Dear Bioengineering Alumni and Friends,

I am pleased to take this opportunity to share with you a number of our community’s many accomplishments from our recent history. As we look back at past events and highlights there is much to celebrate; however, I cannot help but look ahead and feel thrilled at the momentum and direction the department. Truly, it will be exciting as we navigate the opportunities and challenges ahead of us.

**TENURE LINE FACULTY RECRUITMENTS**

A primary focus for Bioengineering has been and remains the growth of our faculty. With the bar set at the highest level, we seek to bring the best people to join our stellar faculty through rigorous broad-area searches and joint efforts with institutes and departments across the university. At the same time, we truly value the collegial faculty we have built, and try to ensure that we recruit people who will further build a positive community. Taking stock of these department-wide efforts, since 2014, this hiring boom resulted in the successful recruitment of no less than seven new core faculty members to Stanford and the Department of Bioengineering:

**Stanley Qi**
Stanley received his PhD from UC Berkeley in 2012, and he joined us in October of 2014 as an Assistant Professor following time as a Systems Biology Fellow at UCSF. He currently holds a joint appointment in Chemical and Systems Biology and is a Stanford ChEM-H Faculty Fellow. Stanley is one of the major pioneers in the CRISPR technology for targeted genome engineering in mammalian cells, and is developing a series of gene regulation and imaging technologies. Stanley has added tremendous strength to our program in Synthetic Biology and has continued to innovate at Stanford, both in genome engineering and also in the application of new technologies guided by collaborations with faculty and students across the university.

**Bo Wang**
Bo received his PhD from the University of Illinois at Urbana-Champaign in 2011 and followed that with a postdoctoral position at UIUC in the Institute for Genomic Biology. In May 2015, he began his faculty appointment at Stanford as an Assistant Professor of Bioengineering and, by courtesy, of Developmental Biology. His research group works at the interface of statistical physics, developmental biology, and bioengineering. Bo’s thoughtful and systematic analysis of the systems biology and evolutionary cell biology of flatworms has the potential to unlock the fundamental rules that control stem cell collective behavior, and ultimately to optimize tissue regeneration, remodeling, and adaptation.

**Polly Fordyce**
Polly received her PhD from Stanford in 2007 and returned to the Farm in September 2014 as an Assistant Professor of Genetics and a Stanford ChEM-H Faculty Fellow. Her connection with Bioengineering was cemented with a joint appointment in our department one year later. Her lab is focused on developing new instrumentation and assays for making quantitative, systems-scale biophysical measurements of molecular interactions, with the goal of improving our quantitative understanding of fundamental biological processes.

**Alison Marsden**
Alison’s recruitment to Stanford from UC San Diego came as the result of a joint effort among the Departments of Pediatrics (Cardiology) and Bioengineering, and the Institute for Computational and Mathematical Engineering (ICME) in the School of Engineering and Medicine.
of Engineering. She formally joined the faculty in July 2015 as an Associate Professor but her ties to Stanford Bioengineering go back to a Postdoctoral Fellowship working with Professors Charles Taylor and Jeffrey Feinstein from 2005 to 2007. She currently leads the Cardiovascular Biomechanics Computational Lab at Stanford, focusing on patient-specific modeling for clinical applications in pediatric and congenital heart disease, and adult cardiovascular disease. This effort supports the SimVascular open source project, which serves as a comprehensive open source software package optimizing cardiovascular blood flow simulations and analysis.

Paul Nuyujukian
In conjunction with the Stanford Neurosciences Institute, Paul's formal faculty appointment is set to begin in April of 2017 as an Assistant Professor in the Departments of Bioengineering, Neurosurgery, and, by courtesy, Electrical Engineering. That said, we are already familiar with his groundbreaking research in the field of brain-machine interfaces (BMIs) via his current appointment as a Postdoctoral Fellow in the Departments of Neurosurgery and Electrical Engineering, as well as his PhD work in Bioengineering (and MD studies) at Stanford, which he completed in 2012. Paul and his collaborators develop neural prostheses, aiming to restore communication and movement to individuals with paralysis. He researches other applications of BMIs as a platform technology for brain-related medical conditions such as stroke and epilepsy.

Possu Huang
Having arrived in October 2016, Possu is our newest active Assistant Professor, whose recruitment came as a result of the most recent broad-area faculty search. He received his PhD in Biochemistry and Molecular Biophysics from Caltech in 2004, and he spent a number of years post-PhD as Research Scientist at the University of Washington solving extremely difficult protein design problems and developing software tools with direct clinical applications. For this, he is already widely recognized for his impact on the field. Possu is a protein artist who we believe has positioned himself to become a world leader in computational protein design through the combination of his research skill-set, vision, and demonstrated collaborative research capabilities.

Lacramioara Bintu
Lacra received her PhD in Physics in 2010 from UC Berkeley and will join us this coming January following a Postdoctoral Fellowship at Caltech. Her application of systems biology, synthetic biology, and biophysics has led her to bring a critical new perspective to the rapidly developing field of chromatin regulation. We are excited to see her move this new field forward as she builds her research program here in Bioengineering.

The diversity of fields of our new faculty members is remarkable, as befits the broad and vibrant nature of the research performed by their colleagues in the department.

LECTURER RECRUITMENTS
Our lecturers play a critical teaching role, especially in our laboratory-intensive core courses. With the departures of Gabriel Sanchez in 2014 (to Zebra Medical, a startup he co-founded) and Joe Shih in 2015 (to the University of Saint Mary in Missouri), we needed to recruit equally strong educators, which we did.

We were most fortunate to hire Ross Venook in 2014 to fill the first Lecturer opening. Ross has been a natural fit to this role, with demonstrated teaching experience at Stanford during his time as a Graduate Student Teaching Assistant in the Department of Electrical Engineering, where he received both his BS and PhD. He was also a Biodesign Fellow in 2007 and spent the following years leading the MRI Safety Team at Boston Scientific Neuromodulation as a R&D Engineer. Ross possesses a unique combination of device engineering knowledge, industry experience, and teaching
skills, and has demonstrated consistent dedication to the department and its Undergraduate Program.

Last fall, we sought a dedicated and dynamic person who would be ready to help develop and teach our undergraduate biotechnology and synthetic biology courses for the major. We found this in Kara Helmke Rogers. Kara has a BS in Biology from UT Austin and a PhD in Molecular and Cell Biology from UC Berkeley. Prior to joining the teaching team in Bioengineering, Kara served as Education and Outreach Coordinator for the UCSF Center for Systems and Synthetic Biology.

**SENIOR STAFF RECRUITMENTS**

While our growing tenure line faculty has high external visibility, we must also acknowledge the integral role our departmental staff play in achieving the mission of Bioengineering. Through national searches, we successfully identified and recruited top quality members of our senior staff.

Director of Finance and Administration Emily Schwarz came aboard in August of this year from a previous position as Budget Director at Smith College. Prior to that she worked at Moody’s in the Higher Education and Not-for-Profit Team and at the American Museum of Natural History in New York. Her training includes a BA from Columbia and an MBA from the Wharton School at the University of Pennsylvania.

In April, Senior Grants Manager Linny Le joined the finance staff as Lead Grants Manager. She came to us with eight years of research administration and grants management experience as a Senior Fund Analyst in the School of Nursing at UCLA.

**FACULTY NEWS AND HIGHLIGHTS**

Our faculty continue to record stunning achievements and collect prestigious awards in recognition of their science. With great pride and awe, I attempt to capture some of the highlights below:

Associate Professor Markus Covert launched and directs The Allen Discovery Center at Stanford University for Multiscale Systems Modeling of Macrophage Infection. The multidisciplinary center is funded by a four-year, $10 million grant from the Paul G. Allen Frontiers Group, a nonprofit organization aimed at spurring biomedical innovation. The center will integrate cutting-edge modeling, computation, and experimental measurements to create multiscale models of the bacteria as they infect human immune cells, shedding new light on how this complex system of cell behaviors creates infectious disease. Associate Professor KC Huang is a Co-Investigator at the Center at Stanford. As you can imagine, major new programs like these do not happen overnight. It is the fruit of a tremendous amount of effort by Markus and outstanding support from his collaborators and institutional leadership.

Formally launched in May 2016, the Joint Initiative for Metrology in Biology (JIMB) enables biotechnology companies to work better together by creating standards for measuring biology (aka, biometrology). JIMB is a partnership between the National Institute of Standards and Technology (NIST), Stanford, private companies, and entrepreneurs and is home-based in Stanford’s Shriram Center. Leaders of the initiative include our own Associate Professor Drew Endy and Adjunct Professor Marc Salit of NIST. JIMB currently supports eight training grants for PhD students and also as many basic and translational research grants to Stanford faculty across the Schools of Medicine and Engineering. JIMB is growing and is hiring Principal Investigators. More information can be found at jimb.stanford.edu.

Professor Russ Altman was named Co-Principal Investigator of a $3.3 million FDA grant for the purpose of founding a joint Center of Excellence in Regulatory Science and Innovation (CERSI) between Stanford and the UCSF School of Pharmacy. Capitalizing
on their combined expertise in pharmacology, therapeutic sciences, and biomedical informatics, researchers will develop new tools in quantitative pharmacology and apply them to safe and effective medications. UCSF-Stanford CERSI Educational Program Director and Bioengineering Lecturer Natalia Khuri is working to help build and implement a regulatory science graduate certificate degree program as well.

Professor Stephen Quake will co-direct a new large-scale bioscience collaboration between Stanford, UCSF, and UC Berkeley, known as the Chan Zuckerberg Biohub. Funded through a $600 million commitment by the Chan Zuckerberg Initiative, this monumental effort seeks to cure, prevent, and manage all diseases by the end of the century through early investment in exploratory research and the scientists who drive discovery.

Assistant Professor Manu Prakash was awarded a “genius grant” from the John D. and Catherine T. MacArthur Foundation in September. Manu was honored for research that is “driven by curiosity about the diversity of life forms on our planet and how they work, empathy for problems in resource-poor settings, and a deep interest in democratizing the experience and joy of science globally.” This is an amazing achievement by Manu and rewards his stunning creativity as well as his passion for sharing science with the world. Earlier, he was named as a recipient of the 2015 NIH New Innovator Award for his project “Mosquitoes Meet Microfluidics: Novel Tools for Ecological Surveillance of Insect-Borne Disease.”

Daniel Fisher, the David Starr Jordan Professor of Applied Physics and Professor, by courtesy, of Biology and of Bioengineering, was elected to the National Academy of Sciences in April 2015. This is an awesome honor and well-deserved recognition of his significant contributions.

Scott Delp, the James H. Clark Professor in the School of Engineering and Professor of Bioengineering, of Mechanical Engineering, and, by courtesy, of Orthopaedic Surgery, was elected to the National Academy of Engineering in February. This amazing honor is reserved for a very small group with the highest levels of achievement.

Polly Fordyce, Assistant Professor of Genetics and of Bioengineering, was named as a recipient of the 2016 NIH New Innovator Award for her project “Leveraging Spectral Encoding for High Dimensional Biological Multiplexing.”

Karl Deisseroth, the D. H. Chen Professor and Professor of Bioengineering and of Psychiatry and Behavioral Sciences, was awarded the $3 million Breakthrough Prize in life sciences for his pioneering work in optogenetics. The prize, funded by grants from the Brin Wojcicki Foundation, recognizes major discoveries in basic sciences, and Karl is a very deserving recipient.

Stephen Quake, the Lee Otterson Professor in the School of Engineering and Professor of Bioengineering and of Applied Physics, received the 2015 Gabbay Award from Brandeis University. The award is given annually to recognize achievements in basic and applied biomedical science. In this instance, it was given to Steve “in recognition of his contributions to both the basic science of microfluidics and its applications to biomedical research.”
The College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE) consists of over 1,500 individuals who are the outstanding leaders, engineers, entrepreneurs, and innovators in medical and biological engineering. Fellows are nominated each year by their peers and represent the top 2% of the medical and biological engineering community. This year, we have an amazingly large contingent of Stanford faculty who were elected to AIMBE Fellows, which really does not detract from the recognition that this election represents.

Among the Stanford Bioengineering core faculty, this year’s newly elected fellows include:

- **Kwabena Boahen**, Professor of Bioengineering and of Electrical Engineering
- **Karl Deisseroth**, the D. H. Chen Professor and Professor of Bioengineering and of Psychiatry and Behavioral Sciences
- **Christina D. Smolke**, Professor of Bioengineering and, by courtesy, of Chemical Engineering

And among our courtesy faculty:

- **Bruce Daniel**, Professor of Radiology (General Radiology) and, by courtesy, of Bioengineering
- **Garry E. Gold**, Professor of Radiology (General Radiology) and, by courtesy, of Bioengineering
- **Sarah Heilshorn**, Associate Professor of Materials Science and Engineering and, by courtesy, of Chemical Engineering and of Bioengineering
- **Beth Pruitt**, Associate Professor of Mechanical Engineering and, by courtesy, of Molecular and Cellular Physiology and of Bioengineering
- **Krishna Shenoy**, Professor of Electrical Engineering and, by courtesy, of Neurobiology and of Bioengineering

**Kwabena Boahen**, Professor of Bioengineering and of Electrical Engineering, was elevated to Fellow of the IEEE for his contributions to system design for neuromorphic chips. This is a great honor, as fewer than 0.1% of voting members are selected for this designation.

**Fan Yang**, Assistant Professor of Orthopaedic Surgery and of Bioengineering, was selected to receive the 2016 Biomaterials Science Lectureship Award, an annual award that honors an early-stage career researcher for their significant contribution to the biomaterials field.

**Christina Smolke**, Associate Professor of Bioengineering and, by courtesy, of Chemical Engineering, was selected in 2015 as one of *Nature*’s “Ten people who mattered this year” for her work on making synthetic opioids through fermentation.

The *Journal of Cell Science* named **Stanley Qi**, Assistant Professor of Bioengineering and of Chemical and Systems Biology, a “Cell scientist to watch” in 2016.

Professor and Shiriram Chair of Bioengineering and Professor of Radiology **Norbert Pelc** received an honorary degree, Doctor of Medicine *honoris causa*, from the Friedrich-Alexander-Universität Erlangen-Nurnberg, in recognition of special scientific achievements in research in the field of diagnostic imaging in physics, mathematics, and medical technology, as well as in recognition of his long-standing scientific collaboration with the university.
UPDATE ON RESEARCH FUNDING
Aside from publications and awards, an objective metric for capturing our research activity and productivity as a department is to examine the faculty’s grant and research funding. It’s encouraging to see that in this difficult climate for extramural funding, we have maintained our research expenditures at $44 million for FY2015 and $42 million for FY2016.

EDUCATION UPDATE AND NEWS
Undergraduate Program Approved in Perpetuity!
Full approval of our undergraduate degree has been a key goal for our department since its creation, and achieving this is the culmination of many years of hard work and dedication on the part of many. While many contributed to this achievement, I want to highlight especially the leadership of Karl Deisseroth and Undergraduate Student Services Officer Teri Hankes, who did a tremendous amount of work. Many thanks to the dedicated members of the undergraduate committee. This marks the first new undergraduate major at Stanford in some time, and incredibly this is the first-ever undergraduate major within the School of Medicine.

While this effort is now behind us, making our BS program an outstanding learning experience for our students will be a continuing effort — in perpetuity — as well. With that, I would like to share with you some statistics on both the Bioengineering undergraduate and graduate programs. I’m proud to state that both programs currently sit stably at a #5 ranking in U.S. News and World Report.
• 23 BS degrees conferred in 2016
• 72 current students with BioE major declared; 49 of those students declared in AY 2016
• 125 freshman and sophomores expressed interest in the BioE major in AY 2016
• 133 students enrolled in BioE 80: Introduction to Bioengineering in AY 2016
• 181 current graduate students; 164 of whom are pursuing a PhD in BioE
• 64% yield of our admitted applicants in 2016, totaling 32 incoming PhD students in AY2017
• Of this new class of PhD students, 50% are women and 19% are underrepresented minorities
• 8 new MS students, a 91% yield, and 53 postdoctoral fellows in AY 2017
NIH BIOTECHNOLOGY TRAINING GRANT RENEWED

With tremendous gratitude to Associate Professor Jennifer Cochran, who led the renewal process.

STAYING CONNECTED

Please visit our website at bioengineering.stanford.edu regularly for updates and news about the department. From there, you can connect to sources for more detailed information about our faculty, students, staff, research programs, and teaching initiatives. I welcome your suggestions and comments about the department’s direction and activities, and I hope that as members of the Bioengineering family, you always feel welcome to visit.

The university offers several opportunities to connect with current students, alumni, and faculty. I encourage you to visit the Stanford Engineering Alumni page for more details and career resources: https://engineering.stanford.edu/connect/alumni

Finally, as always, I want to thank the many alumni and friends who support the department and school in so many ways. We look forward to your continued engagement in the years to come.

Sincerely,

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