Stanford | ENGINEERING
Management Science & Engineering

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Dear Management Science and Engineering Alumni and Friends,

This last year was my second as Chair of the Department of Management Science and Engineering, and I continue to be impressed with the impact that our faculty and students are having on the world. Being Chair offers a unique perspective on how connected MS&E is to the solution of problems cutting across multiple areas of business, government, and technology development. As you will read below, our faculty is engaged in research ranging from selling cars on the Internet to financial risk management to political polarization to structuring gIobal work teams! Of course, the diversity of problem areas addressed by MS&E is reflected in what is taught in our classrooms, providing our students with real-life examples of how their chosen discipline is changing the world.

Over the last year, the Department initiated the process of reconsidering its curriculum at the undergraduate, Master's, and PhD levels. The curriculum review process has included gathering information from many sources, and is providing the faculty with an opportunity to think from first principles about the thinking skills that a 21st century education in our field should represent. The review is continuing this year, with the intent that our Master's program will be restructured in time for the 2014-15 incoming class, and with the undergraduate and PhD programs to be updated the following year. In addition, the Department is reconsidering the way in which it has configured its PhD space, in recognition of the fact that so much research today that is solitary can be pursued via the Internet from a student's home (or favorite coffee shop!), and that much of the value in PhD education lies in the opportunity to engage in informal research discussions with fellow students of diverse disciplinary backgrounds. As with the curriculum review, this is a process that will take time to fully unfold, but the first changes in MS&E's space utilization will be implemented this year.

Faculty Hires

When MS&E thinks about its faculty hiring, it often explicitly thinks about how the Department might look at some point in the future, one often-used date being 2025. Framed in this way, the goal is to hire faculty who will ensure that the MS&E of 2025 continues to be at the forefront of the discipline. In view of this hiring principle, it gives me great pleasure to introduce our newest faculty member **Melissa Valentine**.

Melissa received her PhD from Harvard University in 2013. Within our multi-disciplinary department, she is joining the faculty in the Center for Work, Technology and Organizations, which is the only university-based research center in the United States dedicated to studying work and its interplay with organizations and technologies. Her research focuses on organizational structures and designs that support collaboration and coordination in fast-paced, highly dynamic work environments. Melissa has conducted multi-method field research in a variety of organizational settings, including

pharmaceutical R&D, software development, and emergency medical care. She has won several awards, including: the Best Paper with Practical Implications award from the Organizational Behavior division of the Academy of Management; the Wyss Award for Excellence in Doctoral Research from Harvard Business School; and the Organization Science/INFORMS dissertation proposal competition. Melissa did her undergraduate work at Stanford, and is delighted to be back on The Farm.

Faculty News

Steve Barley has been studying the impact of the Internet on the process of the car selling/buying and shown that the Internet has dramatically shifted the traditional power relationship between the salesperson and the buyer. Among the study's more interesting findings, Barley notes that high-pressure tactics often associated with in-person sales are ineffective online and there is little haggling over price on the Internet. Barley suggests that car dealerships might use his findings to alter their on-the-lot sales scripts to adapt to such shifts.

Margaret Brandeau received a five-year grant from the National Institute on Drug Abuse on "Making Better Decisions: Policy Modeling for AIDS and Drug Abuse." This is Margaret's fourth consecutive five-year grant from NIDA and supports her ongoing work to address emerging questions about global HIV prevention, treatment and prioritization in substance-using populations through epidemiologic modeling.

Tom Byers has become the first holder of the Entrepreneurship Professorship in the School of Engineering. In 1994, a group of donors created a fund to support the study of entrepreneurship in the School of Engineering and to permanently endow the position of the director of the Stanford Technology Ventures Program (STVP), which Byers has held since the program's inception. Tom's leadership of STVP over the past two decades led to his formal appointment to the Entrepreneurship Professorship.

Samuel Chiu and a group of his students posted a 2012 presidential Electoral College prediction site, which projected the distribution of electoral votes for the presidential candidates. Applying their probability model to state-by-state polling data, the team calculated the win/loss probability of each state to predict the five most-likely outcomes. All five pointed to an Obama victory, with varying electoral vote counts. The final 332 electoral votes for candidate Obama was one of the two most likely outcomes, as forecast by Chiu's team's model.

Chuck Eesley co-authored the study, "Impact: Stanford University Economic Impact via Innovation & Entrepreneurship," which quantifies the global economic impact of Stanford entrepreneurship and innovation. The numbers are startling and impressive: global revenues of $2.7 trillion annually and 5.4 million jobs created since the 1930s. Chuck's paper on how founding team composition affects startup performance, written with David Hsu and Edward B. Roberts, was accepted for publication in the Strategic Management Journal in 2013. Chuck's course, E145, Technology Entrepreneurship has cumulatively reached over one hundred thousand students worldwide via **Amin Saberi's** online education platform novoed.com.

Kay Giesecke was promoted to associate professor with tenure and named the Paul Pigott Faculty Scholar in the School of Engineering. Kay's group studies systemic risk in financial networks and his work has won the Fama/DFA Prize for the Best Paper in the Journal of Financial Economics. Kay was also elected Vice Chair of the Activity Group on Financial

Mathematics and Engineering in the Society of Industrial and Applied Mathematics. At Stanford, he restructured MS&E's Quantitative Finance Certificate Program and taught a free introductory online finance class through Stanford Online that registered 35,000 students.

Peter Glynn gave the 2013 Wasserstrom Family Distinguished Lecture at Northwestern University, following the inaugural lecture given by **Margaret Brandeau** in 2012. His research in the last year focused on building models that more effectively fit arriving traffic in settings such as call centers, Internet traffic, and many other applications contexts, by establishing statistically that such traffic typically exhibits a type of variability that is not described by conventional models. The proposed model captures this new type of variability parsimoniously.

Ashish Goel, **Ramesh Johari**, and **Amin Saberi** were named principal investigators on a new $5.6M DARPA grant entitled "MEGA: Modern Graph Analysis for Dynamic Networks." The goal is to better model complex communication patterns in social networks in real time. The grant funds research on theoretical, algorithmic and statistical foundations to detect anomalous patterns in a network of some 200 million nodes including phone records, email, financial transactions, and social-media messages.

Ashish Goel and doctoral candidates, Pranav Dandekar and David T. Lee, devised a mathematical model that helps demonstrate what's behind the growing rift in American politics. Their paper in the Proceedings of the National Academy of Sciences (PNAS) proposes a mathematical model for a behavioral phenomenon commonly known as confirmation bias—or cherry-picking evidence—and shows how opinions in a social network diverge when people are biased.

Warren Hausman was invited to participate in the invitation-only 16th Annual Supply Chain Thought Leaders Roundtable hosted by UCLA.

Sig Hecker continued his decade-long effort to secure dangerous Russian nuclear materials left behind at a nuclear test site in Kazakhstan and received a lot of media attention. You can read more about Sig's work in our department news section at MSandE.stanford.edu.

Pamela Hinds has a paper in press at *Organization Science* where she and her co-author, Catherine Cramton of George Mason University, explore the role that site visits play in global work and identify what happens during successful site visits that improves coordination. A second paper, also co-authored by Cramton and provisionally accepted by the same journal, examines the process global distributed work teams use to adapt to cross-cultural differences while constrained by local contexts.

Riitta Katila is the W.M. Keck Foundation Faculty Scholar and also on the faculty of the Stanford Technology Ventures Program. She continued her exploration of the intersection of technology strategy and organizational learning with publication of two papers during the year. The studies look at the way in which the continual and complex search for new knowledge and information has an influence on innovation, new product introductions and organizational success. The papers appeared in the *Academy of Management Journal* and *Research Policy*.

Congratulations to **David Luenberger** on his retirement in September marking 50 years of service to Stanford University!

Robert McGinn, though technically on sabbatical, kept busy with an invited talk entitled, "MisMatch.com: Ethics Education and Engineering Practice" at Cal Tech, and

continued work on his new book, *The Ethically Responsible Engineer: Concepts and Cases for Engineering Students.* His article on the ethical responsibilities of nanotechnology was accepted for publication in *Nanoethics* and he completed an ethics research project for the Stanford Nanofabrication Facility (SNF).

Elisabeth Paté-Cornell served as a member of the committee that selected the new director of the Freeman Spogli Institute of International Studies. She was also named to co-chair the selection committee of Section 12 for the National Academy of Engineering. She will assume sole chair next year. Among her published papers, a key example titled, "On Black Swans and Perfect Storms," appeared in *Risk Analysis* in December was highlighted in *Stanford Report* and received attention worldwide.

Michael Saunders was named to the 2013 class of the Society for Industrial and Applied Mathematics (SIAM) Fellows for his contributions in numerical optimization, linear algebra and software. SIAM's Fellows program recognizes members who have made outstanding contributions to building cooperation between mathematics and science and technology.

Ross Shachter served on a National Research Council committee reviewing, "Data-to-Decisions: Integrating Humans, Machines and Networks." He has recently published a pair of papers with new PhD Charles Tripp on machine learning techniques for Markov decision processes, establishing near-optimal policies for decision analysis problems too large to solve exactly.

Tina Seelig was appointed to a five-year term as Professor of the Practice in the Department of MS&E, bestowed on an exceptional practitioner whose professional life is devoted substantially to his or her respective discipline, Department, and School. Professor Seelig, Executive Director of the Stanford Technology Ventures Program (STVP) and Founding Director of the National Center for Engineering Pathways to Innovation (EPIC), is one of six such Professors of the Practice at Stanford. She is the first in the School of Engineering to receive the distinction.

Benjamin Van Roy published, "Eluder Dimension and the Sample Complexity of Optimistic Exploration," with doctoral student Dan Russo, one of only 20 papers selected from 1420 submissions for a full oral presentation at the Neural Information Processing Systems Conference. The paper explores the phenomenon of politicians eluding reporters to keep true positions hidden.

Yinyu Ye was appointed to the Kwoh-Ting Li Professorship in the School of Engineering. Yinyu has made fundamental contributions to operations research and the management sciences, with papers spanning a wide spectrum in the area of optimization and its many applications. For his work, he has received many of the major awards and prizes in his discipline, including the von Neumann Theory Prize of INFORMS, the Farkas Prize, and the inaugural ISMP Tseng Lectureship Prize.

Special Recognition

William "Bill" Perry was selected as one of seven 2012 Stanford Engineering Heroes who have advanced the course of human, social and economic progress through engineering. The seven, chosen from among former faculty and alumni, have worldwide reputations as technology innovators and industry leaders. Perry is the Michael and Barbara Berberian Professor (emeritus) and a senior fellow at the Freeman Spogli Institute for International Studies. He is recognized for serving as U.S. Secretary of Defense from 1994-1997 and as an expert in US foreign policy, national security and arms control.

Alvin "Al" Roth, an alumnus of the department, was awarded the 2012 Nobel Prize in Economics. Roth received his MS ('73) and PhD ('74) in Operations Research and is a pioneer in the field of game theory and experimental economics and in their application to the design of new economic institutions.

Transitions

Sadly, our friend and colleague Arthur "Pete" F. Veinott, Jr. passed away last December. Pete joined Stanford in 1962, helped found the Department of Operations Research and was a valued member of the successor departments, EESOR and MS&E. He was widely known for his research contributions to dynamic programming, lattice programming, supply-chain optimization and network optimization, and for graduating 27 PhD students. He was a member of the NAE, a Fellow of INFORMS and the IMS, and was awarded the John von Neumann Prize, the highest recognition of INFORMS for lifetime research contributions.

Staying Connected

The social fabric of Stanford MS&E is strong and vibrant, and we all benefit from that network, which is quickly expanding online. Our virtual community for alums has proven a fun and effective way for people to reconnect and to share ideas. Many MS&E alumni, students and faculty have joined our Facebook group—search for "MSandE"—and I also invite you to visit our website at **msande.stanford.edu** for updated information about the department. Please keep us apprised of your professional activities and contact information. We love to hear from you and to follow your professional development. You can log on at **e-update.stanford.edu** to update your contact information. As always, we are looking for new ways to improve the department; your ideas and offers of help are welcome and appreciated through email to **msande-chair@stanford.edu.**

With my best regards,

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