

■ BELÉN CALLES



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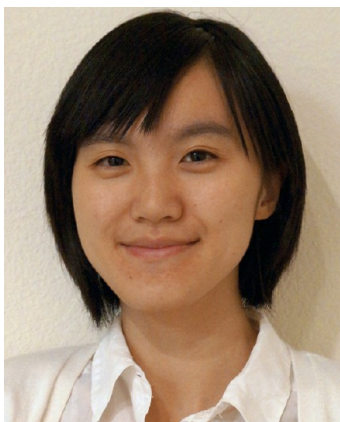
Current position: Senior Post-Doctoral Fellow. Systems Biology Program, Centro Nacional de Biotecnología-CSIC, Madrid, Spain. Advisor: Prof. Víctor de Lorenzo.

Education: Ph.D. Molecular Biology, Centro de Biología Molecular, Universidad Autónoma, Madrid, Spain (2002). Advisor: Prof. Margarita Salas. B.S. in Biology, Universidad Complutense, Madrid, Spain (1995).

Nonscientific interests: Reading good literature, art exhibitions and traveling, especially to visit medieval buildings.

In general, I am very interested in gene expression regulation. During my Ph.D. research I was studying different mechanisms of prokaryotic regulation of transcription. In my current work I have also contributed to the study of the regulation of gene expression by the cAMP–CRP system in the soil bacteria *Pseudomonas putida*. My research is also strongly focused in developing genetic tools to manipulate bacteria and reprogram them to have novel behavior. The main goal is constructing cells endowed with new functioning genetic circuits for the production of added value compounds. A key problem in such Synthetic Biology approaches is isolating specific metabolic pathways away from their side reactions. To address this question, we have developed a new genetic platform to produce enzymes of conditional activity by tagging them with the recognition site of a very specific protease, by using a transposon based approach. This tool can also be used for the functionalization of transcription factors and other proteins with new traits of interest. (Read Calles' article; DOI: 10.1021/sb400050k).

■ MENG CHEN



Baolu Shen

Current Position: Data Scientist at Intuit, Mountain View, CA.

Education: Ph.D. in Mathematics, University of California, Irvine. Advisor: Dr. Qing Nie. M.S. in Statistics, University of California, Irvine. B.S. in Information and Computing Sciences, University of Science and Technology of China, Hefei, P.R. China. Advisor: Dr. Mengping Zhang.

Nonscientific Interests: Painting and photography.

My research interest lies in understanding the interaction between biological systems and noise. A challenge in designing cellular signaling systems is amplifying a signal without amplifying noise. In this article, we present a novel method in evaluating noise buffering at both the ON and OFF states of biological switches, and we find an interesting trade-off in noise buffering when both states are considered. The principles we established based on the new quantity, input associated Signed Activation Time (iSAT), are easily understandable and allow for a concise description of how a circuit may respond to input noise. Altogether, we envision the analysis of iSAT will facilitate in revealing the noise properties of biological networks and designing robust switches that buffer noise at both the ON and the OFF states. (Read Chen's article; DOI: 10.1021/sb400044g).

■ FAHIM FARZADFARD



Nava Gharaei

Current position: Ph.D. candidate, Microbiology Graduate Program, Massachusetts Institute of Technology, Cambridge, MA. Advisor: Timothy K Lu.

Education: BSc and MSc in Biotechnology, Tehran University, Tehran, Iran.

Nonscientific interests: Reading, traveling, Ping-Pong, and chess.

My current interests lie in synthetic and evolutionary biology. I'm interested to apply both rational and evolutionary design principles to develop biologically inspired designs that could enable new capabilities for engineering living systems. The paper published in this issue describes a synthetic platform for regulation of gene expression in eukaryotic cells. I envision that the platform can be used for rational design of complex synthetic gene circuits, and for rewiring endogenous transcriptional networks in large scales. At the same time, this platform offers a novel strategy for introducing

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high-throughput and random perturbation of transcriptional networks, which may be useful in phenotypic screening applications. (Read Farzadfar's article; DOI: 10.1021/sb400081r).

■ BRENDAN HUSSEY



Brendan Hussey

Current position: Ph.D. Candidate, Department of Cell and Systems Biology, The University of Toronto, Ontario, Canada. Advisor: David McMillen.

Education: Undergraduate: University of Guelph, Ontario, Canada. Advisors: Bonnie Mallard and Elena Choleris.

Nonscientific interests: I love the outdoors, particularly mountain and river sports such as backpacking and kayaking. Recently, I have become fully addicted to adventure/obstacle races such as Tough Mudder and Spartan Beast. Health and fitness have been a foundation of my lifestyle for many years and currently combat my love of cooking and one of my newest passions: craft beer and brewing. Admittedly, I subject the latter interests to as much science as is possible, but nonetheless, they remain nonacademic.

My interests are in the potential applications of synthetic biology through metabolic engineering, as well as the more fundamental problem of biological parts production and standardization/characterization. What was clear from contributing to the review was that while the number of parts for use in synthetic biology has been increasing, many of these parts still lack thorough characterization through dose response data. Thus, it was often difficult to tell which type of tuning was involved from steady state data alone. Another observation was the lack of protein parts for post-translational tuning. This deficit is of interest, as post-translational events are on the faster end of cellular time scales, a property that can be useful, if not necessary, for some control system problems in the cell. (Read Hussey's article; DOI: 10.1021/sb4000564).

■ RICHARD KIL



Richard Kil

Current position: Ph.D. Candidate, Department of Chemistry, University of Toronto, Canada. Advisor: Dr. David R. McMillen.

Education: M.Sc. in Physical Chemistry, University of Toronto, Canada. Advisor: Dr. M. Cynthia Goh. Hon. B.Sc. in Chemistry and Physiology, University of Toronto, Canada.

Nonscientific interests: I enjoy different cultures and natural wonders. I am an avid sports fan and enjoy playing rugby. Films, word and board games, gardening, and my ukulele keep me upbeat at home.

My interests have recently focused on the growing list of potential health and environmental diagnostic applications being explored through synthetic biology. With safety and tight control being paramount to upscale use and public acceptance, I am looking for novel ways to control cell populations, or render them inert when a given task has been accomplished or when operating outside a user-defined range of inputs. To this end, I am exploring kill switches and band-pass filters that limit the fitness of populations upon given cues. This requires very thorough characterization of the genetic networks being developed since unchecked divergences can be catastrophic outside of the laboratory. This review provides us, and hopefully the larger community, a framework with which one can more completely characterize networks being created and a convenient catalogue of methods to tune and level-match connected processes. (Read Kil's article; DOI: 10.1021/sb4000564).

■ CHANG LIU



Shira Liu

Current position: Assistant Professor, Department of Biomedical Engineering, UC Irvine.

Education: Postdoc work in Synthetic Biology, UC Berkeley. Advisor: Adam Arkin. Ph.D. in Chemical Biology, The Scripps Research Institute. Advisor: Peter Schultz. B.S. in Chemistry, Harvard University. Advisor: Stuart Schreiber.

Nonscientific interests: I am a serious musician (pianist). Outside of music, I enjoy sports (basketball and skiing), cooking, and traveling.

My research spans the fields of genetic engineering, synthetic biology, chemical biology, and directed evolution. I am interested in engineering new genetic systems that dramatically increase the speed, efficiency, and scalability of the evolutionary process. We apply these systems to (1) the creation of new biochemical and biological functions that address pressing challenges in health and industrial biotechnology and (2) the study of molecular evolution. I am also interested in understanding complex biological regulatory systems, which we approach through experimental evolution, analysis, modeling, and synthesis. (Read Liu's article; DOI: 10.1021/sb400044g).

■ DAVID MCMILLEN



M. Cynthia Goh

Current position: Associate Professor, Departments of Chemistry, Physics, and Cell and Systems Biology, University of Toronto Mississauga.

Education: Postdoctoral fellowship at the Center for BioDynamics, Boston University. Advisors: J. J. Collins and N. Kopell. Ph.D. from University of Toronto. Advisor: G.M.T. D'Eleuterio.

Nonscientific interests: I'm very interested in history, mythology, and spoken-word storytelling. My wife and I met at a weekly storytelling event in Toronto, and now we travel the world together, visiting historical sites and local grocery stores in equal measure. The photo was taken in Istanbul, a history-buff's dream of a city.

The McMillen lab works on implementing synthetic biological constructs in bacteria, yeast, and human cells, and we combine wet lab work with computational and analytical modeling studies. The subject of tuning response curves came up as we were investigating mechanisms for achieving integral feedback control in a synthetic biology context: it became clear that tuning not just the level but the shape of these curves was going to be a fundamental operation in customizing dynamics, and we felt that a review article surveying the methods currently available for such tuning would be a useful resource for the community. Time (and citations) will tell if we were right about that. (Read McMillen's article; DOI: 10.1021/sb4000564).

■ FELIX MOSER



Felix Moser

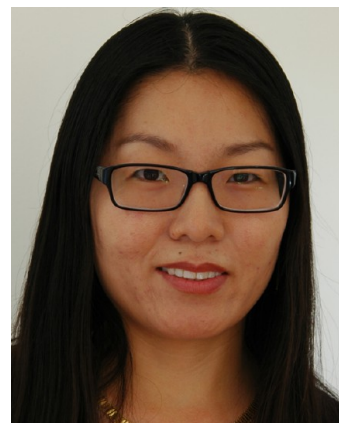
Current position: Graduate student in biological engineering at MIT. Advisor: Dr. Christopher Voigt.

Education: B.S., Cornell University. Advisor: Dr. David Wilson.

Nonscientific interests: I'm an avid runner and usually race 3–4 marathons each year. I'm also an active member of the MIT triathlon team.

The lack of sensors is a big challenge for synthetic biologists. In our work, we characterize a sensor in *E. coli* and move this sensor into *S. cerevisiae*. We tune each sensor to demonstrate that their responses can be tuned to different specifications based on need. Finally, we show that the sensors are useful as biosensors both for screening methyl halide transferase enzyme activity and for detecting methylating agents in soil samples. The yeast sensor is notable in that it is the only protein, to our knowledge, capable of detecting and removing methyl phosphotriester lesions on the DNA backbone in eukaryotes. (Read Moser's article; DOI: 10.1021/sb400086p).

■ LIMING WANG



Liming Wang

Current position: Assistant Professor, Department of Mathematics, California State University, Los Angeles, CA.

Education: Ph.D. in Mathematics, Rutgers University. Advisor: Eduardo Sontag. B.S. Peking University, Beijing, China.

Nonscientific interests: Reading. I read mostly on philosophy, art, and recently also on traditional Chinese medicine. Maybe I could study traditional Chinese medicine using mathematical models one day.

My research interest is to develop and analyze mathematical models arising from biology, especially from cell signaling networks. In the past, my colleagues and I have employed various mathematical tools, including perturbation analysis, stochastic processes, and monotone systems to study ultrasensitivity in multisite protein phosphorylation/dephosphorylation systems and noise management in cell signaling networks. Currently, we are working on models of epigenetic switches and population heterogeneity. (Read Wang's article; DOI: 10.1021/sb400044g).