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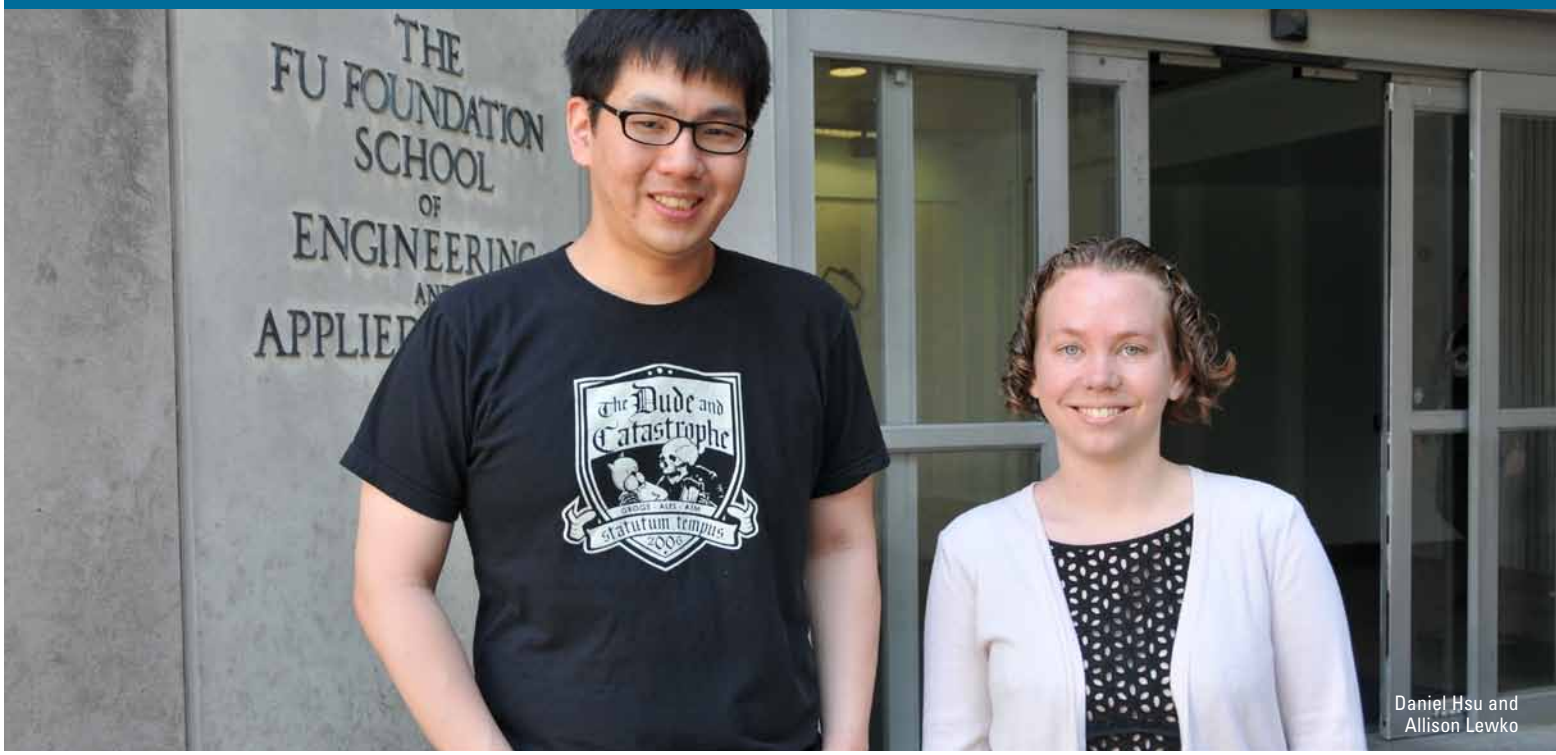


Daniel Hsu and Allison Lewko

CUCS **Welcomes Two New Faculty**


Assistant Professor of Computer Science **Allison Lewko**

"**Allison Lewko** is using mathematics to revolutionize the field of modern cryptography. Her work on functional encryption provides a fundamentally new way to think about the classical concept of encryption."

–TAL MALKIN

ALLISON BISHOP LEWKO received her Ph.D. in Computer Science from the University of Texas at Austin in 2012. She also received a Certificate of Advanced Study in Mathematics from the University of Cambridge in 2007 and her Bachelor's degree in Mathematics from Princeton University in 2006. Her research interests include cryptography, complexity theory, distributed computing, harmonic analysis, and combinatorics. Prior to joining Columbia, she was a postdoctoral researcher at Microsoft Research New England.

CUCS: How did you first become interested in computer science?

I took a somewhat long and indirect route to computer science. I began college as an english major because I wanted to do creative writing, but then I started taking some pure mathematics courses and discovered that math can be creative in ways I hadn't realized. After starting my graduate studies in math, I went looking for potential applications of mathematics to motivate my research. I found that computer science offers a great mix of deep theoretical challenges and the promise of practical impact. So midway through my doctoral studies I became a computer scientist.

What attracted you most to a faculty position at Columbia?

Columbia is home to many truly stellar researchers that I expect to collaborate with over the coming years. I am also deeply impressed by the excellent students at Columbia and feel very lucky to have the opportunity to work with them.

(continued on next page)

What are some of your ongoing research projects and what motivated you to focus on these directions?

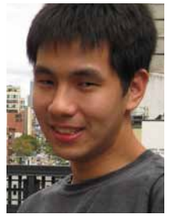
I am currently working on two main research directions. One direction is to extend the reach of provable security guarantees for cryptographic systems, while the other is to develop error-resilient algorithms and lower bounds for distributed computation and communication tasks. These are problems that have many potential applications, but our current understanding of the inherent tradeoffs between the competing goals of efficiency and security is quite lacking.

Do you have a method or approach that you like to use in your research?

I do what probably most theoreticians do—I ask a lot of questions and I generate a lot of bad ideas! I usually start with many ideas that individually don't work, try to figure out how and why each fails, and extract insight from this that can be mined for solutions.

How do you pick your research topics and what do you believe makes a good research question?

I am typically drawn to problems that populate the boundaries between what is theoretically possible and impossible, and I seek to understand what are the core features of a problem that tip the balance between a potentially practical solution and an impossibility result. I think a good research question is one that isolates the most basic gap in current understanding and suggests a path towards further progress.



Assistant Professor
of Computer Science
Daniel Hsu

"**Daniel Hsu** pioneered novel approaches to learning statistical models from data by using spectral techniques and the method-of-moments. While previous approaches got stuck at suboptimal solutions, Hsu's work guarantees globally optimal models in a computationally efficient manner."
–TONY JEBARA

DANIEL HSU received his Ph.D. in Computer Science in 2010 from the Department of Computer Science and Engineering at UC San Diego, where he was advised by Sanjoy Dasgupta. He was a postdoc at Microsoft Research New England from 2011 to 2013; before that, he was a postdoc with the Department of Statistics at Rutgers University and the Department of Statistics at the University of Pennsylvania from 2010 to 2011, supervised by Tong Zhang and Sham M. Kakade. Daniel received his B.S. in Computer Science and Engineering in 2004 from the Department of Electrical Engineering and Computer Sciences at UC Berkeley. His research interests are in algorithmic statistics and machine learning.

What attracted you most to a faculty position at Columbia?

The people here are enormously talented and accomplished, and also ever friendly and generous. This combination makes for a wonderful academic home.

What are some of your ongoing research projects and what motivated you to focus on these directions?

One project aims to develop machine learning algorithms that preserve privacy in a rigorous sense. This is important because many applications of machine learning rely on personal and sensitive data about individuals (e.g., genome sequences, financial histories). Another project concerns machine learning in interactive settings, where the data and feedback that are collected depend on specific choices made by the algorithm. These settings are ubiquitous, yet require techniques which are fundamentally different from more "classical" machine learning approaches. A third project looks at algorithms for deriving new representations of data useful for machine learning. This is part of a broader goal of making machine learning more widely usable and automatic.

How do you pick your research topics and what do you believe makes a good research question?

Topics of research are, ideally, necessary and sufficient for progress in some grander scheme. I think many people (myself included) are also attracted by other aspects, such as aesthetics and practical significance. One strategy is to pick a problem or question such that whatever the eventual solution or answer is, it will still be interesting to you.

Where do you see your field progressing over the next decade?

At the core, there is still much effort put towards making machine learning a more automatic, reliable, and scalable technology. This is necessary for the field to mature, and I think the next decade will see significant advances in these foundational issues.

If you were advising students at the undergraduate level who wanted to do what you're doing now, how would you suggest they go about it?

A lot of practice in both algorithmic design and mathematical analysis goes a long way in machine learning.

Student-led Social Media Startup **Wins Grand Prize in Statewide Competition**

The old adage, "a picture is worth a thousand words," is particularly fitting for the creators of WordsEye.

The text-to-image software startup, co-founded by computer science PhD candidates **Bob Coyne** and **Daniel Bauer**, recently won the grand prize—a $100,000 award—at the Fourth Annual New York Business Plan Competition. WordsEye bested more than 430 teams from nearly 60 colleges and universities statewide in the competition, sponsored by the State University of New York's College of Nanoscale Science and Engineering (CNSE) to support high-tech education and entrepreneurship amid the state's thriving technology scene.

The WordsEye team, which also includes Columbia Business School student Neelam Brar, intends to use the award money to further develop its proprietary software, which the team describes as "Twitter meets Instagram." WordsEye's technology, geared toward social media users, provides a new medium for visual expression, allowing users to create 3D scenes or images simply by text descriptions.

"The goal of WordsEye is to help people express themselves in visuals as quickly and easily as they can with language," says Coyne. "It took a while for the news to sink in. Our next step is to get financing to actually launch the business."

The team's momentum is in overdrive, having been in the works over the past several years. Coyne says they are already talking to several potential investors, plan to participate in more pitch events, and aim to beta test the software this summer.

The team has already gained interest from the educational sector. The software can be used for vocabulary building, literacy, special needs instruction, cyber arts, and storytelling. "We tested WordsEye with sixth-grade students in an enrichment program a couple of summers ago at Harlem Educational Activities Fund," says Coyne, "and found that students using it improved more significantly in their tested literacy skills as compared with a control group." Down the road, the team will look into applying WordsEye to 3D games.

Julia Hirschberg, Professor and Department Chair of Computer Science, is Coyne's faculty adviser and has been involved early on in the making of WordsEye. With Columbia Research Scientist **Owen Rambow**, and Richard Sproat (now at Google), Hirschberg helped secure funding from the National Science Foundation to conduct additional research on WordsEye and get the product where it is today.

"Now we're at the stage where WordsEye can be made widely available, through social media," says Hirschberg. About the significance of the software, she remarks, "Being able to draw beautiful pictures using regular language seems like magic to WordsEye users, even though it's based on a great deal of very sophisticated language processing technology."

Coyne got the idea for WordsEye after his then two-year-old son woke him in the middle of the night and he was unable to get back to sleep. He had been developing a commercial 3D graphics system at the time and felt frustrated that he never had the time to actually use the system himself; the system was flawed in that it was too laborious and time consuming.

This WordsEye image was generated from the following text: "The orange cat is on the chair. The chair is white. The ground has a design texture. The ground is shiny. The huge yellow illuminator is 7 feet above the cat."

"I wanted to much more easily translate my own artistic ideas into actual scenes. It occurred to me that language would let me do that," recalls Coyne. "By using language you give up some amount of control over details but you gain in expressive power."

WordsEye's primary focus is social media, as a tool, adds Coyne, "to let everyone create pictures that they can share. With WordsEye, people won't have to spend months learning complex tools and hours using those tools in order to create beautiful rendered 3D scenes."

By Melanie A. Farmer

Bigshot Camera Does Good

Nayar aims to help children combine creativity with science using Bigshot

Shree Nayar hopes children will learn from first building his camera and then sharing photos

A long-awaited project has come to life for **Shree Nayar**: Bigshot, a kit that features a build-it-yourself digital camera he has designed to serve not only as a creative tool but also as a medium for education. More than four years in the making, Bigshot is the culmination of a dream for Nayar, who was inducted into the National Academy of Engineering in 2008 as well as the American Academy of Arts and Sciences in 2011 for his pioneering contributions to computer vision and computational imaging.

"The camera is central to what we do," says Nayar, T.C. Chang Professor of Computer Science at Columbia Engineering. "It's more than just a device that captures images in time, memories in pixels. It allows us to express ourselves and to communicate with each other in powerful ways—it has evolved into a technology with great social relevance."

Bigshot, which Nayar developed for anyone interested in how cameras work ("kids" from 8 to 108), includes features like a hand-cranked power generator to supplement the rechargeable battery, and a "Swiss Army" lens with a wheel you can rotate to switch between regular, panoramic, and stereo or 3D modes. The kit is accompanied by an in-depth website that includes an interactive textbook with engaging demos of the science and engineering concepts related to the camera—optics, mechanics, electronics, and image processing.

The project was inspired by *Born into Brothels*, a documentary about desperately poor children living in the red light district of Calcutta who were given cameras by one of the directors. Nayar had already been thinking about how to leverage the appeal of the camera to make a broader social impact when he saw the film, and so he embarked on Bigshot as a side project to his research.

"As the kids learned photography, they began to look at their world with new eyes," Nayar observes. "The film reaffirmed my belief that the camera is unique as a technology in its ability to inspire creativity."

He notes that building Bigshot component by component exposes children to a wide range of science concepts, and they learn by doing: "Once they have a fully functioning digital camera on their hands, they get to enter the world of photography, storytelling, and documentation. The inherent nature of the camera enables us to juxtapose the sciences and the arts within a single learning experience." Younger children benefit from working with their parents and teachers on the project; older teens and camera enthusiasts enjoy exploring the camera and website on their own.

At Columbia, Nayar worked with independent contractors to build about a dozen prototypes of the camera. He and a team led by graduate students **Guru Krishnan** and **Brian Smith** developed the first version of the educational website. They field-tested the prototypes and the website over a six-month period with hundreds of kids and their teachers in four cities—New York, Bangalore, Vung Tau, and Tokyo.

The camera kit was so well-received that Nayar founded Kimera (short for kid camera) in 2010 as a for-profit social venture to manufacture and distribute the Bigshot kits. His goal is to use some of Kimera's royalties to donate cameras to kids in highly underprivileged communities through a program he calls Bigshots for Good. He is hoping children will share their photos online, and on the Bigshot website. And he intends to partner with educational nonprofits and after-school programs—he already has one partnership inked with the Center for Arts Education in New York, to bring Bigshot to underserved students.

"To me Bigshot is not just a kit, or a digital camera," Nayar says. "It's an experience that I hope will pique curiosity. One kid may be drawn to the science behind it and another may be inspired by the art of photography. Both would be equally good outcomes in my mind."

By Holly Evarts

PHOTO OF SHREE NAYAR: JEFFREY SCHIFFMAN

Forbes 30 Under 30 Recognizes Rising Star Allison Lewko

Assistant Professor **Allison Lewko**

Allison Lewko, Assistant Professor of Computer Science, has been named to the annual Forbes 30 Under 30 list in the Science & Healthcare category

Allison Lewko, Assistant Professor of Computer Science, has been named to the annual Forbes 30 Under 30 list in the Science & Healthcare category for her work on designing encryption algorithms and keeping data secure. She joins an exciting group of, as the Forbes editors note, "young disruptors, innovators, and entrepreneurs who are impatient to change the world."

"I'm very proud to be recognized as part of such a talented group," says Lewko, who is focused on developing new techniques to achieve flexible data sharing and enhanced security in the cloud, for example, how to keep secrets on devices like cloud-connected cell phones that are frequently leaking information.

"We call this functional encryption, a way to enable only the users with specific attributes that match the encryption policy of the data to decrypt the document," she explains. She sees functional encryption as a new method for obtaining strong security guarantees while still allowing a variety of uses of sensitive data. "In previous models of encryption, encrypted data would be safe but not very usable," she adds. "We are modernizing these concepts and creating tools that can scale with the size and variety of data and users in current systems."

Before coming to Columbia Engineering in fall 2013, Lewko was a postdoctoral researcher at Microsoft Research New England, where she designed error-tolerant algorithms. She is a faculty affiliate of Columbia's Institute for Data Sciences and Engineering and the Institute's Cybersecurity Center.

By Holly Evarts

Roxana Geambasu
Wins NSF CAREER Award

Assistant Professor
Roxana Geambasu

Roxana Geambasu, Assistant Professor of Computer Science, has won a National Science Foundation (NSF) CAREER Award for her proposal to create new data protection abstractions for modern operating systems

Roxana Geambasu, Assistant Professor of Computer Science, has won a National Science Foundation (NSF) CAREER Award for her proposal to create new data protection abstractions for modern operating systems. The five-year, $499,000 grant, the most prestigious NSF award to recognize outstanding junior faculty, will help fund her project, "New Abstractions for Responsible Sensitive Data Management in Modern Operating Systems."

"This is a great honor," says Geambasu, who is one of three faculty members directing the Software Systems Lab and a member of the Institute for Data Sciences and Engineering's Cybersecurity Center. "We are looking at creating new, convenient protection mechanisms that will promote a responsible approach to data management, in which users can manage their data carefully and minimize their exposure to attacks."

Her research is focused on ensuring data security and privacy in an era of cloud computing and ubiquitous mobile devices. She notes that these technologies, which billions of users rely upon to access and host sensitive data—such as emails, documents, and financial information, have become easy targets for theft, espionage, hacking, and legal attacks. "And, despite the threats," she observes, "today's data management practices are looser and more irresponsible than ever."

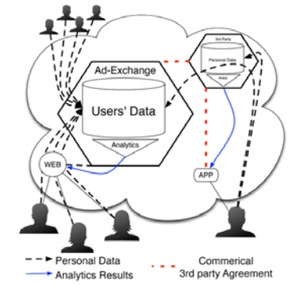
These days, she points out, the mobile devices we carry with us everywhere are packed with confidential information under operating systems that never securely erase data. At the other end, cloud services not only accumulate endless logs of user activity, such as searches, site visits, and locations, but also keep them for extended periods of time, mine them for business value, and at times share them with others—all without the user's knowledge or control.

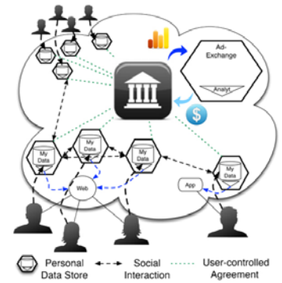
"This has become an untenable situation," Geambasu says. So she is working to identify the security risks inherent in current mobile and web technology and designs, and constructing systems to address those problems. Her NSF CAREER-funded proposal is focused on looking at data storage in modern operating systems, including Android and iOS, and developing fine-grained data protection.

"Ensuring mobile and cloud data security demands new mechanisms and abstractions to facilitate programmers' work; ensuring privacy demands new levels of transparency that empower users to protect themselves," Geambasu says. "My research addresses these challenging problems and anticipates those to come with the archiving of vast quantities of sensitive data."

By Holly Evarts

Augustin Chaintreau
Wins CAREER Award, Rising Star Award





Chaintreau's Banalytics project demonstrates how information about a consumer's behavior, however mundane, can be used with tremendous values and risks to the individual.

Assistant Professor
Augustin Chaintreau

Augustin Chaintreau, Assistant Professor of Computer Science, is on a roll. He recently won a prestigious National Science Foundation (NSF) CAREER Award for his Banalytics research project that demonstrates how information about a consumer's behavior, however mundane, can be used with tremendous values and risks to the individual. One of the NSF's highest honors for exceptional junior faculty, the CAREER Award will support his work with a $500,000 five-year grant. In addition, Chaintreau has been awarded the distinguished 2013 ACM (Association for Computing Machinery) SIGMETRICS Rising Star Researcher Award for his significant contributions to the analysis of emerging distributed digital and social networking systems.

"This is truly a double honor," says Chaintreau, who also is a member of the Institute for Data Sciences and Engineering's New Media Center. "My earlier work has now received its highest recognition. And being awarded this prominent NSF CAREER grant will accelerate my lab's research at a time when reconciling the rapid progress in big data with personal privacy has never been so critical. This is so gratifying!"

With more and more companies using customer data as a central component of their business plans, the world is becoming ever more dependent on researchers and policy makers who can access individuals' personal data. "Today, customer data is what makes a company profitable. Tomorrow, sharing our personal data will offer ways to improve our lives and advance society. So how," Chaintreau asks, "do we reconcile this progress in big data with privacy? This is a problem that's getting worse every day, especially now that personal data and its value for national security has become such a controversial—and important—issue."

Modern-day analytics, defined by Chaintreau as the "science of identifying and exploiting individual types and trends," currently run behind closed doors—you cannot control how companies like Facebook or Google use and market user data. "The first step," he notes, "is to prove you can perform analytics with data transparency, where personal information is controlled by individuals who can then decide what they want to share—or not." His research is targeted at finding alternatives that will help people manage their personal data in an easier, more transparent way. Data transparency, he explains, would make big data socially more efficient—"but once you prove it's technically feasible, you face the real question of how can we overcome adoption barriers so that the web as we know it will evolve towards better transparency?"

"Privacy and economics are really intertwined," he continues. "Users and companies will not work together if the solution handles one well at the expense of the other. Enabling users to effectively own their data and trade them with companies raises all kinds of technical, economic, and societal challenges. Answering that question will decide if the mobile web we inhabit in 10 years is a hospitable and prosperous place, a means of unprecedented surveillance, or a vast collection of fiefs guarded by metal doors. Researchers, app developers, and regulators, all are making progress, but nobody has yet gotten the path to a transparent web completely right. That's what we are trying to do."

Along with building behavioral analytics that put users in control, Chaintreau plans to create a new course for both engineering and journalism students on personal data management.

"Some of the most innovative work measuring how companies handle personal data come not from the conferences I attend, but from the newspapers and blogs we all read," Chaintreau says. "At Columbia, I am very fortunate because we can bring together the best of computer science and journalism. In fact, we are now working on launching a pilot class in particular for the dual MS degree program on how to inform society about the risks and values of personal data."

It is getting increasingly more important for individuals to understand the value of their data.

"In 10 years all students should understand the value of information in our evolving society," he adds. "This is really a civic responsibility—we need good technologists and, just as importantly, good journalists who are truly tomorrow's data first-responders to improve how citizens make critical choices. Surrendering our data for some free services, for instance, is not a good option for critical areas like health and energy. I hope that my research will shape a different future for the mobile web."

By Holly Evarts

Making the Grade: Servedio, Vallancourt Win Presidential Teaching Awards

Associate Professor of Computer Science **Rocco Servedio**

Rocco Servedio, Associate Professor of Computer Science, and David Vallancourt, Senior Lecturer in Electrical Engineering, have been awarded Columbia's Presidential Teaching Award, a top teaching honor given by the University to just five recipients each year at Commencement. Established in 1996, the presidential awards recognize the best of Columbia's teachers "for the influence they have on the development of their students and their part in maintaining the University's longstanding reputation for educational excellence."

Both Servedio and Vallancourt joined the faculty procession at the University Commencement Ceremony held May 22, 2013.

"We are extremely proud that Rocco and David have been honored this year by the University for their outstanding teaching," said Donald Goldfarb, interim Dean of Columbia Engineering. "SEAS has two of the five awardees this year, which really underscores the great strength of our faculty and their commitment to teaching."

Servedio and Vallancourt were surprised to hear the news.

"I was thrilled," says Servedio. "There are so many tremendously dedicated and skilled teachers at Columbia, all across the different schools of the University, that it was really very meaningful to get this recognition."

As teachers, both aim to keep it interesting. Their teaching styles differ but they agree it is key to be able to engage the students in the material and help them really understand it.

Vallancourt, who teaches the first-year engineering course in electrical engineering, has been credited for keeping the lectures fresh, fun, and full of interesting demonstrations. "One of my main tools is making connections between course material and common devices with which students are familiar," says Vallancourt, who has in the past dissected everything from smartphones to electric guitars in class. "This gives me the opportunity to tear things apart on 'company time,' and what engineer wouldn't enjoy that?"

Servedio aims for a relaxed classroom style "with a heavy emphasis on making sure that students first have a solid intuitive and conceptual grasp of the material before getting into mathematical details."

Servedio teaches an introductory course in computational learning theory and it is important to him to try to explain the material clearly and convincingly so that students understand why it is interesting and worthwhile. "A lecture is a lot like a story, and if a story doesn't make sense on a 'gut level' then there is no way a listener is going to care enough to absorb the details."

A leading computational theorist, Servedio joined Columbia Engineering from Harvard where he was an NSF Mathematical Sciences postdoc in the University's Division of Engineering and Applied Sciences. He studied at Harvard, earning his AB in Mathematics and both his MS and PhD in Computer Science. Servedio's research focuses mainly on computational learning theory as well as computational complexity theory, cryptography, and quantum computation.

Vallancourt, who is also an alumnus of Columbia Engineering, having earned his bachelor's, master's, and PhD here all in electrical engineering, joined the School in 1987 as an assistant professor. In 1992, he left Columbia for AT&T Bell Labs (later Lucent Technologies) where he served on the technical staff until 2000. Before returning to Morningside in 2005 as a senior lecturer in Circuits and Systems in the Department of Electrical Engineering, he worked at Texas Instruments and Vitesse Semiconductor.

This is not the first time Vallancourt has been honored for exemplary teaching. In 2007, he received a Distinguished Faculty Teaching Award, which is presented annually on Class Day by the Columbia Engineering Alumni Association. What makes him a good teacher? "I try to lower the perceived wall between 'faculty' and 'student'," he says, "and to be friendly and helpful as my teachers and industry mentors have been. I don't make students follow a lot of rules, and instead, encourage them to focus on the engineering."

For Vallancourt, the reward of teaching is a two-way street. "Chatting with students is a blast. I've met some really cool people who might not normally hang out with an old white-haired guy."

Servedio and Vallancourt join five Engineering professors who have won the Presidential Teaching Award in the past. This list of outstanding educators includes Patricia Culligan, professor of civil engineering and engineering mechanics; George Deodatis, Santiago and Robertina Calatrava Family Professor of Civil Engineering and Engineering Mechanics; George Flynn, Higgins Professor of Chemistry and professor of chemical engineering; Yannis Tsividis, Charles Batchelor Professor of Electrical Engineering; and the late Nicholas Turro, William P. Schweitzer Professor of Chemistry and former Co-Chair of Chemical Engineering.

By Melanie A. Farmer

Henning Schulzrinne **Inducted to Internet Hall of Fame**

Henning Schulzrinne is being recognized for co-developing the key protocols that enable Voice over Internet Protocol, known widely as VoIP, and other significant multimedia applications

Julian Clarence Levi Professor of Mathematical Methods and Computer Science **Henning Schulzrinne**

Technology pioneer **Henning Schulzrinne** is once again all over the Net.

Schulzrinne, who is Julian Clarence Levi Professor of Mathematical Methods and Computer Science at the Engineering School, has been inducted into the Internet Hall of Fame as a leading innovator. Schulzrinne is being recognized for co-developing the key protocols that enable Voice over Internet Protocol, known widely as VoIP, and other significant multimedia applications, including real-time web streaming and the Session Initiation Protocol (SIP), which sets up and configures VoIP telephony communications in businesses.

Schulzrinne is one of 32 individuals who have been selected for the Hall of Fame this year by the Internet Society. Visionaries, innovators, and leaders around the world—from engineers to entrepreneurs—gathered August 3rd in Berlin, Germany, where they were officially inducted and honored at the Society's annual awards ceremony.

Since December of 2011, Schulzrinne has served as the chief technology officer for the U.S. Federal Communications Commission (FCC). In this role, he guides the FCC's work on technology and engineering issues, together with the FCC's Office of Engineering and Technology. He advises on matters across the agency to ensure that FCC policies are driving technological innovation, including serving as a resource to FCC Commissioners, and is helping the FCC engage with technology experts outside the agency and promote technical excellence among agency staff.

At Columbia Engineering, Schulzrinne is also a professor of electrical engineering and former chair of the computer science department. His research interests include Internet multimedia systems, applied network engineering, quality of service, and performance evaluation.

Schulzrinne received his undergraduate degree in economics and electrical engineering from the Darmstadt University of Technology, Germany; his master's degree as a Fulbright Scholar from the University of Cincinnati, Ohio; and his PhD from the University of Massachusetts in Amherst. Before joining Columbia in 1996, he was a member of the technical staff at AT&T Bell Laboratories, Murray Hill, and an associate department head at GMD-Fokus (Berlin). He is a fellow of the Institute for Electrical and Electronics Engineers and former member of the Internet Architecture Board.

By Melanie A. Farmer

Professor **Eugene Agichtein** received the Karen Sparck Jones Award, which recognizes advances in our understanding of Information Retrieval and Natural Language Processing with significant experimental contributions. Eugene received his Ph.D. in Computer Science from Columbia University in 2005 and is now an associate professor at Emory University. He is a Sloan Research Fellow.

Professor **Augustin Chaintreau** and coauthors from Stony Brook, AT&T, and Telefonica won a Best Paper Award at the ACM/USENIX IMC conference held in Barcelona. The conference is about Internet measurement and although their contribution was submitted as a short paper, it received the highest rank among 178 submissions. In the paper titled "Follow the Money: Understanding Economics of Online Aggregation and Advertising", the authors propose to explore the hidden side of the web: the one where the money is made! While the web quickly evolves to accommodate new ad-based revenues and social services, the mobile social lab at Columbia is working with various groups on making the economics of Internet content and your data more transparent.

Professor **Steve Feiner** received the 2014 Virtual Reality Career Award of the IEEE Computer Society Visualization and Graphics Technical Committee. The citation reads, "In recognition of his lifetime contributions to augmented reality and virtual reality, including seminal research on mobile augmented reality, automated design and layout, and applications to task assistance and navigation."

Professor **Roxana Geambasu** received Honorable Mention for Dennis M. Ritchie Doctoral Dissertation Award, which recognizes research in software systems and to encourage the creativity that Dennis Ritchie embodied, providing a reminder of Ritchie's legacy and what a difference one person can make in the field of software systems research. Roxana received the first honorable mention for the inaugural Ritchie Award competition!

Kyung Hwa Kim

Jong Yul Kim

Hyunwoo Nam

Professor **Henning Schulzrinne**

CS PhD students **Kyung Hwa Kim**, **Jong Yul Kim** and EE PhD student **Hyunwoo Nam** won first place in the Juniper/Comcast Software-Defined Network (SDN) workshop and competition recently held at the Juniper Networks OpenLab facility in Bridgewater, NJ. Students were challenged to develop solutions using Juniper's Junos Space Platform to improve network utilization and quality of user experience under dynamic network conditions. The Columbia team, whose faculty advisor is Professor **Henning Schulzrinne**, presented an application-aware SDN solution. They won for an excellent visualization tool to monitor network status, a differentiated routing algorithm that takes application needs into account, and a compelling business model for service providers.

Professor **Vishal Misra** receives U. Mass Amherst Outstanding Alumni Award. In celebration of his significant achievements and inspiring successes in his early career, Vishal will be awarded the 2014 College of Engineering Outstanding Junior Alumni Award. The citation reads: "for exemplary accomplishments, epitomizing the potential of a U. Mass Amherst College of Engineering education." The award will be presented on September 26, 2014 at U. Mass Amherst during Homecoming Weekend 2014.

Anargyros Papageorgiou

Professor **Joseph Traub**

CS Research Scientist **Anargyros Papageorgiou** and Professor **Joseph Traub**'s publication "Measures of quantum computing speedup" was designated as Editors' Suggestion in Physical Review A. The journal also publishes a list of a small number of Physical Review A papers that the editors and referees find of particular interest, importance, or clarity. These Editors' Suggestion papers are listed prominently on *http://pra.aps.org/* and marked with a special icon in the print and online Tables of Contents and in online searches. The paper introduces the concept of strong quantum speedup. It is shown that approximating the ground-state energy of an instance of the time-independent Schrodinger equation with d degrees of freedom and d large enjoys strong exponential quantum speedup. It can be easily solved on a quantum computer. Some researchers in QMA theory believe that quantum computation is not effective for eigenvalue problems. One of the goals of this paper is to explain this dissonance.

Professor **Rocco Servedio** was awarded a three-year NSF grant to study learning and testing probability distributions. A long and successful line of work in theoretical computer science has focused on understanding the ability of computationally efficient algorithms to learn and test membership in various classes of Boolean functions. The proposal of Rocco advocates an analogous focus on developing efficient algorithms for learning and testing natural and important classes of probability distributions over extremely large domains. The research is motivated by the ever-increasing availability of large amounts of raw unlabeled data from a wide range of problem domains across the natural and social sciences. Efficient algorithms for these learning and testing problems can provide useful modeling tools in data-rich environments and may serve as a theoretically grounded "computational substrate" on which large-scale machine learning applications for real-world unsupervised learning problems can be developed.

Evangelia Sitaridi

Professor **Kenneth Ross**

Evangelia Sitaridi was Awarded IBM PhD Fellowship, an intensely competitive worldwide program that honors exceptional Ph.D. students who have an interest in solving problems that are important to IBM and fundamental to innovation in many academic disciplines and areas of study. Fellows are awarded a stipend for one academic year, and can apply for renewals for a total of up to three years. Eva Sitaridi is currently working with her advisor Professor **Kenneth Ross** on database query processing algorithms using graphics processors.

Professor **Venkat Venkatasubramanian** and coauthors won the Best Poster award at the 23rd Annual Meeting of the European Symposium on Computer Aided Process Engineering (ESCAPE 23), held in Lappeenranta, Finland. This is a prestigious gathering of process systems engineers in the world, held annually at some European city. A committee of the conference organizers evaluate all the poster papers and announce the best poster paper award at the concluding session of the conference. This time, there were more than 100 posters presented from all over the world. The paper titled "Intelligent Alarm Systems applied to Continuous Pharmaceutical Manufacturing" discusses the development of a model-based intelligent control system that effectively integrates different models of process knowledge. This system provides timely guidance to the operator regarding the detection and diagnosis of exceptional events along with relevant mitigation strategies, with the goal of avoiding emergency shutdowns.

Professor **Vladimir Vapnik** was awarded the 2013 C&C Prize bestowed by NEC Foundation, the foundation arm of IT and networking giant NEC Corp. He is recognized for contributions to establishing Statistical Learning Theory and for the invention of high-performance and practical learning algorithms. His breakthroughs were significant, and he has made valuable contributions to the development of machine learning technology and the expansion of its application field, cited NEC C&C. Established in 1985, the C&C Prize is awarded to distinguished individuals for their pioneering contributions related to the integration of computers and communications technologies and the social impact of developments in these fields.

Dr. Adam Waksman

Matthew Suozzo

Professor Simha Sethumadhavan

Dr. **Adam Waksman** and CS Junior **Matthew Suozzo** won a Best Student Paper Award at the 20th ACM SIGSAC Conference on Computer and Communications Security, held at Berlin, Germany in November 2013. The paper "FANCI: Identification of Stealthy Malicious Logic Using Boolean Functional Analysis" was co-authored with their advisor Professor **Simha Sethumadhavan**, which describes a method for detecting backdoors in hardware circuits before the design is taped-out and sent to the market. This is the first purely static analysis technique for detecting backdoors in hardware. Only three of 530 submissions received this honor.

Professor **Junfeng Yang** won Google Faculty Research Award. Mobile and wearable devices offer unprecedented convenience to our lives, yet they also bring new threads. Studies have shown that the apps running on these devices are often plagued with programming errors that degrade user experience. Worse, apps are sometimes infected with malware, which can steal users' private information, install key loggers, fake mobile payments, etc. Junfeng and his team will use the funding from Google to build AppDoctor, a new system for detecting programming errors and malware in Android apps, benefiting every Android user.

Dr. Lisa Wu

Raymond Barker

Professor Martha Kim

A paper by Dr. **Lisa Wu**, EE student **Raymond Barker**, Professor **Martha Kim**, and Professor **Kenneth Ross** was named IEEE Micro "Top Picks from the Computer Architecture Conferences" in its May/June 2014 issue. This issue collects some of this year's most significant research papers in computer architecture based on novelty and long-term impact. Any computer architecture paper (not a combination of papers) published in the top conferences of 2013 is eligible. Top Picks will attempt to recognize those significant and insightful papers that have the potential to influence the work of computer architects for years to come. The paper that was recognized appeared in the International Symposium on Computer Architecture (ISCA 13) and is entitled "Navigating Big Data with High-Throughput, Energy-Efficient Data Partitioning."

Two Columbia publications were selected as "Top Picks in Computer Architecture" in the July/August 2013 issue of IEEE Micro. The issue features eleven of the year's most significant research papers in computer architecture based on novelty and long-term impact. The first paper is titled "Collection, Analysis, and Uses of Parallel Block Vectors." Authored by PhD student **Melanie Kambadur**, undergraduate **Kui Tang**, and Professor **Martha Kim**, this research establishes a novel perspective from which to reason about the correctness and performance of parallel software. In addition, it describes the design and implementation of an open source tool that automatically instruments an program to gather the necessary runtime information.

Melanie Kambadur

Kui Tang

Dr. John Demme

The second paper is titled "A Quantitative, Experimental Approach to Measuring Processor Side-Channel Security." The authors are Dr. **John Demme**, MS student Robert Martin, Dr. **Adam Waksman** and Professor **Simha Sethumadhavan**. This paper describes quantitative method to identify bad hardware design decisions that weaken security. The methodology can be used in the early processor design stages when security vulnerabilities can be easily fixed. The paper marks the beginning of a quantitative approach to securing computer architectures.

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