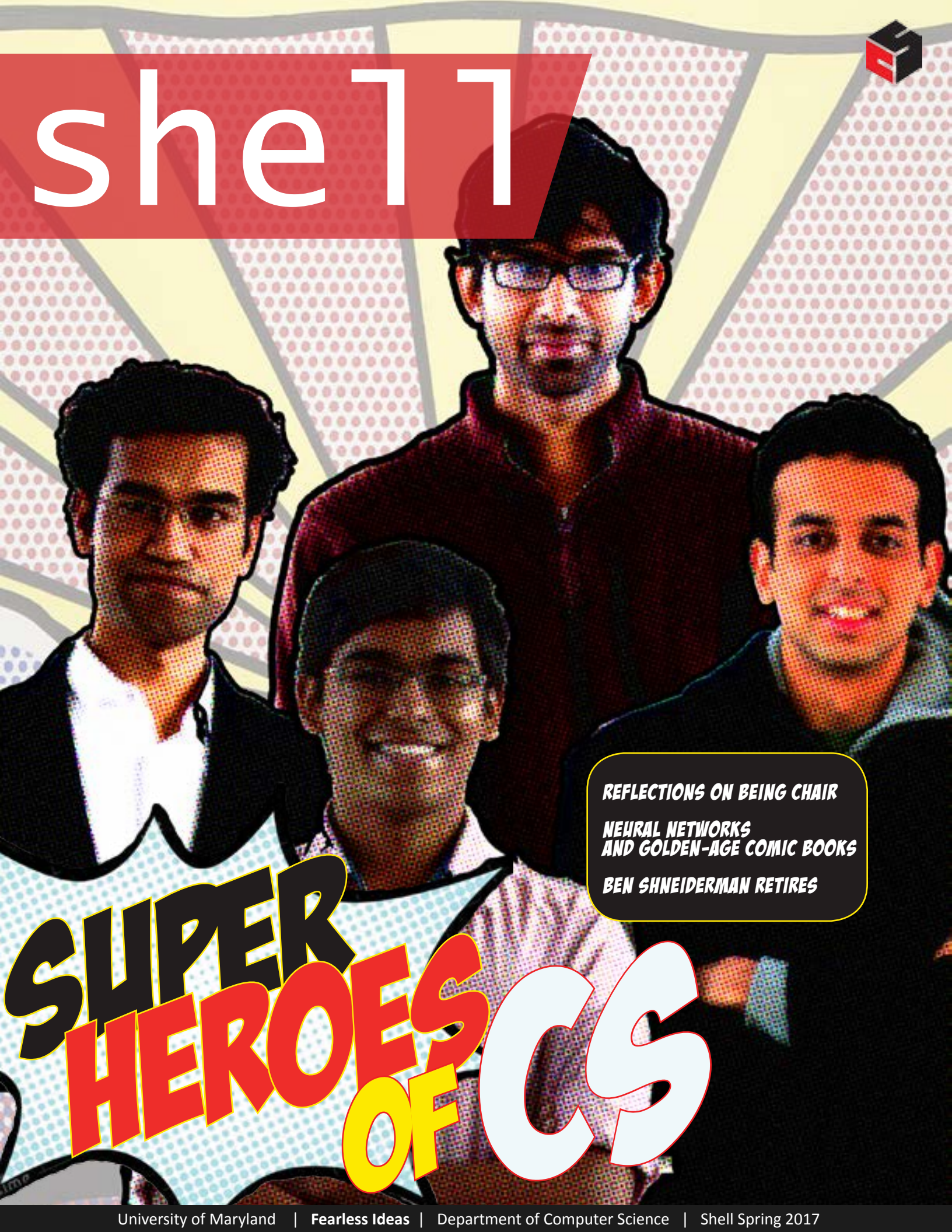

REFLECTIONS ON BEING CHAIR

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SUPER HEROES OF CS

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Reflections on being Chair

Dear Colleagues:

This is my last official letter as chair—the department is on an excellent trajectory and I hope for an even greater future. I encourage you all to follow news about the Computer Science Department on our website and social media.

I'd like to note a few major changes in the last five years.

A NEW HOME

The department is finally scheduled to move into the Brendan Iribe Center for Computer Science and Innovation after three decades in our "temporary home," the A.V. Williams Building. In February of 2014, I invited Brendan Iribe and Michael Antonov to visit the department. In April, they visited for Bitcamp, and during that visit were inspired and eager to support a new space for computer science at Maryland with extraordinary gifts. This project has brought faculty and staff together, and has been a game changer for us all. The Brendan Iribe Center will have inviting open spaces for study and collaboration, welcoming natural light, modern classrooms for active learning, and a cafe!

The new space will be a major recruiting tool for our department. The building will have a major impact on generations of students. With the co-location of the Computer Science Department, the University of Maryland Institute for Advanced Computer Studies (UMIACS) and other related faculty and labs, we expect this building to strongly influence the already innovative research being conducted here, especially in the areas of robotics and virtual reality.

I would especially like to acknowledge the hard work of our space committee, chaired by Professor Jeff Hollingsworth and Professor Neil Spring. Our work has been supported by the fundraising efforts of Emeritus Professor Bill Pugh and Stacey Sickels Locke as well as by the communications team of B.K. Adams and Todd Holden. I would like to acknowledge all of our donors, as well. Their engagement and commitment to the department has been truly inspiring. Our alumni and friends have supplied us with energy for us to give more than 100 percent to this project every single day. The Iribe Center and the work associated with it has received immense support from the State of Maryland as well as our campus administration including President Wallace Loh, Provost Mary Ann Rankin and Dean Jayanth Banavar. For all of their support and best wishes, we are eternally grateful. I would also like to thank Carlo Colella, Ross Stern, and Bill Olen, as well as the team at HDR Architecture including Brian Kowalchuk, Rachel Park, Stephen Waller, and Michael Vinkler.

NEW HIRES AND NEW CHAIRS

A huge step in the department has been the recruitment of talented and brilliant faculty and staff members. In the last five years we have hired gifted assistant professors including David Van Horn, Zia Khan, Tom Goldstein, Michelle Mazurek, Marine Carpuat, David Levin, John Dickerson, Furong Huang, and Max Leiserson. We have also hired excellent senior faculty including Andrew Childs, Eytan Ruppin, Daniel Abadi, and Matthias Zwicker. We welcomed inspiring lecturers including Pedram Sadeghian, Anwar Mamat, and Jason Fillipou. These faculty enable us to offer new courses, and build strength in quantum computing, cybersecurity, computational (systems) biology, personalized medicine, language processing, machine learning, databases and augmented and virtual reality. We have recently hired four new assistant professors including Jordan Boyd-Graber, Xiaodi Wu, Leilani Battle, and Abhinav Shrivastava.

We have three new chaired professorships funded by Elizabeth Iribe that have helped us to recruit talented people to the department. We also have a new prestigious post-doctoral fellowship founded by Emeritus Professor Vic Basili.

UNDERGRADUATE INITIATIVES

As many of you know, the nationwide trend of increasing enrollment in Computer Science has been amplified at Maryland. The number of majors will have increased from 900 in 2010 to over 3100 by fall semester of 2017. Unlike most other comparable departments, enrollment in CS at Maryland is not limited. In order to help with this rise in the number of students, we have hired additional academic advisors (bringing the total up to five), and we have recently hired a new assistant director for the undergraduate program. This rapid growth in the number of students has been a challenge for everyone, especially the undergraduate office and Associate Chair Professor Alan Sussman.

For our many undergraduates we have created new major specializations in data science and cybersecurity, and we have added several exciting courses in robotics, virtual reality, machine learning, data science, and web development. We have several new scholarships for our outstanding students including our newest scholarship named for Randy Baden, Ph.D. '12. Our CS honors program is thriving thanks to the work of Professor Neil Spring. Our students have worked on research with professors, and they have spent time studying abroad. We continue to sponsor hackathons both inside of the department and around campus. They are fantastic opportunities for our students to work and collaborate on group-defined projects, have fun, and learn something new. When it is time for our students to look for internships or full-time jobs, our two career fairs per year bring over 200 companies on campus and over 3000 participating CS, CE, and i-School students. It's a sight to behold.

GRADUATE STUDENT INITIATIVES

For our graduate program, we are so proud to have launched the Maryland Max Planck Ph.D. Program in Computer Science. It offers students a singular opportunity to pursue a Ph.D. degree with faculty from our department and a Max Planck Institute in Germany. Graduate students are co-advised, perform collaborative research and take advantage of the expertise, resources, and culture at both institutions by spending time in both countries. Without Professor Bobby Bhattacharjee and Professor Peter Druschel, this international exchange of ideas and research could never have happened. I am grateful to them both.

ALUMNI AND OUTREACH INITIATIVES

In 2013, we launched a major alumni outreach initiative as we planned the department's 40th anniversary event, with Professor Ashok Agrawala leading this effort. In order to reconnect with our alumni, we created an email list of over 1000 successful and talented graduates. We continually update them about what is going on here, learn how we can further reconnect with our alumni, and continue to help them in their ventures. Many of our former students come back to visit. We have continued to host events all over the country with some in New York City, Seattle, Washington D.C. and the Bay Area—places where many alumni live and work. In addition, we launched the Corporate Partners in Computing (CPIC) program with UMIACS, and this has led to increased engagement between our faculty and students with local, national, and international companies.

In one of our largest community and outreach initiatives, we opened the Maryland Center for Women in Computing (MCWIC) in 2013-14. Jan Plane currently serves as the center's director and she is assisted by Kate Atchison, our excellent coordinator. They run several programs, perhaps the most notable being summer programs for middle and high school students and the management of the Building, Recruiting, And Inclusion for Diversity (BRAID) program that has now provided funding to send over 150 students to the Grace Hopper Celebration for Women in Computing. I am also delighted to announce Brendan Iribe's continued and kind support for several programs being run out of MCWIC.

I would like especially to thank Professor Bill Gasarch, who has run our summer Research Experience for Undergraduates program with great enthusiasm. We have had 100 students from all over the country participate in this program already. We have even invited talented high school students to participate, as well.

NEW TECHNOLOGY

I would also like to thank Phil Horvitz, '75 for providing us generous funding towards the Horvitz Research Cluster in the AV Williams datacenter. The cluster consists of four computing nodes, two storage nodes providing 14.4 terabytes of disk storage and a 10Gb Ethernet switch. The cluster provides a high-availability virtualization environment to serve the needs of undergraduate honors students, independent graduate student researchers, and faculty.

AWARDS

Many of our faculty and graduate students have received numerous awards from the university and outside organizations including Sloan fellowships, CAREER awards, and best paper awards. Several of our graduate students have landed outstanding academic and research positions. Thanks to the efforts of our able and hardworking Associate Chair Professor Jeff Foster, we have also had a steady stream of impressive on-and-off campus awards for our students. As for undergraduates, we have nominated several students to the Computing Research Association (CRA) undergraduate research competition. Many of our students have been named finalists

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or have received honorable mentions. Before they leave for graduate school several of our undergraduates have received NSF Graduate Fellowships, as well. Research is important for all of our students, and I am proud that they work with our outstanding faculty. This hard work results in their getting admitted to top graduate programs.

EXPERIENCE AND ADVICE

My experience has not always been perfect. I have had my fair share of challenges and frustrations leading such a large, sometimes unpredictable, but ultimately superior department. In my own humble view, a significant challenge we sometimes face is that we are not consistently more than the sum of our parts. My greatest wish for all of us is that our senior faculty come together more often to accomplish more great things, and provide leadership and guidance to our junior faculty, staff, graduate students, and undergraduate students.

We started this effort in the strategic planning process in Spring semester of 2015, and I look forward to seeing these plans carried out. I would like to see the computer science department become a more diverse group of scholars. I am especially proud of how the number of women in the undergraduate program has increased from fewer than 100 in 2010 to nearly 600 in 2017. We also have one of the most racially and ethnically diverse groups of undergraduates in the nation. We have improved so much, but there is still a long way to go.

There will be a time when our students have an equal number of men and women faculty members who are inspiring them, teaching them, guiding their research, and advising them through undergraduate research, master's theses, and the Ph.D. defense.

THANK YOU

I am incredibly grateful to the campus and department administration for their support. I am so thankful to my colleagues for this opportunity to have served the department for the last five years. I would like to acknowledge Pat Ipavich, Stephanie Peters, Sharron McElroy, Brenda Chick, Adelaide Findlay, B.K. Adams, Todd Holden and Stacey Locke. They have dealt with me patiently, responded to my late night and early morning phone calls and emails, and kept everything running. It has been an honor and pleasure to work with them. The department has brilliant, thoughtful, and tenacious staff. They have taken on the significant challenge of new initiatives that the department has launched, all in addition to our current and existing activities. The number of evening and weekend events for both faculty and staff has been at an all time high.

I thank everyone for their hard work in this time of change for CS, but especially Professor Emeritus Bill Pugh, who is an eternal fountain of good ideas, and who has been integral to funding the Sandbox makerspace and CS Education for tomorrow.

Computer science is a field full of disruption, unconventionality and brilliant thinking. These are some of the core characteristics of our amazing department. Faculty educate and inspire students, and students in turn inspire us to work harder. Through our new group of young faculty we can expect groundbreaking, inspiring research and a future filled with successes.

The unprecedented support of our alumni is astounding. I am especially thankful for the gifts that Brendan and Lizzie Iribe, Michael Antonov, Bob Reisse, Dana Reisse and Jagdeep Singh have bestowed upon our department. Their love for the university and particularly the department has been especially heart warming. My hope is that together, we will make our accomplished alumni and generous friends even prouder of the department then they already are.

As for me, I am looking forward finally to spending time with my family and graduate students once again. They have hardly seen me in these last five years. They have all been so incredibly supportive throughout my time as the chair of the best computer science department in the world. They (and I) are counting the days until June 30th, 2017.

This department is one that is daring. It is one that is unconventional. It has a cast of characters who challenge each other and push established limits, and embark upon paradigm-shattering ideas. At times, through sheer force of will, we have achieved and continually strive for unrivaled success.

Samir Khuller
Professor and Elizabeth Stevinson Iribe Chair

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CONSTRUCTION UPDATE:

The Brendan Iribe Center

for Computer Science and Innovation

Construction of the Brendan Iribe Center for Computer Science and Innovation is underway. In late August of 2016, workers with excavators began unearthing the parking lot and tunneling through concrete in order to set the foundation for the building. Professor Jeff Hollingsworth and Associate Professor Neil Spring have been with the project since its earliest inception—serving as the co-chairs of the department's building committee. Recently, they agreed to answer some questions about the building's progress. To learn more about the Iribe Center and to watch the 24-hour construction camera, please visit iribe.cs.umd.edu.

What does the timeline look like for the building at this point?

The crane just arrived and the steel is starting to go up. This is a very exciting stage of the project because the overall shape and size of the building will soon be visible. We are still looking forward to completion in fall of 2018.

Have there been any setbacks to the process?

It took a bit longer than we hoped to figure out and fabricate the steel for the rounded front of the building. Also, some underground conditions near the site needed additional work like replacing an old manhole and working around all the things already buried under Paint Branch Road.

Are there any challenges (that you can share) that are particularly compelling?

There's a list of, so far, 263 questions from the builder back to the architect, often looking to resolve conflicts, where, say a pipe on one diagram runs through a glass pane or steel beam on another. In writing software, a compiler and linker report conflicts and test cases find errors, but designing a building still needs manual effort to identify conflicts and track changes.

Compared to when we built the Computer Science Instruction Center (CSIC) about 15 years ago, it is amazing how many of these conflicts are caught before any materials are brought to the site.

Samir Khuller and Brendan Iribe
credit: Mike Morgan

Will you be among the first people allowed to see the Edward St. John building? What are your expectations for that space, and will that inform you in any way about the Iribe Center?

We've visited the ESJ construction site a few times already, looking at whether the large lecture halls will work for us: that they have a gentle rake and aren't too deep, and that students can turn around and work with those in other rows.

We want our classrooms to support collaborative learning: to have students working together to solve problems. ESJ is built for this, and we think that with these spaces for CS, it will be easier for us to teach using active learning techniques.

Overall, ESJ is a great facility, but we have found a few things (like positions for screens and flat panel monitors) that we will move a bit in the Iribe Center based on what we saw in that building.

Are there additional things that committee members will be asked to do in the coming weeks or months?

The committee will be working on finalizing the choices of things like office furniture and equipment for the building. There are an amazing number of things you need for a new building, from networking equipment to mops. It all costs several million dollars and must be carefully planned and ordered.

As you see the building rising from the excavation pit, what are your hopes for it? What do you see it doing for the department and the community at large?

The Iribe Center will bring us together and give us many places for chance meetings with dozens of colleagues on the same floor. Students and visitors will be able to be in the building without being in an office or in a hallway.

We hope it will promote more collaboration among the CS Department, UMIACS, and the rest of the University. It is a privilege for us to be located at such a prominent location, right at the main entrance, With that, we have a responsibility to be ambassadors for campus and welcome the university community.

What is one thing that you wish would go in the building but cannot—due to budget constraints or space constraints?

With any project, your desires are much larger than you can afford. For example, we saw this great glass that changes from clear to opaque at the flip of a switch. You could use it instead of blinds. It's a great technology, but ridiculously expensive so we didn't put it into the building. You also have to look not only at what it costs to build something, but also what it will cost to keep it looking good and running for decades. Some materials looked great, but it was clear that they would need replacing every few years. We instead chose materials that would last a long time.

Have decisions been made about faculty and staff offices and spaces?

Offices are shaped within several constraints: campus standards, maintainability, and cost. We ensure that there's enough network connectivity, furniture we can move and swap, and mostly uniform office sizes despite a curved building. All of the spaces are designed, but it will be a while before we decide who will get which offices. People and projects are constantly changing at the university. It's best to wait as long as possible before assigning people to specific spaces.

Is there any other information that you'd like for us to know?

There is a huge team working on this building! Security, safety, mechanical, structural, a/v, equipment, sustainability, electrical, etc., and everyone is invested in making the best building we can.

Jon Froehlich & Tom Goldstein

SLOAN FELLOWS for 2017

On February 21st 2017, the Alfred P. Sloan Foundation named its newest class of Sloan Research Fellows. This year, the Computer Science Department has the distinct honor of having two members of this year's class of fellows: Assistant Professor Jon Froehlich and Assistant Professor Tom Goldstein. They are among 126 researchers who have been awarded two-year fellowships "in recognition of their distinguished performance and a unique potential to make substantial contributions to their field."

Jon Froehlich joined the Department of Computer Science in 2012 after earning a doctorate in computer science from the University of Washington in 2011. "I am truly honored to receive the Sloan—an award that so many great, inspirational scientists have received and one that I previously thought unattainable for myself. I truly believe, however, that the recognition should be shared with my wonderful students and collaborators who help enable and enrich my research. I am also thankful for the support of the CS department and my colleagues in the Human-Computer Interaction Lab who have helped mentor and inspire me," he said.

Tom Goldstein joined the Department of Computer Science in 2014 after spending time as a post-doctoral associate at Stanford University and Rice University. He earned a doctorate in applied mathematics from the University of California Los Angeles in 2010. "When I found out I got the Sloan I was pretty overwhelmed. I know many great people who have gotten a Sloan, and I never expected to be among them," he said. "Even though this award goes to one person, the award was really given for work I did (and am still doing) with a number of people."

He added, "I'm incredibly grateful to my advisors and collaborators for teaching me how to be successful in research. In particular, Stanley Osher, Richard Baraniuk, Guillermo Sapiro, and Mario Figueiredo have been incredibly influential on my research, and have helped guide me in the right directions. My long-time collaborators, among them Christoph Studer and Gavin Taylor, have been an endless source of good ideas."

Samir Khuller, The Elizabeth Stevinson Iribe Chair of Computer Science, expressed joy about these two awards. "The Sloan fellowship is one of the most prestigious fellowships for young scientists. I am so very delighted that Jon Froehlich and Tom Goldstein have won this very prestigious fellowship. This is the first time in the history of our computer science department that we have had two awardees in one year. Both professors represent very different viewpoints and fields in computer science—and this shows the breadth and excellence of computing at the University of Maryland. Jon and Tom have made all of us proud and they underscore the exciting research and happenings in Computer Science here at the University of Maryland," he said.

NSF CAREER AWARDS

FOR Professor & Alumna

Assistant Professor Jon Froehlich, who also has an appointment in the university's Institute for Advanced Computer Studies (UMIACS), is the recipient of a five-year National Science Foundation Faculty Early Career Development (CAREER) award. His work, *A Tangible-Graphical Approach to Engage Young Children in Wearable Design*, enables children as young as five to be able to engage with technology through physical objects to learn concepts from programming to design to data science. Children are able to manipulate and arrange objects to perform tasks (such as arranging tiles to create blinking lights in order to enhance a costume) to intuitively learn important fundamentals concepts in computer science. These same objects can be used by older children to further develop their understanding as they create innovative projects of their own design including interactive pedometers, or lacrosse sticks that record approaching opponents. The CAREER award supports early career-development activities teacher-scholars "who most effectively integrate research and education within the context of the mission of their organization. Such activities should build a firm foundation for a lifetime of integrated contributions to research and education."

Froehlich's project is certainly in line with this mission, as well as his larger research agenda to examine how wearables can be designed to provide children (and their families) with relevant, meaningful STEM experiences.

"Jon's energy and dedication to this work is inspiring," said Samir Khuller, Elizabeth Stevinson Iribe Chair of Computer Science, "and his ability to encourage his graduate students and undergraduate students in this multidisciplinary work bodes well for the future of the department."

Froehlich joined the Department of Computer Science in 2012 after earning a Ph.D. in Computer Science from the University of Washington in 2011. He is also the founder of the Makeability Lab, which is a part of the Human Computer Interaction Lab. The Makeability Lab designs and studies "novel interactive experiences that cross between bits and atoms—the virtual and the physical—and back again" to support, promote and improve environmental sustainability, health and wellness, education, and universal accessibility.

Barna Saha, Ph.D. '11 (pictured left with Samir Khuller) was awarded a National Science Foundation (NSF) Career Award for 2017. Samir Khuller, Elizabeth Stevinson Iribe Chair of Computer Science, served as her advisor. Saha is currently a professor at University of Massachusetts Amherst College of Information and Computer Science. Her specialties include theoretical computer science and data management. In an interview published by UMass Amherst, Saha explained that she will be working on what problems can be solved by computers in a reasonable amount of time and which are problems that, "no matter how clever you are, you cannot solve them efficiently," she said.

GRADUATE STUDENTS
Earn Prestigious Fellowships

Ph.D. student Elissa Redmiles has been named a Facebook Fellow for 2017. She joins twelve other fellows from universities all over the world named to the honor this year. The fellowship was started six years ago "to encourage and support promising doctoral students engaged in innovative and relevant research across computer science and engineering."

"This year we received over 800 applications from promising Ph.D. students," said Rebekkah Hogan, Facebook Fellowship Program Manager. "The 2017 Fellows represent some of the most talented young researchers in computer science and engineering disciplines from universities across the globe."

After learning about this fellowship, Redmiles was invited to the Facebook Women in Research Invitational Summit. While at the summit, she met Regina Dugan, former head of DARPA, now head of Building 8 (a secret research and development team) at Facebook. She also heard from women researchers in security and virtual reality, and she met the sole woman on the Hadoop team.

"It was ready great to connect with both of them and also to connect with the other attendees," said Redmiles. "I really loved that one of the women said that when she was invited to this and to a Facebook machine learning event, it made her feel really proud and powerful. I thought that was great!"

Ph.D. students Milod Kazerounian and Elissa Redmiles (pictured above) have been named as National Science Foundation (NSF) Graduate Research Fellows for 2017. Kazerounian's advisor is Professor Jeff Foster, and Redmiles' advisor is Assistant Professor Michelle Mazurek.

Two undergraduate computer science majors have been named NSF Graduate Research Fellows as well: Katherine Cordwell, who is a double major with mathematics, and Jonathan San Miguel who is a double majoring with physics.

ALUMNI
OF THE YEAR

In May 2017, Jagdeep Singh,'86, Qiang Yang Ph.D.,'89 and Rajiv Gandhi Ph.D.,'03 will be inducted into the Alumni Hall of Fame.

Jagdeep Singh

Jagdeep Singh has spent his life as an entrepreneur and innovator. After finishing his undergraduate degree at the age of 19, Singh went to work for Hewlett-Packard before founding several very successful companies. He is currently the cofounder and CEO of QuantumScape Corporation, a startup constructing a fundamental disruption in the energy storage sector. Prior to his work at QuantumScape, he was cofounder and CEO of Infinera Corp (NASDAQ: INFN), developer of the world's first large-scale photonic integrated circuits and optical transmission systems based on these chips. At Infinera, Singh led the company to the number one market share position in North America and he took the company public in an IPO valued at over one billion dollars. Singh also founded and was the CEO of Lightera Networks, an optical switch company which was acquired by CIENA Corporation. For his work with Lightera in 1999, Singh was named to MIT Technology Reviews' Innovators Under 35 list. Lightera's flagship product, the Core Director, generated more than one billion dollars in revenue with top telecommunications carriers around the world. He also founded two additional companies OnFiber (where he was also CEO), an optical telecommunications carrier that was acquired by Qwest Communications, and AirSoft, a software company focused on communication protocols for low bandwidth, high latency networks such as those found in wireless and remote access networks.

He holds a B.S. in Computer Science from the University of Maryland, an M.S. in Computer Science from Stanford University, and an MBA from the University of California, Berkeley. Singh served on the Stanford Graduate School of Business Advisory Board from 2004-2006, and has been recognized for his contributions to the industry through numerous awards, including Ernst and Young Entrepreneur of the Year and Light Reading Person of the Year.

l to r: Brit Kirwin, Jayanth Banavar, Ashok Agrawala, Jagdeep Singh, and Brendan Iribe

ALUMNI OF THE YEAR

Rajiv Gandhi

Rajiv Gandhi is currently an Associate Professor of Computer Science at Rutgers University-Camden. His primary research area is applied algorithms in which he focuses upon approximation algorithms for NP-hard problems—particularly those with applications in areas such as scheduling, wireless networks, communication networks, clustering, and other related areas. His work has appeared in several publications including the *Journal of Algorithms*, *Networks*, *ACM-IEEE Transactions on Networking* as well as the *Journal of the ACM*.

Gandhi's career has been marked by a dedication to teaching and doing research with undergraduate students. He created and taught a free, voluntary 13-week course entitled *Discrete Math and Problem Solving* so that his students could learn everything they needed to do well in more advanced courses in computer science. For his dedication to students and to pedagogy, Rutgers University awarded him the Provost's Teaching Award, and he was interviewed for his work with students by the *Philadelphia Inquirer*. He is a recipient of the Warren I. Susman Award for Excellence in Teaching.

Gandhi sends many of his students to prestigious graduate schools. At his institution most of his students are first generation university students, many of whom are underrepresented minorities in computer science. His students have gone on to doctoral programs at Princeton, Carnegie Mellon University, Rutgers University, Brown University, University of Southern California, University of Pennsylvania, Cornell University, Virginia Polytechnic University, and University of Maryland. Gandhi earned his doctorate in computer science in 2003. Professor Samir Khuller, Elizabeth Iribe Chair of Computer Science served as his advisor.

Qiang Yang

Qiang Yang serves as the New Bright Professor of Engineering, Chair Professor and Head of Department of Computer Science and Engineering, at the Hong Kong University of Science and Technology (HKUST). Before moving to HKUST, Yang was a professor at the University of Waterloo and at Simon Fraser University. Yang is also the founding director of Noah's Ark Lab, and his research interests include data mining and artificial intelligence.

Yang was the founding editor of *ACM Transactions on Intelligent Systems and Technology* (TIST), and is the founding editor of *IEEE Transactions on Big Data*. He is the Associate Editor of *IEEE Intelligent Systems*, the series editor of Morgan & Claypool Synthesis Series: *On Research Methodology* and has served Associate Editor of *IEEE Transactions on Knowledge and Data Engineering*. He is the current Associate Editor of *Journal of Computer Science and Technology*, and an editorial board member of *Frontiers of Computer Science in China*.

Yang is a Fellow of IEEE, AAAI, AAAS, IAPR and an ACM distinguished scientist, recognizing his contributions to AI and data mining. He was also the founding director of the research lab of Huawei Technologies from 2012-2014. Yang earned his doctorate in computer science at the University of Maryland in 1989. Professor Dana Nau advised Yang's thesis entitled *Improving the Efficiency of Planning*.

Special thanks to Professor Ashok Agrawala, Professor Jeff Foster, and Professor Jim Reggia for serving on this year's award committee.

ACL & EATCS Fellowships

Emerita Professor Bonnie Dorr named ACL Fellow for 2016

Emerita Professor Bonnie Dorr (now also of the Florida Institute for Human and Machine Cognition, IHMC) has been named an ACL (Association for Computational Linguistics) Fellow for 2016. Fellows are recognized for their "enduring and outstanding contributions to the field of computational linguistics." Dorr was specifically recognized for her "significant contributions to machine translation, summarization, and human evaluation." Dorr also served as the Vice President of the ACL in 2005.

Dorr joined the Computer Science Department in 1992 after she earned in Ph.D. in computer science from Massachusetts Institute of Technology in 1990. She also held a joint appointment in the Department of Linguistics. Her research includes many areas of broad-scale multilingual processing, including machine translation, summarization and cross-language retrieval. While here at the university, Dorr co-founded the Computational Linguistics and Information Processing Laboratory (CLIP LAB) in UMIACS and served as co-director for 15 years and she advised countless graduate and undergraduate students.

She has also served as the Associate Dean of Graduate Studies for The College of Computer Math and Natural Sciences. Before she became an Emerita Professor with the Department, Dorr served as a program manager at DARPA where she oversaw research in human language technology. In addition to being an ACL Fellow, Dorr is an AAAI Fellow, a NSF Presidential Faculty Fellow, and a Sloan Research Fellow.

Professor Aravind Srinivasan named EATCS Fellow

Professor Aravind Srinivasan has been named a fellow the European Association for Theoretical Computer Science (EATCS) for major contributions to algorithms, the uses of randomisation in algorithms, randomness in networks, and the real-world applications of these topics.

Founded in 1972, The European Association for Theoretical Computer Science (EATCS) is an international organization which facilitates the exchange of ideas and results among theoretical computer scientists.

TEST OF Time

Ben Shneiderman and Catherine Plaisant

presented Test of Time Awards at IEEE VISualization Conference

Along with Distinguished University Professor Ben Shneiderman and Catherine Plaisant, Senior Research Scientist, members of the Human Computer Interaction Lab (HCIL) received two Test of Time Awards at the IEEE VISualization Conference which was held in Baltimore, Maryland from Oct 24-28, 2016.

For their work from 2006 entitled "A Visual Interface for Multivariate Temporal Data: Finding Patterns of Events across Multiple Histories", Ben Shneiderman, Jerry Fails, Amy Karlson and Layla Shahamat received the first VAST Conference Test of Time Award.

This particular award goes to a paper from the conference 10 years ago that has had a significant impact in terms of citations, influence, uptake and overall effect on the visual analytics community. The team who published this paper started working on it in a Spring 2005 course on Information Visualization. Jerry Fails is an Associate Professor at Boise State University, Amy Karlson worked for Microsoft Research, and Layla Shahamat works as a Senior Software Developer for ISN Corporation. Working with Catherine Plaisant, undergraduate research student Stanley Lam implemented a later variation of this project which was then used in collaborative research with physicians at Washington Hospital Center. That research led to a paper in the 2008 American Medical Informatics Association Conference.

The second paper to win the Test of Time Award is "Strategies for evaluating information visualization tools: Multi-dimensional In-depth Long-term Case studies (MILCs)" by Shneiderman and Plaisant. In this paper, Shneiderman and Plaisant suggest that controlled experiments were insufficient for understanding the long-term usage by knowledgeable domain experts. This case study evaluation strategy has become widely used by HCIL Ph.D. students. The ACM lists 2693 downloads and 99 citations for this paper, while Google Scholar shows 353 citations. Shneiderman cites his close partnership with Plaisant and the dissertation work of other computer students as important to the evolution and refinement of the ideas. These students include Harry Hochheiser, Jinwook Seo, David Wang, Krist Wongsuphasawat, Cody Dunne, John Guerra-Gomez, Megan Monroe, and Sana Malik.

"These efforts strongly contributed to HCIL's growing success story in developing event analytics tools, such as EventFlow," said Shneiderman.

Finally, Shneiderman and Plaisant have also been honored with BELIV's 2016 Impact Award for their work "Strategies for Evaluating Information Visualization Tools: Multi-dimensional In-depth Long-term Case Studies." This paper is the most viewed, downloaded, and cited in the history of the conference. Shneiderman and Plaisant originally presented this paper at a conference entitled "Beyond Time And Errors: Novel Evaluation Methods For Visualization."

NEIL SPRING

University System of Maryland
Board of Regents' Faculty Award
For Excellence in Mentoring for 2017

Each year the University System of Maryland (USM) awards faculty members for excellence and their contributions to the university community. This year, one of the recipients for excellence in mentoring is Associate Professor of Computer Science, Neil Spring. According to USM, the awards represent "the highest honor presented by the board to exemplary faculty members. Presented in four categories, the awards honor excellence in teaching, public service, mentoring, innovation, and a combined category of research, scholarship and creative activity."

Doctoral student Ramakrishna Padmanabhan nominated Spring for the award. "Neil is one of those rare few professors who adapt themselves to their students' styles instead of expecting the students to adapt to theirs," said Padmanabhan. "He is passionate, honest, and is a bastion of constructive criticism."

Spring joined the Department of Computer Science in 2005 after earning his doctorate in computer science from the University of Washington. His tenure here has been marked not only by research and awards, but by dedication to both the department and to the field of computer science at large. Spring served as the co-chair of the department undergraduate honors program from 2012-2015, and he redesigned CMSC 396H, the course which introduces honors students to research in computer science. He also served as the information services director for ACM SIGCOMM from 2007-2013. He is currently the co-chair of the department's building committee for the Brendan Iribe Center for Computer Science and Innovation.

"Neil is a gem. He is a star researcher, who is worth his weight in gold. Neil is fully invested in his students' success, and I cannot think of a faculty member more worthy of the mentoring award in our department," said Samir Khuller, Professor and Elizabeth Stevinson Iribe Chair of Computer Science.

Spring's mentoring abilities are also evident in the undergraduate classroom as well. He has recently created an honors section of CMSC 216: *Introduction to Computer Systems*. Sophie Jessel and Sandra Sandeep, two first year students who are in the course, praised Spring's teaching style and his addition of Arduino boards to make learning objectives and concepts clearer. When asked about their experience with Spring and the class, they praised his ability to not only immerse them in the C language, but to quickly clarify problems any student encounters in the course. Jessel and Sandeep also credit Spring with increasing their confidence in computer science.

"He's a really smart programmer and we could tell immediately that Neil knows a lot. He is super enthusiastic, and it's cool to see what's ahead as he introduces us to new concepts," said Jessel.

"Neil assumes that you know a lot, and the class moves fast but he allows you to stop and ask questions. There is never any condescension, and you never feel behind because there is always a moment where you can get concepts clarified," said Sandeep.

Marine Carpuat

Outstanding Computer Science Professor for 2016

For her outstanding work in teaching CMSC 422: *Machine Learning,* Assistant Professor Marine Carpuat was named an Outstanding Computer Science Professor for 2016. In a letter nominating her for the award, she is continually praised for her brilliance, and her careful construction of lectures so that all students have a clear understanding of the material. The letter praises her ability to explain the most complicated topics in multiple, clear, and concise ways. She is described as skillful; a professor who designs fair assignments. Carpuat ensures that students understand both theory and concepts related to machine learning. She encouraged her students to "create connections needed to learn the material," and her care with the material and her students ensured success. Her teaching impressed the nomination writer so much that even the last day of class was a part of the nomination:

"On the last day of class, she even spent a chunk of time explaining how machine learning can be relevant in our lives and how we can apply what we learned in the class in our future endeavors. As a student who likes seeing these connections to real world applications, I was ecstatic to see this. I strongly believe that Professor Carpuat is one of the best, if not the best, professors that I've had in my time within the CS program and within UMD at large (and I'm a double major at Smith, another outstanding school). I believe she's a model professor, and if we had more professors like her, our program would reach new heights of success. With all that said, I very much believe that Professor Carpuat is deserving of the recognition as an Outstanding Professor of CS."

Other outstanding instructors and teaching assistants for 2016:

Mr. Fawzi Emad, Outstanding Computer Science Lecturer

Ms. Angelisa Plane, Outstanding Graduate Teaching Assistant

Mr. Phong Dinh, Outstanding Undergraduate Teaching Assistant

JAN PLANE

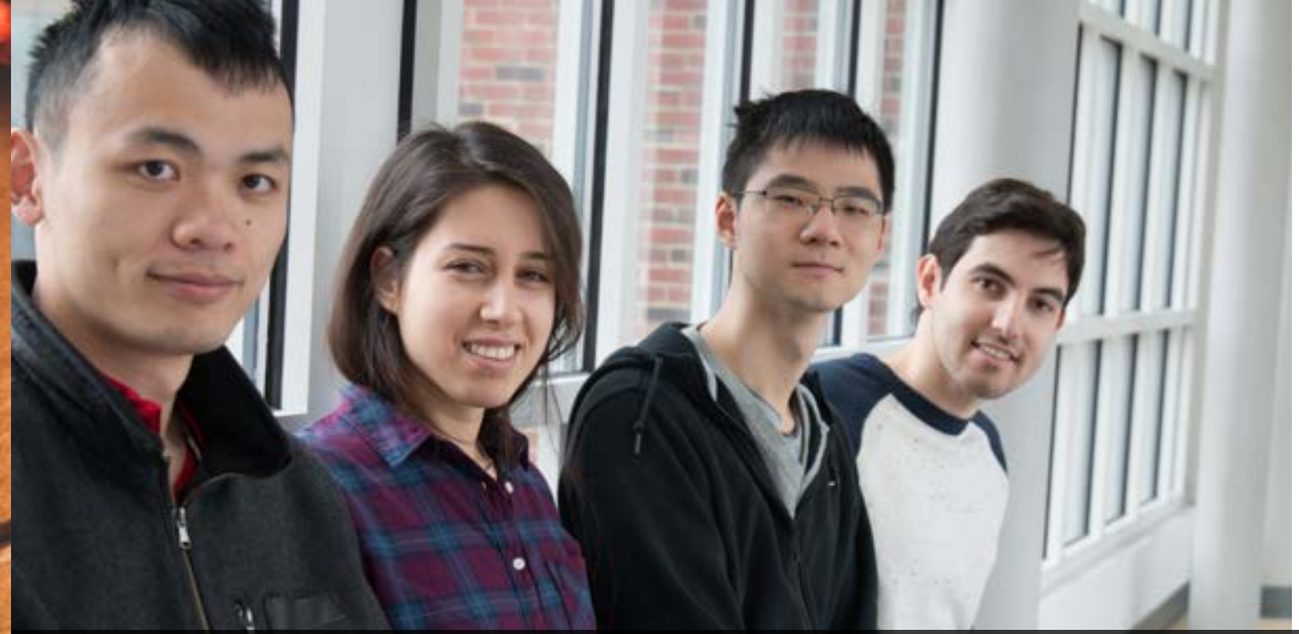
Woman of Influence

Principal Lecturer Jan Plane has been named a University of Maryland Woman of Influence by the President's Commission on Women's Issues. Emerita Professor Ellin Scholnick, Faculty Ombuds Officer and Chair of the President's Commission on Women's Issues noted, "We had a very strong pool of nominees, and Dr. Plane stood out among them as a true Woman of Influence."

Plane is the Director for the Maryland Center for Women in Computing (MCWIC). She heads the Computer Science Connect Program, which introduces middle school girls to computer science through fun, challenging, and enriching activities. She has also led several delegations of university students to the Anita Borg Institute Grace Hopper Celebration of Women in Computing. She currently serves as the Associate Director of the ACES Cybersecurity Honors Program as well.

Professor Samir Khuller, Elizabeth Stevinson Iribe Chair of Computer Science, is one of four faculty members who jointly nominated Plane for the award. "This award is truly deserved. Jan Plane has been absolutely instrumental in launching many new programs as the Director of the Maryland Center for Women in Computing, and we are all absolutely delighted that she is being recognized publically for her work," he said. Michel Cukier, Director of the ACES Cybersecurity Program, Mihai Pop, Professor of Computer Science and Acting Director of The University of Maryland Institute for Advanced Computer Studies and Hal Daumé III, Associate Professor of Computer Science and Director of CLIP Lab also nominated Plane for the award.

Plane received her award at a ceremony at the annual Celebration of Women event at the McKeldin Library. There was also special panel commemorating the 100 year anniversary of the first women students on the University of Maryland, College Park campus.



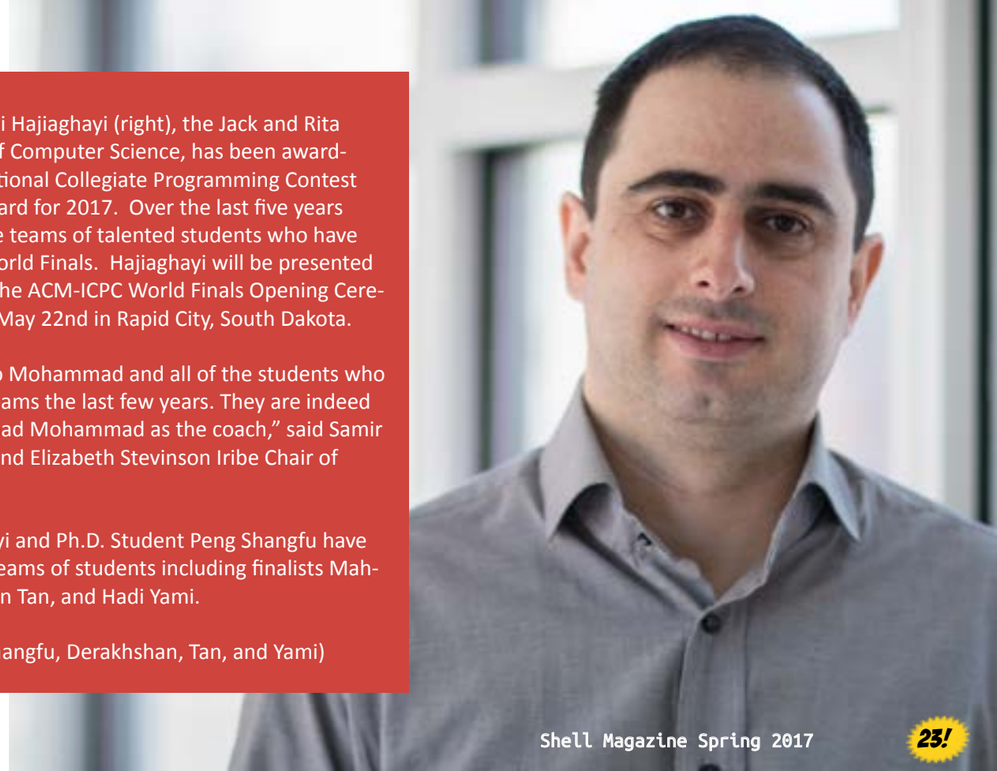
MOHAMMAD TAGHI HAJIAGHAYI AWARDED 2017 ACM ICPC COACH AWARD

Mohammad Taghi Hajiaghayi (right), the Jack and Rita Minker Professor of Computer Science, has been awarded an ACM International Collegiate Programming Contest (ICPC) coaching award for 2017. Over the last five years he has coached five teams of talented students who have advanced to the World Finals. Hajiaghayi will be presented with the award at the ACM-ICPC World Finals Opening Ceremony on Monday, May 22nd in Rapid City, South Dakota.

"Congratulations to Mohammad and all of the students who have been in the teams the last few years. They are indeed fortunate to have had Mohammad as the coach," said Samir Khuller, Professor and Elizabeth Stevinson Iribe Chair of Computer Science.

This year, Hajiaghayi and Ph.D. Student Peng Shangfu have coached talented teams of students including finalists Mahsa Derakhshan, John Tan, and Hadi Yami.

(Pictured above: Shangfu, Derakhshan, Tan, and Yami)



MATTHIAS ZWICKER

Joins UMD as the Reginald Allan Hahne Endowed E-Nnovate Professor in Computer Science

By: Matthew Wright

Matthias Zwicker joined the University of Maryland Department of Computer Science and the university's Institute for Advanced Computer Studies (UMIACS) in March 2017 as the Reginald Allan Hahne Endowed E-Nnovate Professor in Computer Science.

"I am very excited to be at a major university with lots of great students and where research in graphics with virtual and augmented reality is on the cutting edge," Zwicker said. "This area of study is not a traditional area of computer science, but the connection with Brendan Iribe and the building makes it very exciting, and I am happy to be here working on this."

In 2015, Elizabeth Iribe established the endowed professorship to honor Hahne, her son Brendan Iribe's high school computer science teacher. Elizabeth donated $526,562 to create the professorship and received an equal match from the state's Maryland E-Nnovation Initiative Fund (MEIF), which aims to spur private donations to universities for applied research in scientific and technical fields by matching such donations.

"With my gift, I wanted to help the University of Maryland become a leader in virtual reality, an emerging field that has become a big part of my life through my son, Brendan," Elizabeth Iribe said.

Zwicker's research focuses on efficient high-quality rendering, signal processing techniques for computer graphics, data-driven modeling and animation, and point-based methods—all of which are needed to create next-generation platforms for virtual and augmented reality.

"Matthias is the right person at the right time for our campus," said Jayanth Banavar, dean of the UMD College of Computer, Mathematical, and Natural Sciences (CMNS). "Our desire to become pre-eminent in virtual reality will be successfully advanced by the addition of Matthias to our faculty."

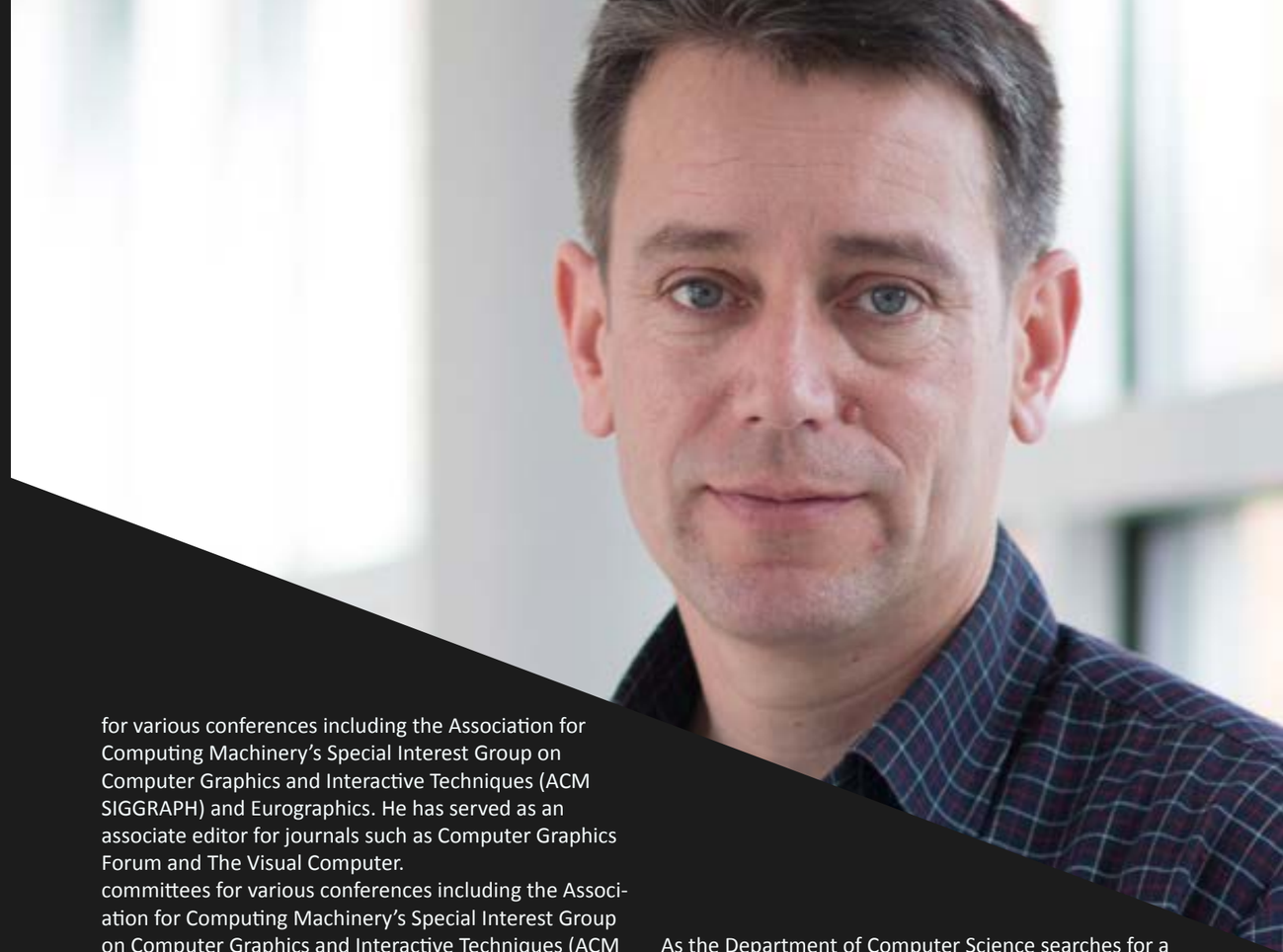
In exchange for accepting the state's matching funds, Zwicker will work at least one day each week in support of entrepreneurial activities at VisiSonics, a UMD startup founded by Ramani Duraiswami, a professor in the UMD Department of Computer Science and UMIACS.

VisiSonics commercialized a technology that replicates with machines the processes humans use to make sense of their environment. The result: a unique 3-D audio experience that the virtual reality company Oculus licensed and included as a key component in its Oculus Rift headset.

"Collaborating with VisiSonics and Ramani Duraiswami will be interesting as sound and visual elements are important for complete immersion in a VR environment," Zwicker said. "The work is an interesting extension of what I'm doing."

Zwicker earned his Ph.D. in computer science from ETH in Zurich, Switzerland, in 2003. After completing post-doctoral research at MIT, Zwicker served as an assistant professor at the University of California San Diego from 2006 to 2008 before joining the faculty at the University of Bern. There, he served as a professor of computer science and head of the computer graphics group at the Institute of Computer Science.

Zwicker has served as a papers co-chair and conference chair of the IEEE/Eurographics Symposium on Point-Based Graphics, and as a papers co-chair for Eurographics 2010. He has been a member of program committees



for various conferences including the Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques (ACM SIGGRAPH) and Eurographics. He has served as an associate editor for journals such as Computer Graphics Forum and The Visual Computer.
committees for various conferences including the Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques (ACM SIGGRAPH) and Eurographics. He has served as an associate editor for journals such as Computer Graphics Forum and The Visual Computer.

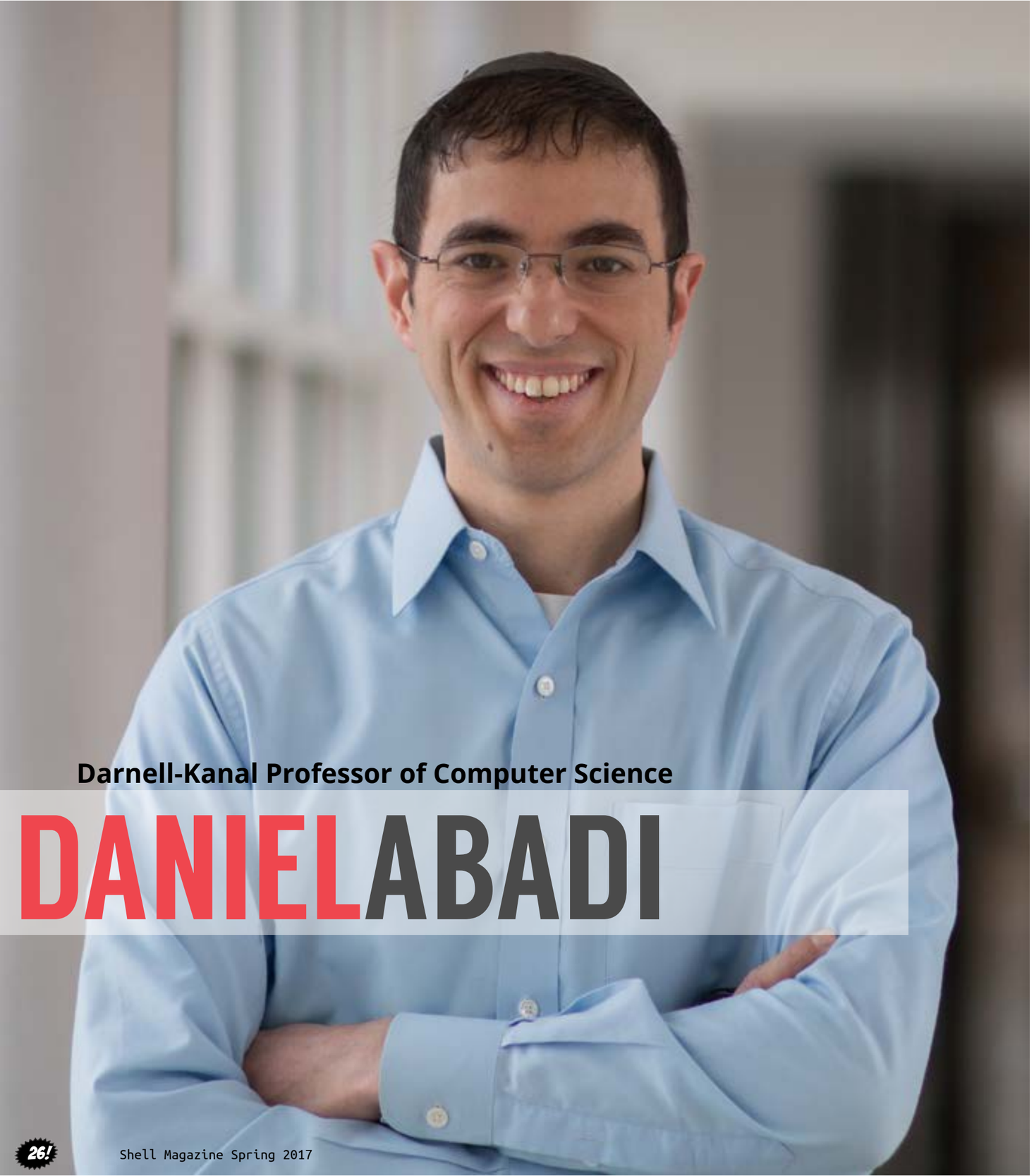
CMNS has received $4.2 million from the MEIF to match private donations establishing two endowed professorships in computer science and three endowed chairs in computer science, the life sciences and mathematics. In addition to the Hahne Professorship, the computer science endowments include:

- The Elizabeth Stevinson Iribe Endowed E-Nnovate Chair, filled by Department of Computer Science Chair Samir Khuller, which was funded by $1.5 million from Elizabeth Iribe and $1.1 million from the state.

- The Paul Chrisman Iribe Endowed E-Nnovate Professor, funded by $526,562 from Elizabeth Iribe and an equal match from the state. It establishes a professorship in virtual reality in the Department of Computer Science, named after Elizabeth's brother to honor his leadership of the family.

As the Department of Computer Science searches for a candidate to fill the Iribe Professorship, construction has begun on the Brendan Iribe Center for Computer Science and Innovation. A cutting-edge research, education and entrepreneurship facility for computer science at UMD, the facility is expected to open in 2018. The new building became a reality thanks to a $31 million gift from Elizabeth's son Brendan, a UMD alumnus and co-founder of the virtual reality company Oculus.

"Matthias Zwicker's new research will be at the forefront of some truly exciting work being done in Virtual and Augmented Reality today," said Samir Khuller, the Elizabeth Stevinson Iribe Chair of Computer Science at UMD. "He is absolutely the best person for this chaired position and I look forward to seeing the great things he will accomplish in the exciting space in the Iribe Center. I am very grateful to the Iribe family for their generosity."



Darnell-Kanal Professor of Computer Science

DANIELABADI

Daniel Abadi, a world-renowned expert in databases, is set to join the Department of Computer Science in July of 2017 as the Darnell-Kanal Professor of Computer Science. The professorship was established by Mr. Christopher Darnell, to honor Emeritus Professor of Computer Science, Laveen Kanal.

"We are delighted to welcome Daniel as the Darnell-Kanal Professor," said Samir Khuller, the Elizabeth Stevinson Iribe Chair of Computer Science. "He is a world leader in the area of databases and high volume transaction processing, and Maryland is rather fortunate to land him. Daniel also has an interest in commercializing his research, and we look forward to the major impact his work will have here, especially as we get ready to occupy the Iribe Center in 2018."

Abadi currently serves as an associate professor of computer science at Yale University. His research specifically involves database system architecture and implementation, particularly at the intersection with scalable and distributed systems. Before joining Yale's faculty, he earned his doctorate in Computer Science in 2008 from MIT.

Abadi is the recipient of several awards and fellowships including a Churchill Scholarship, a National Science Foundation CAREER Award, a Sloan Research Fellowship, and the 2013 Very Large Data Bases (VLDB) Early Career Researcher Award. He is also the recipient of a VLDB Best Paper Award, and has been recognized for the impact of his work with a VLDB 10-year Best Paper Award. In 2008, he was awarded the SIGMOD Jim Gray Doctoral Dissertation award. Abadi's teaching has also been celebrated with the Yale Provost's Teaching Prize.

"Daniel's scholarship, dedication to students, and focus on innovation, commercialization, and entrepreneurship will bring new ideas and strengths to the Department of Computer Science," said Jayanth Banavar, dean of the UMD College of Computer, Mathematical, and Natural Sciences. "We are excited to welcome such a talented faculty member to Maryland."

When asked about reasons that compelled him to join the faculty at University of Maryland, Abadi mentioned that he was impressed by the number of professors and the diversity of fields that they research. "One of the appeals of the University of Maryland is that it is a large department and very vibrant," he said.

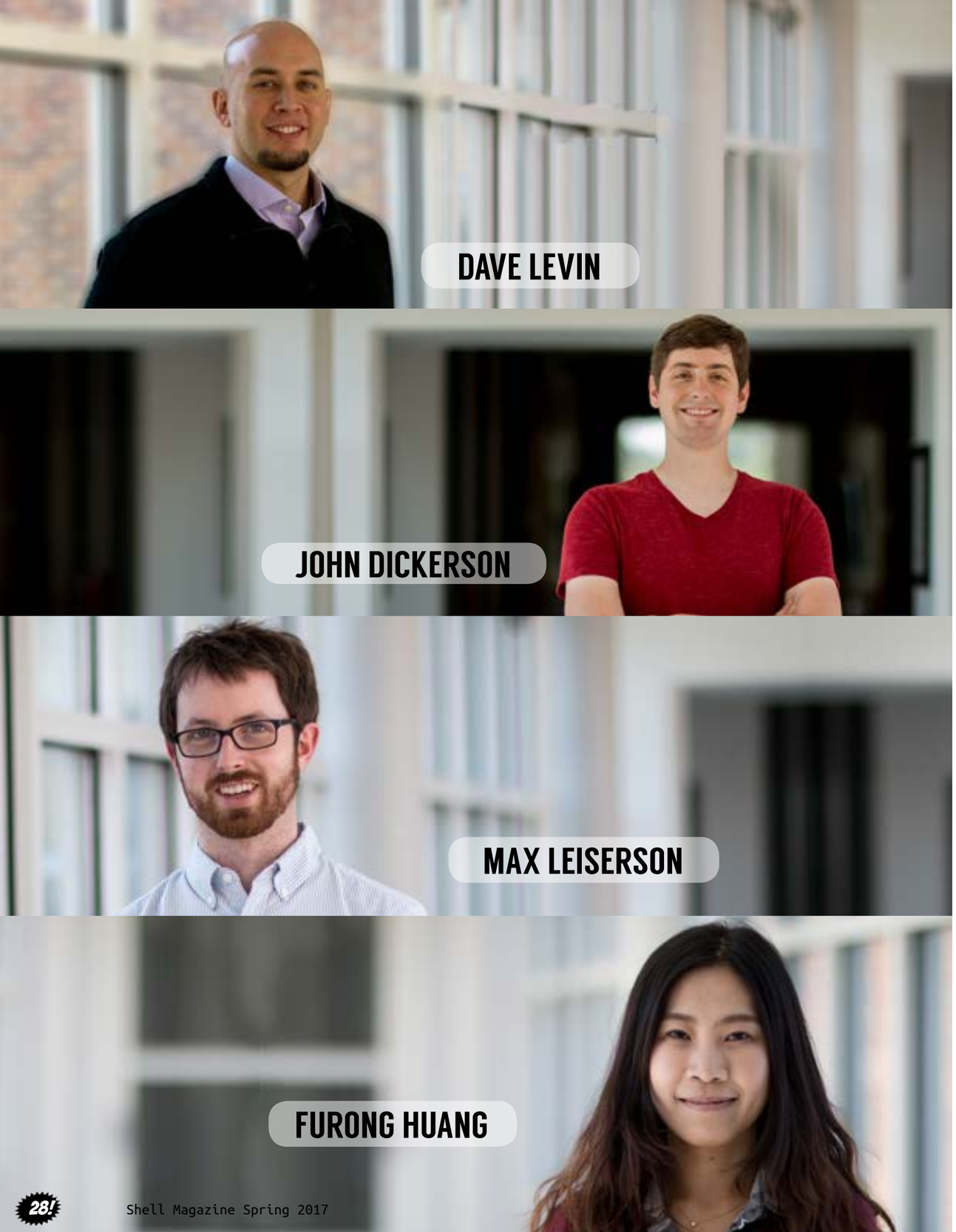
"There are so many research projects going on here." Abadi mentioned that he particularly looks forward to working with his fellow database researchers, Professor Amol Deshpande and Professor Nick Roussopoulos. "There are also many great faculty at Maryland outside of the field of databases," he mentioned, "and I'm looking forward to working with them."

In addition to his research with a postdoctoral and graduate students, Abadi will be teaching a graduate course in the fall. He remarked that he looks forward to teaching a diverse set of undergraduates and graduate students in the coming years.

As the Darnell-Kanal Professor of Computer Science, Abadi will honor the working relationship of Emeritus Professor Laveen Kanal and Christopher Darnell, Director at Grantham, Mayo, Van Otterloo & Co. LLC and GMO Trust - GMO Benchmark-Free Allocation Fund. Darnell established the professorship "in gratitude for the warm reception and intellectual support afforded by Professor Laveen Kanal more than twenty years ago." Darnell attributes the foundation of his very successful career in financial management to an informative meeting with Professor Kanal in which they discussed Kanal's research in pattern recognition. Abadi praised the collaborative relationship that these men developed and work they did to transition substantive research into the outside world.

"My name will be linked to Professor Kanal's moving forward for the foreseeable future—as well as Chris Darnell's—and think that in general, this particular combination of the Darnell-Kanal Chair is a very good fit for what I am all about," said Abadi. "One of my philosophies of doing research is that it is important to write papers, but it is also important to not stop there and to engage in the tech transfer process and bring [the work] out into the real world."

Finally, Abadi mentioned that he is looking forward to spending time in the Brendan Iribe Center for Computer Science and Innovation. "I'm excited about the new building and am impressed with the support from Maryland alumni," he said.



NEW ASSISTANT PROFESSORS

Dave Levin, Ph.D.,
Computer Science,
University of Maryland

Levin works at the intersection of networking, security, systems, and economics and works to understand when and why security breaks down, and in building an internet where users feel safe and motivated to help one another achieve better performance and reliability. Levin currently teaches CMSC 818O: *Advanced Topics in Computer Systems; Computer and Network Security* as well as CMSC 396H: *Computer Science Honors Seminar*. He is also the chair of the undergraduate computer science honors program.

John Dickerson, Ph.D.,
Computer Science,
Carnegie Mellon University

Dickerson works at the intersection of computer science and economics, with a focus on solving practical problems using stochastic optimization and machine learning. He currently teaches CMSC 320: *Introduction to Data Science* and during the fall semester of 2016 he taught CMSC 828M: *Advanced Topics in Information Processing; Applied Mechanism Design for Social Good*.

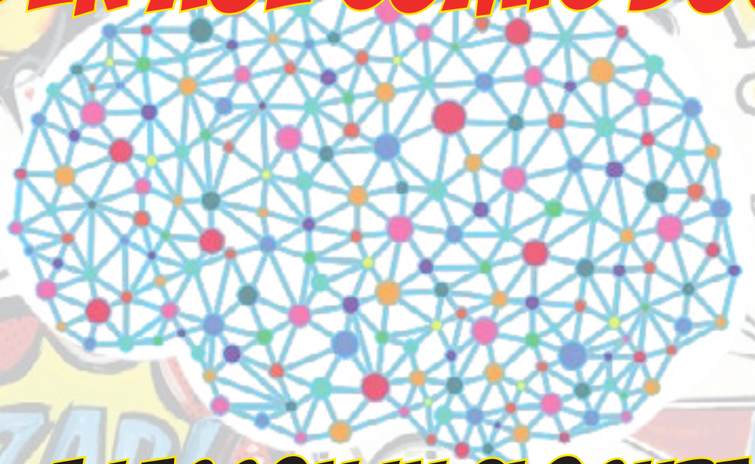
Mark (Max) Leiserson, Ph.D.,
Computer Science,
Brown University

Leiserson will start as an Assistant Professor in August of 2017 after spending a year at Microsoft Research in New England. He develops algorithms and mathematical models to study biological processes. He works in the field of cancer genomics, comparing the differences between the genomes of healthy tissue and cancerous tissue in the same individual.

Furong Huang, Ph.D.,
Computer Network and Distributed Computing,
University of California, Irvine

Huang will start as an Assistant Professor Computer Science in July of 2017, after a postdoc at Microsoft Research in New York. She works on machine learning, high-dimensional statistics and distributed algorithms, both the theoretical analysis and practical implementation of parallel spectral methods for latent variable graphical models.

NEURAL NETWORKS & GOLDEN AGE COMIC BOOKS:



A LESSON IN CLOSURE

What happens when a neural network is tested to see if it can learn about the act of reading and understanding a comic book? What lessons do we learn about machines and learning, and more importantly, what do we learn about our own reading and ourselves?

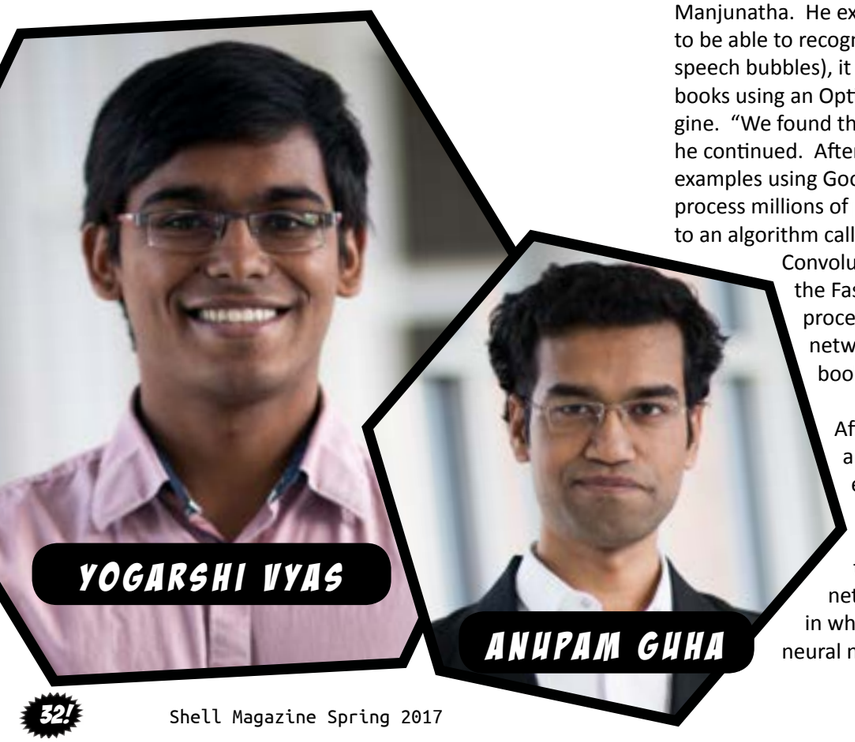
Reading comic books and graphic novels is a rather complicated and very human task. It might not seem terribly difficult upon first consideration because many young comic book and graphic novel readers instinctively know (or easily learn) how to read panels upon panels of comics. Readers understand how to absorb the information inside of each panel while taking into account the speech bubbles—which indicate dialogue—and the art, which helps them to understand setting and action, as well as genre and overarching aesthetic.

Readers are not only able accomplish all of these tasks simultaneously while examining individual panels of comics, but they are also able to make important inferences from panel to adjacent panel, even if pertinent information appears to be missing. Readers simply know or understand what has happened in sequential panels of comics, even if the action is not made explicit.

However, when a machine (or more specifically a neural network—a computer system that is modeled on the human brain and the nervous system) is given the task of 'reading' comic books, the subtle complexities of engaging with this artform become far more evident. A group of graduate students in the Computer Science Department led by Ph.D. students Mohit Iyyer and Varun Manjunatha decided to test a neural network's ability to make inferences about sequential panels of comics. In other words, they test for the machine's ability to understand the flow of events.

Iyyer and Manjunatha worked with fellow Ph.D. students Anupam Guha and Yogarshi Vyas to teach a machine to dissect panels of comics into text and visual art components. Their goal was to have a machine try to understand this artform much in the same way that a human would. The group then set out to determine if a neural network would be able to make inferences across panels of comics imitating the human act of reading/closure. They also designed small tasks to test the machine's ability to infer the text of a subsequent speech bubble.

For humans, the act of reading a comic book or graphic novel may feel like a fluid, uninterrupted activity. However, this task actually involves a piecing together of fragments of a story into an incorporated whole. Comic book readers join parts of the narrative together using both visual and verbal context clues. According to comic book author and critic Scott McCloud, we also use the space that connects the panels together to make sense of the narrative. All of this work to comprehend a comic panel is what the researchers define as closure, which is "(1) understanding individual panels, and (2) making connective inferences across panels," even when the panels do not seem to follow a clear narrative order.



A machine must be able to detect both text and images to process what is happening in a given comic panel. Fortunately, neural networks have advanced to the point where they can describe natural images, but the group of researchers was unsure how a neural network would react to more abstract images. They tested the network to see if it could understand the artwork employed in comic book panels in a narrative defined by closure. The machine also needed to understand the text that was employed as well.

In order have a neural network learn how to 'read' comic panels, it needs a great deal of data. Fortunately, Iyyer, Manjunatha, Guha, and Vyas were able to access a large repository of 4,000 comic books from the Digital Comics Museum (www.digitalcomicsmuseum.com). These comic books represent most extant examples from what is called the Golden Age of Comics (1938-1954). Thanks to copyright expiration, these books exist in the public realm. Together, these comic books contain 1.2 million panels of comics with 2.5 million text boxes. Manjunatha explained that humans have very little difficulty understanding the speech bubbles present in comic panels, but it would take an incredibly long time to read comic books in the repository. Computers cannot read the text outright, but with help, it doesn't take them very long to process the repository of information.

"Humans can read text, but computers can't," said Manjunatha. He explained that in order for a computer to be able to recognize the text in a comic book (in the speech bubbles), it is necessary to process the comic books using an Optical Character Recognition (OCR) engine. "We found that Google's OCR worked the best," he continued. After teaching the neural network a few examples using Google's OCR, the machine was able to process millions of panels in a matter of hours thanks to an algorithm called a Faster RCNN (Region-based Convolutional Neural Network). "We used the Faster RCNN, which learns how to do a process very quickly," he said. This neural network could learn about 4,000 comic books in a day.

After the neural network processed all of the comic books, the researchers gave the network small tasks to be able to determine if it could make inferences after learning the process of closure. The neural network was given a textual cloze test, in which a participant (in this case the neural network) is given an assessment in which it must examine a portion of a text in which certain words are removed. The neural network is tested to see if it understands what should happen in the last panel of a series of texts and images. The researchers also gave the neural network visual cloze tests as well. They tested various ways that the neural network could process closure and complete cloze tasks using the 4,000 comics. In the end, the machine performed fairly well at being able to predict what happened next in a sequence of panels, but could not do as well as a human.

The group embarked on this work after the North American Chapter of the Association for Computational Linguistics (NAACL). Iyyer had worked on using natural language processing to understand characters and how they develop in novels and began to think about extending his work to other creative domains. Iyyer and Manjunatha had also done work on visual questioning using computer vision. "We thought about combining computer vision with natural language processing and then they landed on the idea about using both to understand comic books," Iyyer said. When asked if they were readers of comic books and graphic novels, all members of the group confirmed that they did read them but their interests in types of comics varied. Vyas prefers DC and Marvel Comics, Manjunatha and Guha seemed to prefer European comics and Iyyer talked about a non-superhero graphic novel, *Y: The Last Man*. The group will continue to work together, but remotely, as Iyyer has recently accepted a position at the University of Massachusetts as an assistant professor.

In order for any machine to be able to understand and process comic books or graphic novels better than the researchers who enjoy them, neural networks will have to truly understand closure and learn a bit more about what isn't written or drawn in comics—perhaps even more than what is.

Learn more about the project in:

"The Amazing Mysteries of the Gutter: Drawing Inferences Between Panels in Comic Book Narratives" Mohit Iyyer, Varun Manjunatha, Anupam Guha, Yogarshi Vyas, Jordan Boyd-Graber (University of Colorado Boulder), Hal Daume III, and Larry Davis.

https://arxiv.org/pdf/1611.05118.pdf

GIFT TO SUPPORT DIVERSITY INITIATIVES

Brendan Iribe has established a substantial fund to support the Department of Computer Science in various initiatives to encourage more women and other underrepresented students to take courses in and major in computer science at the University of Maryland. Iribe's gift will support the Center for Women in Computing, summer research experiences for undergraduates (REUs), and a speaker series highlighting women academics and industry representatives in computer science.

The department has been fortunate as its student body has become one of the most diverse in the country. The number of women in the department has increased from 100 to more than 600 over the course of four years, and the numbers of underrepresented students has increased substantially as well. Iribe's gift will allow for programs to increase recruitment efforts and ensure retention of underrepresented students in computer science.

"Brendan has been incredibly passionate about the department and raising our profile. His generosity knows no bounds, and he was no doubt inspired by our fantastic programs here—like our computer science tutoring program as well as our struggles to fund them properly. This gift will have an impact on generations of students in a variety of ways," said Samir Khuller, Professor and Elizabeth Stevinson Iribe Chair of Computer Science. "His gift will also have a major impact on middle school students interested in learning more about computing, and it will provide students with research and networking opportunities. We are forever grateful to him for his generosity."

The Maryland Center for Women in Computing (MCWIC) will be able to continue its Computer Science Connect Program (CompsciConnect), a three-year summer camp designed to introduce middle school girls to computing while building connections to each other and the world around them. The program allows girls to learn about the field in a welcoming, and warm environment. They program robots, develop in Scratch, create dynamic web pages, and build basic virtual reality games. "With Brendan Iribe's gift, we are able to increase the number of students that participate in CompSciConnect from 75 students to about 130 students each summer. This curriculum is shared in after-school programs and other outreach throughout the year by our MCWIC Ambassadors," said Jan Plane, Director for MCWIC.

Brendan Iribe with Jan Plane, Kate Atchison and the UMD delegation to Grace Hopper

MCWIC will also be able to continue its very popular tutoring program for first and second year students in computer science. "We were swamped this week, which is great, and we had four tutors working fifteen hours to help support first-year students in computer science. Now that we have more funding we can support second-year students, and work to keep improving our retention rates," said Kate Atchison, Coordinator for MCWIC.

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Jonelle Bowen

A senior and computer science tutor for MCWIC, Jonelle Bowen, enumerated the ways that Iribe's gift will help students. She tutors students in CMSC 131 and 132, the introductory courses in the major. She credits increased funding with being able to assist more students to ask questions they may not want to ask teaching assistants. "As students we are told that there are no stupid questions, but that doesn't mean that you necessarily feel that way. When you have a tutoring program like this, you have the space to go in and ask all of your 'basic questions' without feeling like you're being judged," she said.

She also praised the space and time that the tutoring program and the funding will give to students. "Having a separate tutoring program definitely helps students understand the material instead of [their] just forcing their way through a project. It gives students the freedom and the space and comfort to ask questions. As a tutor I try to encourage students to pinpoint the place in which your gap of understand so that I can fill it," Bowen added.

Finally, Iribe's gift will allow many women in computer science to continue attending the Grace Hopper Celebration of Women in Computing for the next five years. The Computer Science Department received funding from the Building, Recruiting and Inclusion for Diversity (BRAID) organization after Professor Samir Khuller applied to the program in 2014. The funding ends this year, and Iribe has ensured that groups of undergraduates will be able to meet mentors, apply for internships, full-time positions, and graduate schools. Iribe's generosity supports the Department of Computer Science's continuing diversity goals.

Imaginative making:

BILL PUGH'S NEW COURSE FOR UNDERGRADUATES

sandbox

(l) Emeritus Professor Bill Pugh works with students.

Emeritus Professor Bill Pugh is on a mission to introduce computer science students to making through his course CMSC 298P: *Prototyping and Fabrication of Cyberphysical Systems*. The course meets in Sandbox, the department's first student-centered making space. In this room filled with arduino boards, soldering irons, tools, and fabrication materials, Pugh pushes computer science, engineering, and art students to build a project alone or in teams using their creativity and art, engineering, and computer science skills.

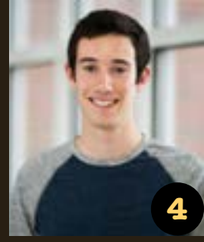
Pugh decided to teach this course as a continuation of the idea of having a makerspace in the Iribe Center. "If the center is going to have a 5,000 square foot makerspace, it is necessary for the department to begin to learn how that worked," he said. The department built Sandbox, a 500 square-foot space in order to determine what is needed to ensure that all students who want the opportunity to learn about resistors, capacitors, and embedded systems can do so.

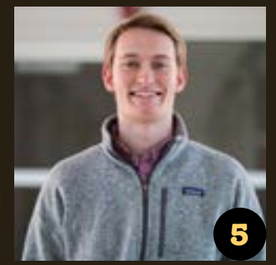
After the opening of Sandbox, Pugh noticed that students who had spent time building gadgets would come into the space, but beginners seemed wary. Several students regularly came to visit and use the space, but the group did not grow or expand in the ways that Pugh had hoped. The course allowed him to teach students a significant amount of skills— instead of one-off workshops.

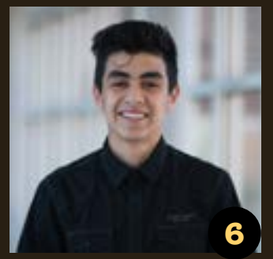
"It is important to me to reach students who perhaps had not spent a lot of time at hackathons or at Collider (the Terrapin Hackers meeting space)," he said. This course allows Pugh to create a welcoming space for students as they learn to build light up costumes, or robots that play games.

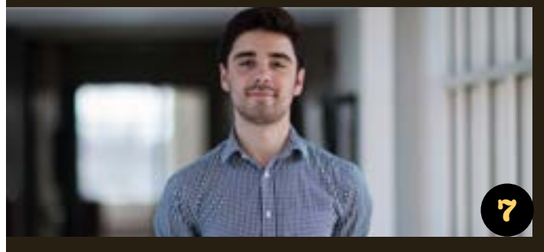
This semester, students began the course by learning to program an Adafruit circuit playground, learning to solder and using a protoboard. After that, students were welcome to become coming up with their own projects.

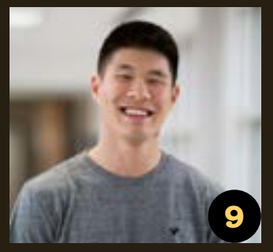
There is very little in the way of lecturing—Pugh does give short interactive lessons on topics that he determines the students may need to learn. But the class feels very much like an inventor's paradise, where tools, imagination, and creativity abound.

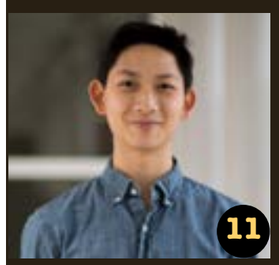


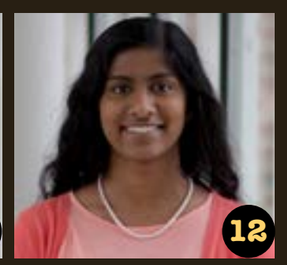


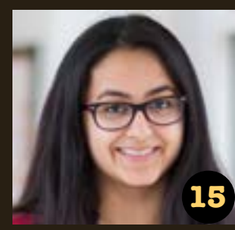












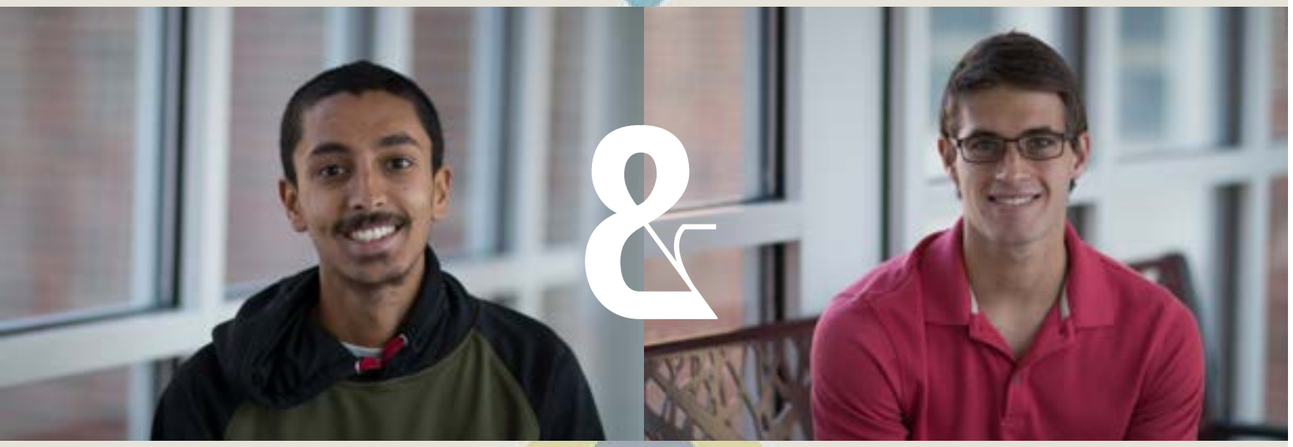
THE NEW CLASS: 2016-2017
Banneker Key Scholars

Every year, the University of Maryland selects talented incoming students to receive the prestigious Banneker-Key (BK) scholarship. The BK scholarship is highly competitive and helps the department to recruit some of our fantastic students. For 2016-2017, the department welcomed twenty-five BK scholars—the most in the department's history. Many BK scholars are interested in several subjects in addition to computer science, they are artists, musicians, mathematicians, writers, and political scientists. The students come from schools all over the area, and represent the future of computing.

In spring semester of 2017, these Banneker Key students will work to recruit the next generation of scholars for the 2017-2018 class.

Pictured: 1:Catelyn Barnes, 2:Jordan Mess, 3:Vivien Zhu, 4:Daniel Smolyak, 5:Michael Williams, 6:Kelli Webber, 7:Erik Ocho, 8:Angel Wen, 9:Camillo Calvo-Alcaniz, 10:Stephan Loh, 11:Albert Wang, 12:Sandra Sandeep, 13:Cole Molloy, 14:Somya Padliya, 15:Sanna Madan

PRAYAAG VENKAT



ASHTON WEBSTER

AWARDED HONORABLE MENTION BY CRA FOR RESEARCH

Continuing a tradition of excellence in the department, Prayaag Venkat and Ashton Webster were awarded Honorable Mention by the Computing Research Association (CRA) for their undergraduate research projects on December 9th 2016. Venkat conducted research with Professor Samir Khuller and Professor Dave Mount. Webster conducted research with Professor Jim Purtilo and Professor Michel Cukier (of Mechanical Engineering and Electrical and Computer Engineering).

While they were preparing for exams, Venkat and Webster kindly corresponded about their research that they conducted over the last year. Venkat plans to apply to graduate schools in theoretical computer science, and Webster is currently in the BS/MS program here.

Prayaag Venkat (Junior):

During the summer and academic year of 2014, I worked with Professor David Mount. Professor Mount and I designed space efficient data structures for solving fundamental problems in computational geometry. Often times, in application areas such as machine learning and physics, there is a large set of points and one wishes to query its geometric properties. These problems are well studied and usually solved by creating a data structure, such as a quadtree, that represents the point set in a way that allows queries to be answered efficiently and accurately. However, it is often the case that the original data set is so large that there is not enough space to create and store such a data structure. For example, in practical applications, one may wish to store the entire data and data structure in main memory, which will give faster processing but is limited in capacity. Professor Mount and I designed a new variant of the quadtree, and showed that it uses (close to) the information theoretic minimum number of bits required to answer certain geometric queries approximately. This work was published and presented at CCCG 2014 (A Succinct, Dynamic Data Structure for Proximity Queries on Point Sets, Prayaag Venkat and David M. Mount, pp. 216-225).

In the summer of 2016, I began a research project with Professor Samir Khuller as part of the University of Maryland CAAR REU (Research undergraduate experience). My group members and I developed approximation algorithms for scheduling problems. In modern datacenters, technologies like MapReduce divide large problems into small jobs, which need to be scheduled on complex architectures. My group introduced a general framework that converts algorithms for offline scheduling and knapsack-type problems (in which the entire input is known upfront) to the online setting (i.e., the entire problem input is not available upfront). We used our framework to produce algorithms that have the best known approximation performance for a variety of scheduling problems. Finally, we implemented our algorithms and found that they perform well on real world data sets. This work is currently in submission.

Ashton Webster (BS/MS program):

I began working with Professor Michel Cukier and a team of undergraduate and graduate students as a sophomore on a method for developing network scan detection models. The paper we wrote describing our work was accepted to the SECURECOMM conference and we presented our work in Dallas, Texas in October 2015. This work specifically designs and improves a model to detect network port scans. Port scans often appear before widespread attacks as attackers gather data, but they are rarely detected or investigated due to the challenges of creating a model capable of reliably identifying them. I lead a team of two other undergraduate students and one graduate student as we created a general and practical framework that could create a “Local Optimal Model”, which is the best possible model for a given performance metric. By processing millions of network flow records into a feature space formachine learning, we were able to create and analyze the performance of thousands of different detection models. I personally worked on the implementation of the experiment and analyzed most of the results by creating various scripts and programs.

Since then, I have been working with Professor James Purtilo on using machine learning technique known as “transfer learning” to better identify software defects and vulnerabilities in source code. This semester I completed my honors thesis on this topic. I have studied another applied machine learning task: identifying vulnerabilities and defects in software projects by analyzing source code metrics and tokens. I designed experiments to test if it is possible, under certain conditions, to use transfer learning techniques for this task; specifically, to determine if it is possible to use one or more vulnerability- or defect-labeled project to predict another, separate project. This work was particularly challenging due to lack of available implementations of transfer learning methods (almost no publicly available implementations exist) and computationally intensive model construction and evaluation (many experiments lasted many days and sometimes weeks). The results are still in the preliminary stage, but they indicate that, in general, no method performs better than the most naïve baseline: simply using all of the available source project(s) data to identify issues in the target project, without any sort of filtering or weighting. This result has significant implications suggesting that developers can identify a large proportion of the defects and vulnerabilities in the code without having to label any of their project’s files as vulnerable or defective, or even perform any complex filtering; they can simply use existing, potentially dissimilar, labeled projects. I also contributed open-source implementations for several different transfer learning algorithms as defined in other research papers, which will make it significantly easier for practical and academic use of these models.

2017: **Prayaag Venkat**, Honorable Mention (advisors: Samir Khuller and Dave Mount)

Ashton Webster, Honorable Mention (advisors: Jim Purtilo and Michel Cukier)

2016: **Andrea Bajcsy**, Honorable Mention (advisor: Yannis Aloimonos)

Frank Cangialosi, Honorable Mention (advisor: Dave Levin)

2013: **Victoria Lai,** Finalist (advisor: Dave Levin)

2012: **Elissa Redmiles**, Honorable Mention (advisor: Samir Khuller)

2010: **Matt McCutchen**, Awardee (advisor: Samir Khuller)

Allison (Hoch) Janoch, Honorable Mention (advisor: David Jacobs)

John Silberholz, Honorable Mention (advisor: Bruce Golden)

2008: **Katrina LaCurts**, Honorable Mention (advisor: Bobby Bhattajarchee)

2007: **Jessica Chang**, Honorable Mention (advisor: Samir Khuller)

SUMMER RESEARCH EXPERIENCES

During the Summer of 2016, the department hosted several computer science students from around the country for the Research Experience for Undergraduates (REU). The REU students worked with several faculty members on challenging research projects including the following:

- **Bill Gasarch: Fun with Probability**
- **Clyde Kruskal: The Can't Stop Game**
- **Tom Goldstein: Deep Learning**
- **Jon Katz: Theoretic Approaches to Public Key Crypto**
- **Samir Khuller: Scheduling Jobs in Data Centers, Online and Offline**

Students worked in teams with their mentors, and all participants met together once a week for lunch and to learn something new from various faculty mentors. The students also earned a generous stipend, and were provided with on campus housing. The mentors were very impressed with 2016's batch of students. Program Director Professor Bill Gasarch was struck by the effort that the students put into their research throughout the summer. "These students would continually give 110%—if that were mathematically possible," he joked. "We had an amazing group of students here from all over the country, and they were super charged and excited about doing research at the University of Maryland. They made substantial progress in their research," said Professor and Elizabeth Stevinson Iribe Chair of Computer Science Samir Khuller.

The REU first began in 2013 and continues to draw extremely talented students to the University of Maryland. This summer, the REU will host a brand new group of high school and university students looking to deepen their understanding of computer science through research.

TECHNICA & Me

By: Sofia Fernandez- Poyatos, Student Writer and Technica Organizer

As I scrolled through my newsfeed, trying to decide which hackathon I would attend next, I stumbled upon University of Maryland's all-women's hackathon: Technica. Technica is unlike any hackathon that I have been to; its goal is to encourage women, from high schoolers to college students, to pursue a future in STEM. Technica exposes these women to a vibrant and inclusive hackathon culture by allowing them to attend tech and design workshops, network with companies, and create a "hack."

As soon as I set foot on campus in fall, I knew I wanted to be a part of Technica's organization committee. The Technica team is composed of enthusiastic students from different majors, and yet everyone is equally passionate to contribute to the hackathon's success. Although Technica's planning had started before fall semester, I reached out to Amritha Jayanti and Amber Mirza, Technica's co-directors, and they immediately got me up-to-speed. I decided to be an organizer of Technica's marketing team. Our committee's responsibility is to spread awareness for Technica by tabling in front of McKeldin, encouraging UMD female students to sign up at the First Look Fair, posting on all social platforms, and contacting journalism students to write about the event and collaborate with the Design team to share their designs.

This year's results were remarkable: Technica became the largest all-women hackathon with over 825 hackers. We also had sufficient funds for our participants from Florida to Canada to be bussed to the event. 68% of participants were not computer science majors; other prominent majors were information systems, mechanical engineering, biology, accounting and public health, demonstrating that regardless of one's major, anyone can learn how to program and combine their major with tech.

A young woman at Technica admitted that STEM "is not a field where there are a lot of people [women] you can look up to," which can be discouraging at times. I believe that times are changing.

University of Maryland's Computer Science Undergraduate Department has a good percentage of women students which has significantly increased over the years! As a young woman pursuing Computer Science, I aspire to improve my programming skills and motivate more women to join the tech revolution.

ALUMNA PROFILE:
CASSANDRA LEWIS '10

Cassandra Lewis '10 agreed to take time out of her busy schedule as a product manager for Kindle at Amazon in Seattle, Washington to tell us about some of the exciting projects that she has worked on and led after graduating from the Computer Science Department. During her time at Maryland, Lewis was involved in the Association for Women in Computing and served as a co-chair in 2009-10.

What happened after you graduated from the University of Maryland?

I moved to Seattle to work with Microsoft on Office 2010 and 2013. After that I moved with Microsoft to Silicon Valley to work on Office for the iPad where I worked on the file save and open pipelines as well as the Office document cache. From there I moved to London to work on the Xbox one launch team shipping Upload and Upload Studio. I then moved back to California with Yahoo to work on project Gemini and organize teams all over the world. I moved to Washington, DC after that to work with LivingSocial on new initiatives and am now in Seattle with Amazon making awesome experiences for the Kindle.

You've traveled quite a bit for work. Where are the most exciting places you've lived and traveled? Did this travel or living in other countries change you as a computer scientist?

London was really exciting and fun as I love to travel. I think that living in another country gives you a great perspective on how far reaching the software you develop can really be. It's amazing how many cultural considerations go into software that you don't really notice and simultaneously the number of people all over the world that use what we make everyday. It's very humbling.

Now you are at Amazon. What do you do? Can you tell us a little bit about what you work on? (If not, our readers completely understand).

I work on Kindle experiences. Thinking through how we might better enable key customer scenarios for our users. Can't say more just yet!

What were your favorite courses in Computer Science? What do you remember working hardest to do well in?

I really enjoyed the HCI (Human-Computer Interaction) course with Ben Shneiderman and Software Engineering as it helped me to decide that I wanted to be a Product Manager. I recall *Advanced Algorithms* being particularly challenging but I did learn quite a bit around logic.

Did you intern as an undergrad? What has that experience like?

Yes, I interned at Microsoft and at a small government contractor in Greenbelt, MD. The experience at Microsoft was great in that they really treated you like a full timer and gave you a high level of responsibility. I remember working on a sharing workflow in Office 2010 that was later adopted by the OneNote team. It's very exciting to see features you thought through as an intern make it to market and be used by millions.

To students who want a job like yours, what advice would you give?

Definitely take the Software Engineering course and HCI. Those two courses encompass a lot of what I do from day to day. Learning user empathy is key so definitely work to hone those skills.

What's your favorite thing about working at Amazon so far?

I have a great team at Amazon with really brilliant people. I am always impressed at their level of knowledge in their respective areas and the passion they bring to work everyday.

Do you keep in touch with your fellow alumni in Seattle?

Yes, we have a good community out here of Seattle alumni. I literally run into fellow Terps all the time.

What's one thing that you wish you had done in undergrad if you could go back?

Study abroad. I think it's so important to travel and learn how big and beautiful his world is. Computer Science is unique in that you can take those skills to any corner of the world and find a great paying job. I think that studying abroad helps break that initial barrier into getting out of your comfort zone.

INCUBATORS FOR EXCELLENCE:

DEPARTMENT OF COMPUTER SCIENCE AND UMIACS

By: Ben Shneiderman

Having spent 41 years as a professor at the University of Maryland, I deeply appreciate how it enabled me to pursue my professional goals in developing the fields of human-computer interaction and information visualization within the rigorous Department of Computer Science. The University of Maryland gave me a diverse community of excellent colleagues within computer science and beyond. It brought me skilled technical and administrative staff who facilitated my work and excellent graduate and undergraduate students who inspired me to do my best. All of them have made my time here satisfying and memorable.

Everyday there were interesting speakers on campus and opportunities to connect with colleagues at nearby institutions or to bring scholars to our campus for collaborations, talks, and workshops. The diverse opportunities in working with federal agencies, corporate partners, and non-government organizations enriched our research by allowing us to form partnerships with practitioners and the ability to test theories while working closely with them. The University of Maryland's location meant that major conferences were often just a metro ride away or that visitors could easily come to us. Flying out to give talks was often just a day trip.

Warren Bennis's book on Organizing Genius describes innovative communities such as Apple, the Manhattan Project and the Lockheed Skunk Works. In a similar way, the Department of Computer Science (CS) and the University of Maryland Institute for Advanced Computer Studies (UMIACS) became incubators of excellence by enabling faculty to form new disciplines and pursue breakthrough research projects. Launched in the early days of the computer age, CS (founded in 1974, https://www.cs.umd.edu/) and UMIACS (founded in1986, https://www.umiacs.umd.edu/) faculty and students produced more than their share of brilliant leaders and creative researchers, whose work continues to influence the information age.

REMARKABLE COLLEAGUES

The stories of excellence began with numerical analyst Werner Rheinboldt who was the first computer scientist on campus. I never met him, but I was the beneficiary of his hiring the legendary Azriel Rosenfeld (1931-2004), who was a key figure in starting the field of computer vision. His intense work ethic and capacity to turn ideas into mathematical clarity, inspired a generation of students – especially the 51 Ph.D. students he advised. Rosenfeld's book on Digital Picture Processing (1976) became the source book for work that continues today. He appreciated my view that user interfaces were a powerful topic and early in my career (1983) gave me the opportunity to start the Human-Computer Interaction Lab (HCIL) as part of his Center for Automation Research (CfAR). Eventually HCIL became a lab within UMIACS and gained a worldwide reputation.

While the world-famous father of computing education, William Atchison served as the initial temporary chair of computer science, Jack Minker became the first permanent department chair (1974). He established a solid administrative foundation, while also developing the key research field of database logic that propelled database systems and artificial intelligence research. In addition, Minker's courageous leadership for ACM's Committee on Scientific Freedom and Human Rights (1980-1989) shows how one faculty member can stimulate worldwide efforts to promote noble causes – it was an inspiring example that has encouraged my own activism. He tells his story in the book: Scientific Freedom & Human Rights: Scientists of Conscience During the Cold War (2012).

The synergistic enthusiasm of Victor Basili and the thoughtful skepticism of Marv Zelkowitz made the Department of Computer Science a world leader in making software engineering a respected component of computer science. Basili's Experience Factory concept is the predecessor for continuous quality improvement and evidence-based learning systems, which have become widely implemented strategies. Similarly, his "Goals, Questions, Metrics" approach to dealing with complex systems of human endeavors has shaped contemporary thinking in many management situations. This work, combined with Zelkowitz's beliefs in empirical validation of software engineering methods, pushed NASA-Goddard and hundreds of other organizations to improve software quality in measurable ways.

Hanan Samet's lucid analyses and creative innovations in algorithms for spatial data structures are used by billions of people, whenever they open a mapping application on their mobile devices. Samet's extraordinary books The Design and Analysis of Spatial Data Structures (1990) and Foundations of Multidimensional and Metric Data Structures (2006) are vital contributions that have made academic research and commercial application in many areas of computer science possible. It was natural that when ACM started the Transactions on Spatial Algorithms and Systems, that Samet would be appointed editor-in-chief.

Many more stories bolstered the Department's reputation for academic rigor and innovative leadership. The field of scientific computing was substantially advanced by the highly mathematical and diligent work of Pete Stewart, Dianne O'Leary, and Howard Elman. Department Chair John Gannon's devotion to the field was apparent in the many hours he spent working with individual students in his office, right up to his untimely death at age 51.

Bonnie Dorr presented a very different personality style by energetically promoting natural language processing as a research topic within the department, as President of the Association for Computational Linguistics, and as a DARPA program manager. The kind and wise Ashok Agrawala's broad interests in networks, operating systems, and information technologies has continually influenced graduate students and industry work. Fast-talking Bill Gasarch has led the way on theoretical computer science and championed the topic in his widely popular co-authored blog on Computational Complexity.

As Department Chair for more than 10 years, Larry Davis kept us functioning smoothly, while being amazingly productive with his research time. His focus on computer vision research and prolific production of Ph.D. students, is clearly inspired by his mentor, none other than Azriel Rosenfeld. I particularly appreciated that Larry Davis led the effort to nominate me to become an IEEE Fellow.

UMIACS Directors have also played important leadership roles in promoting a productive intellectual community. Larry Davis, Joseph JaJa, VS Subrahmanian, Amitabh Varshney, and now Mihai Pop all gave generously of their time by providing and managing resources that enabled us to do our work. Another important and memorable aspect of the CS & UMIACS experience has been the hard-working, competent, and diligent staff who helped the faculty and students every day in meaningful ways.

INDICATORS OF EXCELLENCE

Some faculty have gone on from UMD to make further contributions elsewhere. This includes Mark Weiser who became the Head of the Computer Science Laboratory at the famed Xerox PARC. His 1991 Scientific American article on "The computer for the 21st century" is among the most influential in computing. Former Department Chair Satish Tripathi has gone on to become SUNY-Buffalo's president. Other former faculty members are department chairs and leading researchers at major universities.

The Department is also famous for its students, especially the more than 800 Ph.D.s who have become industry leaders, prominent government lab researchers, academic stars, and successful entrepreneurs. For example, Glenn Ricart is a national technology leader, honored in the Internet Hall of Fame, while many other alumni continue to collect awards and recognitions from professional societies such as IEEE, ACM, AAAS, AAAI, and ACL.

Even our undergraduates had outstanding successes, including Sergey Brin, whose father Michael was a math professor at UMD. Like many immigrant children Sergey Brin came to study here, earned his BS degree (1993), and then went on to co-found Google. Other alumni have established companies and lead research groups around the world. A recent success story includes three of the founders of Oculus VR, which was purchased by Facebook for $2B (2014), enabling the founders to donate funds for the construction of the Brendan Iribe Center for Computer Science and Innovation, which is scheduled for completion in 2018.

There are many other stories of remarkable faculty making breakthroughs and astonishing students winning prizes. One of our advantages was Jack Minker's influential effort in mentoring several dozen young faculty in their applications for the Presidential Young Investigator and NSF Career Awards, thereby accelerating their research agendas. Another departmental asset was work by faculty a few years younger than me who introduced our community to emerging topics.

COLLABORATIONS

One measure of the impact my colleagues have had on me is the number of co-authored papers I have written with them. The list of CS Faculty co-authors includes Vic Basili, Ben Bederson, Amol Deshpande, Bonnie Dorr, Ramani Duraiswami, Christos Faloutsos, Richard Furuta, Lise Getoor, Steven Salzberg, Neil Spring, and Mark Weiser. Other collaborations with faculty in the Colleges of Information Studies (especially Gary Marchionini), Engineering, Behavioral and Social Sciences (especially Kent Norman), Business, and Computing, Mathematics and Natural Sciences, as well as off-campus partners also enriched the experience, improved the work, and raised the impact.

My main collaborator for the past 30 years has been UMIACS Research Scientist Catherine Plaisant, who has been a reliable partner in supervising students and writing more than 90 joint papers. Her devotion to working closely with our practitioner partners, her creative approaches to problems, and her diligence in evaluation raised the quality of our joint work – and made for satisfying professional and personal experiences. I also appreciated those supportive faculty members, especially Ben Bederson and Jon Froehlich, who over the years participated in work on the emerging topics of human-computer interaction and information visualization.

The deep collaborations with wonderful undergraduate and graduate students gave meaning to my career, inspiration to push forward, and hope for the future. The new Iribe Center for Computer Science and Innovation, which became possible because of the hard work of Department Chair Samir Khuller, Emeritus Professor Bill Pugh, and others, will be a welcoming home for our students and a place where faculty and staff can continue our traditions of quality.

CONCLUSION

In summary, this rich environment of star performers pushed me along to make my own contributions. Each colleague has been an inspiration, as they pursed their own research agendas, offering their distinctive style and giving me examples of visionary goals. I thank them and celebrate their contributions (see the histories written by Jack Minker and Marv Zelkowitz https://www.cs.umd.edu/about/history). As I move on to research policy projects, more time with family and friends, and new adventures with my wife Jenny, I have high confidence that the Department of Computer Science and UMIACS will remain incubators of excellence.

Ph.D. PLACEMENTS 2016-17

The department has had the pleasure of granting Ph.D.s to some of the brightest and most innovative students in the country. Many of our alumni have gone on to work in academic departments, research labs, government agencies, and industries all over the world..

*Keep us informed about your news at **www.cs.umd.edu/commuity/alumni**.*

Melika Abolhassani, (Ph.D. '16)
Google, NY, NY
Advisor: Mohammad Hajiaghayi

Ross Adelman, (Ph.D. '16)
U.S. Army Research Lab.
Advisor: Ramani Duraiswami

Stephen Bach, (Ph.D. '15)
Postdoc, Stanford University
Advisor: Lise Getoor

Ishan Banerjee, (Ph.D. '16)
VM Ware Inc., Palo Alto, CA
Advisor: Atif Memon

Preeti Bhargava, (Ph.D. '16)
Lithium Technologies, San Francisco, CA
Advisor: Ashok Agrawala

Sravanthi Bondugula, (Ph.D. '16)
GE Global Research Center, NY
Advisor: Larry Davis

Cody Buntain, (Ph.D. '16)
Postdoc, University of Maryland
Advisor: Jennifer Golbeck

Snigdha Chaturvedi, (Ph.D. '16)
Postdoc, UIUC
Advisor: Hal Daume III

Xi Chen, (Ph.D. '15)
Apple Inc., Cupertino, CA
Advisor: Larry Davis

Jun-Cheng Chen, (Ph.D. '16)
Postdoc, University of Maryland
Advisor:

David Darais, (Ph.D. '?)
Assistant Professor University of Vermont
Advisor: David Van Horn

Ethar Elsaka, (Ph.D. '16)
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Advisor: Atif Memon

Kotaro Hara, (Ph.D. '16)
Postdoc, Carnegie Mellon University
Advisor: Jon Froehlich

He He, (Ph.D. '16)
Postdoc, Stanford University
Advisor: Hal Daume III

Di-Wei Huang, (Ph.D. '16)
Postdoc, University of Maryland
Advisor: James Reggia

Jinseong Jeon, (Ph.D. '16)
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Advisor: Michael Hicks

Changhyun Kang, (Ph.D. '15)
AT&T Labs, Middletown, NJ
Advisor: V.S. Subrahmanian

Chang Liu, (Ph.D. '16)
Postdoc, UC Berkeley
Advisor: Michael Hicks

Teng Long, (Ph.D. '16)
Google, Mountain View, CA
Advisor: Alan Sussman

Sana Malik, (Ph.D. '16)
Adobe Research, San Jose, CA
Advisor: Ben Shneiderman

Alex Malozemoff, (Ph.D. '16)
Galois Inc., Portland, OR
Advisor: Jonathan Katz

Andrew Miller, (Ph.D. '16)
Assitant Professor, UIUC
Advisor: Jonathan Katz

Leslie Milton, (Ph.D. '16)
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Advisor: Atif Memon

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Varun Nagaraja, (Ph.D. '16)
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Advisor: Larry Davis

Uran Oh, (Ph.D. '16)
Microsoft, Bellevue, WA
Advisor: Leah Findlater

Bahadir Ozdemir, (Ph.D. '16)
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Advisor: Larry Davis

Young Sam Park, (Ph.D. '16)
Yahoo, Sunnyvale, CA
Advisor:

Noseong Park, (Ph.D. '16)
Assistant Professor, UNC, Charlotte
Advisor: V.S. Subrahmanian.

Jay Pujara, (Ph.D. '16)
Postdoc, UC, Santa Cruz
Advisor: Lise Getoor

Manish Purohit, (Ph.D. '16)
Google, Mountain View, CA
Advisor: Samir Khuller

Abdul Quamar, (Ph.D. '16)
IBM, San Jose, CA
Advisor: Amol Deshpande

Eric Raboin, (Ph.D. '15)
Palantir, Washington, DC
Advisor: Dana Nau

Arti Ramesh, (Ph.D. '16)
Assistant Professor, SUNY Binghamton
Advisor: Lise Getoor

Mohammad Rastegari, (Ph.D. '16)
Allen Institute for AI, Seattle
Advisor: Larry Davis

Aseem Rastogi, (Ph.D. '16)
Microsoft Research India
Advisor: Jeff Foster

Bryan Robbins, (Ph.D. '16)
FINRA, Rockville, MD
Advisor: Atif Memon

Avinash Sahu, (Ph.D. '16)
Postdoc, University of Maryland
Advisor: Sridhar Hannenhalli

Karla Saur, (Ph.D. '15)
Intel Labs, Hillsboro, OR
Advisor: Michael Hicks

Anshul Sawant, (Ph.D. '16)
AT&T Labs, San Ramon, CA
Advisor: Samir Khuller

Ching Lik Teo, (Ph.D. '15)
DSO Natl Laboratories, Singapore
Advisors: Aloimonos and Fermüller

Mehmet Adil Yalcin, (Ph.D. '16)
Visual Data Analysis, Arlington, VA
Advisors: Bederson and Elmquist

Yezhou Yang, (Ph.D. '15)
Assistant Professor, AZ State University
Advisors: Aloimonos and Fermüller

Fan Yang, (Ph.D. '16)
eBay Inc., San Jose, CA
Advisor: Larry Davis

CAREER PROFILE:

BEN SHNEIDERMAN

Ben Shneiderman's work has had a huge impact, far beyond what most academics can expect to achieve. According to Google Scholar his 74,000+ citations make him the most cited University of Maryland College Park faculty member.

Ben Shneiderman is a member of the National Academy of Engineering, in recognition of his pioneering contributions to human-computer interaction and information visualization. He is also a Fellow of the American Association for the Advancement of Science, the IEEE, the ACM, and the National Academy of Inventors. This astonishingly broad support for him indicates widespread appreciation of his accomplishments. His 40-50 public lectures a year have meant he is known widely to researchers. He has been featured as a TED speaker (1998) and profiled in Scientific American (1999).

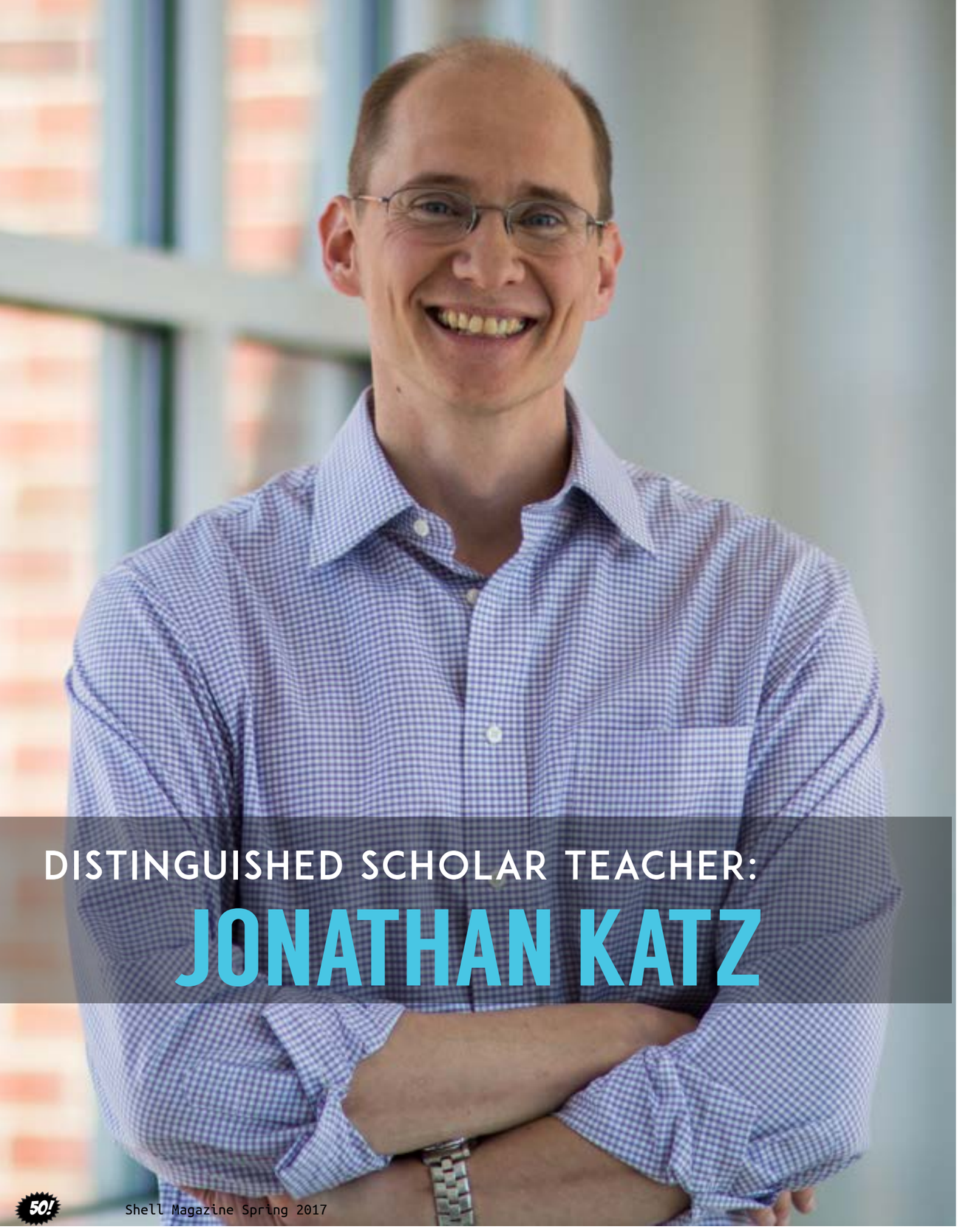
His internationally acclaimed books, such as Designing the User Interface, now in 6thEdition (2016), and Leonardo's Laptop (2003) have earned numerous awards and been translated into eight languages. These influential books secured his position as an inspirational leader in the maturing field of human-computer interaction, whose remarkable products have reshaped the world we live in. Shneiderman himself was a key figure in developing the selectable link of the World Wide Web and the small touchscreen keyboards that are so prevalent in smartphones and other devices. His research and advocacy for universal usability help ensure access by diverse users.

Shneiderman's research on information visualization enables exploration of complex data that describe key phenomena, such as business information, social networks, electronic health records, etc.. He developed widely used and commercially successful visualization tools such as Spotfire and the open source successes of treemaps for hierarchical data and NodeXL for network data. His work on event analytics continues to gain popularity in finding actionable patterns in medical histories, customer shopping reports, or cybersecurity logs.

Ben Shneiderman's primary collaborator for the past 30 years has been with Research Scientist Catherine Plaisant, whose complementary skills make them a highly creative and productive team. Shneiderman's close collaboration with students has helped him achieve breakthroughs, leading students to successfully recommend him to be campus Mentor of the Year (2012).

His latest ambitious effort is to transform academic research so that it has greater societal impact. His book The New ABCs of Research: Achieving Breakthrough Collaborations (2016) lays out a visionary plan for achieving the twin-win of excellence in applied & basic research so as to produce practical solutions that are disseminated widely and high-impact peer reviewed papers that present validated theories.

In addition to these research accomplishments and technology innovations, Shneiderman's broad vision is demonstrated in the aesthetically attractive and informative art works based on real data. His Treemap Art Project (http://treemapart.wordpress.com) produced 12 large colorful prints which have been on exhibit at the University of Maryland, the National Academies in Washington, DC, the Howard Hughes Medical Institute, and University of California at Irvine. A set of the 12 prints is in the collection of the Museum of Modern Art in New York City.



DISTINGUISHED SCHOLAR TEACHER: JONATHAN KATZ

The University has named Jonathan Katz one of its Distinguished Scholar-Teachers. Katz is currently a Professor of Computer Science and the Director of the Maryland Cybersecurity Center. He has coauthored *Introduction to Modern Cryptography* with Yehuda Lindell, which is now in its second edition. The Distinguished Scholar-Teacher Award, established in 1978, recognizes a few professors each year who "have demonstrated notable success in both scholarship and teaching." As a part of this award, Katz will give a public presentation on a topic within his discipline during next academic year.

When asked how he incorporates his research into teaching undergraduate students, Katz emphasized that his goal is to introduce the essence of modern cryptography. "One of the things that inspires me to teach and inspired the textbook that I wrote, is that crypto has changed a lot over the years," he said. He explained how the field, active since the 1970s, underwent a transition in the 1980s and 90s from what he calls an 'ad hoc' approach to cryptography to a more mathematically rigorous field.

This 'ad hoc' approach was one in which students spent time looking at constructions (a set of protocols in which a cryptographic function both exists and can take place) but spent a great deal of time on the underlying mathematics. This approach to teaching cryptography dominated the classroom until the 2000s. When recalling his own start at the University of Maryland in 2002, Katz noted that there weren't many cryptography courses taught around the country. If they were taught, they were mostly in mathematics departments or taught by people who were not doing research in the area. "Nowadays modern crypto is based upon precise definitions of what you want to achieve, which involves laying out a set of assumptions and then giving a formal mathematical proof that some construction you come up with satisfy those properties," he said.

For Katz, incorporating a modern approach to cryptography allows undergraduates to understand why it's important, learn what professor practitioners do, and understand what cryptography is relevant for. Students are then able to learn simple proofs and see that they can prove something about constructions. "It's not just ad hoc; it's not something we just started. We try to prove what we are doing. For the undergraduates, those particular proofs can be hard, but what I try to do is to get them to understand that these things can be proved secure."

For graduate students, his aim is to prepare them for research through a broad introductory course and a more focused course. For his broad course in cryptography, his goal is to ensure that students learn fundamental principles, whether or not they go on to do research in the field with him in crypto and security. He also wants them to carry the objectives that they've learned back to their own areas of research.

Katz says that his interest and enjoyment of the field informs his teaching. His excitement about cryptography is evident in the joy he has explaining it to other people in the classroom, through an online forum such as Coursera, or through his book. In hopes of reaching a wider audience, Katz mentioned that he is considering writing a book for a general audience about cryptography. "People are interested in cryptography, and it is in the news often. A lot of what people encounter in the media is either inaccurate or does not go into depth or misses the mark. It would be nice to correct that. My passion for the subject is what I want to get across to people," he said.

And like many professors, he enjoys the moments when a student finally understands a concept. "My favorite thing is when you can see in their eyes that it is clicking at some point in the semester, and they get really interested in cryptography." It is especially pleasing when he learns that cryptography may not have been a topic that a student thought would interest them. The fact that they've learned something and have been inspired by it is enough for Katz. "Cryptography might not be something that students will necessarily study in grad school or beyond, but when they come away with an appreciation for the subject? That spark is really motivational."

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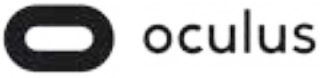

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