ACS SyntheticBiology

Introducing Our Authors

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MICHAEL ASENSIO

Han Teng Wong

Current Position. Research Associate, GigaGen, Inc.

Education. M.S. in Bioengineering, University of California, Berkeley and University of California, San Francisco. Advisor: Dr. Danielle Tullman-Ercek. B.S. in Bioengineering, University of Illinois, Urbana−Champaign.

Nonscientific Interests. Telling funny stories, electronic music, ultimate frisbee, hiking, and movies about aliens.

I am interested in studying the complex structures that biology can build at the nanometer scale and exploring how we can use these to investigate biological properties and build materials. In this work, we use a viral capsid as a nanocontainer for enzymatic reactions. An important aspect of using this capsid is the ability to change its chemical properties with precise changes to its primary structure. We see that electrostatic forces on a very small scale can influence substrate and product flux in this type of system. I hope that this work can be a foundation for understanding native control of enzymatic pathways as well as aid the creation of new synthetic pathways to produce compounds in sustainable ways. (Read Asensio's article; DOI: 10.1021/acssynbio.5b00037).

ANA MAFALDA CAVALEIRO

Se Hyeuk Kim

Current Position. Ph.D. student at The Novo Nordisk Foundation Center for Biosustainability at the Technical University of Denmark (DTU), Hørsholm, Denmark.

Education. M.Sc. in Applied Microbiology, Faculty of Sciences, University of Lisbon, Portugal and the Gulbenkian Institute of Science (IGC), Oeiras, Portugal. Advisor: Dr. Lisete Fernandes. Diploma degree in Microbiology, Faculty of Medicine and Faculty of Sciences, University of Lisbon, Portugal. Advisors (2 projects): Dr. Margarida Barata and Professor Rogério Tenreiro.

Nonscientific Interests. I love to travel and spend time with my friends. I also enjoy outdoor activities and reading.

My research is focused on tool development for DNA assembly to facilitate parts exchange and minimize *de novo* design, *e.g.*, for production of valuable compounds in *E. coli*. We have developed a more robust and standardized way of assembling DNA, and with this optimized protocol we minimized certain limitations of uracil excision cloning. Furthermore, we expanded the toolbox for accurate, one-tube, DNA assembly and genome integration in *E. coli* by combining uracil excision cloning with clonetegration. I believe this work will have major impact on the quality and time spent on DNA editing in synbio projects. (Read Cavaleiro's article; DOI: 10.1021/acssynbio.5b00113).

BERNARDO CERVANTES

Cyrus Modavi

Current Position. Ph.D. graduate student, Microbiology at MIT.

Education. Bachelors of Science in Bioengineering from U.C. Berkeley. Former advisor: John Dueber.

Nonscientific Interests. I will take any opportunity to play soccer, go hiking, or go backpacking through random places in the world. If I have to stay at home then I'll spend my time perfecting my cup of coffee and practicing magic tricks.

My scientific interests revolve around engineering microbial systems to perform useful tasks. It was a pleasure working on this paper because it is devoted to facilitating rapid engineering of *S. cerevisiae*, a main model organism in synthetic biology. The tools and protocols described in this paper are meant to help anyone who is interested in engineering *S. cerevisiae*, and adoption of the entire described system has been shown to accelerate research progress in multiple laboratories. (Read Cervantes' article; DOI: 10.1021/sb500366v).

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WILLIAM DELOACHE

Cyrus Modavi

Current Position. Scientist at Zymergen Inc.

Education. Ph.D., UC Berkeley/UCSF Joint Graduate Group in Bioengineering; advisor: Dr. John Dueber. B.S., Davidson College; advisor: Dr. A. Malcolm Campbell.

Nonscientific Interests. Kiteboarding, ultimate frisbee, triathlons, and Sour Patch Kids.

I am broadly interested in developing tools to aid in engineering biological systems to perform new and useful functions. My primary graduate work focused on utilizing yeast for the production of therapeutics. I realized early on (as I'm sure most graduate students do) that our ability to come up with interesting strain designs vastly exceeded our capacity to actually build the strains that we wanted to test. To address this bottleneck, a group of students in the lab teamed up to build a yeast strain engineering pipeline that would significantly lower the barrier to testing our ideas. While it required a large portion of our time to develop (as well as an open-minded advisor), in the end we estimate that the yeast toolkit has improved the productivity of our lab more than four-fold. We hope that by sharing it with the community, we can enable others to spend more time thinking and less time pipetting! (Read DeLoache's article; DOI: 10.1021/sb500366v).

JEFF GLASGOW

Jeff Glasgow

Current Position. Postdoctoral Fellow, National Institute of Standards and Technology/Stanford University.

Education. Ph.D. Chemistry, University of California, Berkeley (2014). Advisors: Danielle Tullman-Ercek/Matt Francis. B.S. Biochemistry and Molecular Biology, Oklahoma State University (2009).

Nonscientific Interests. Music, cooking, reading.

This paper is the result of a fun collaboration between chemists and engineers to explore a topic that I find fascinating, the ways cells can use organization to alter metabolism. We developed a method to encapsulate enzymes inside a protein compartment made from an engineered viral capsid. We then used different variants of the capsid to examine how the pores affected the enzymatic reactions inside and described the changes using a mathematical model. We hope this research will contribute to a better understanding of compartmentalized processes in biology, especially in bacterial microcompartments like the carboxysome or propanediol utilization (Pdu) compartments. (Read Glasgow's article; DOI: 10.1021/acssynbio.5b00037).

CHRISTOPHER JAKOBSON

Han Teng Wong

Current Position. Ph.D. Candidate, Tullman-Ercek Lab, Department of Chemical and Biomolecular Engineering, U.C. Berkeley.

Education. B.S. Chemical Engineering, Cornell University.

Nonscientific Interests. Running, cooking, Middlesbrough F.C.

I am interested in the adaptation of naturally occurring multiprotein structures to serve as synthetic organelles for biosynthesis. Engineering biosynthetic organelles will enable the production of a wide array of chemicals and pharmaceuticals in microbial hosts. In this work, we demonstrate the possibility of controlling the transport of small molecules in and out of these synthetic organelles using modifications to the protein structure itself. The principle explored here in MS2 virus-like particles has broad applications to other protein-bound structures, such as bacterial microcompartments. (Read Jakobson's article; DOI: 10.1021/acssynbio.5b00037).

SE HYEUK KIM

Ana Mafalda Cavaleiro

DOI: 10.1021/acssynbio.5b00165
ACS Synth. Biol. 2015, 4, 946−950

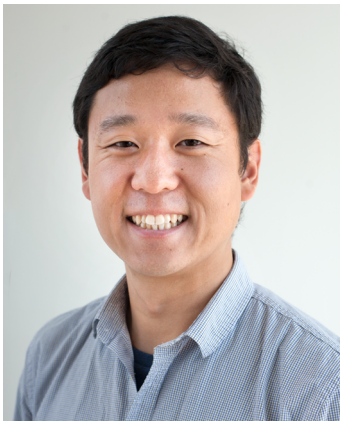
Current Position. Postdoctoral researcher at The Novo Nordisk Foundation Center for Biosustainability at the Technical University of Denmark (DTU), Hørsholm, Denmark.

Education. M.Sc and Ph.D. in Biotechnology, Department of Molecular Science and Technology, Ajou University, Suwon, Korea. Advisor: Dr. Pyung Cheon Lee. Bachelor's degree in Biotechnology, Department of Applied Chemistry and Biological Engineering, Ajou University, Suwon, Korea.

Nonscientific Interests. I love to play all sports, especially football. And, I'm into watching baseball.

In this work, we describe an advanced uracil excision cloning technique, which offers faster and accurate DNA assembly for construction of biosynthesis pathways in a plasmid as well as in a genome. My scientific interests lie in a developing an *Escherichia coli* cell factory for production of valuable compounds. In a way to develop these producing strains, we need various molecular biology tools, which are able to facilitate each step faster with precise manner. Thus, I'm also focusing on developing molecular biology tools that enable us to work more efficiently. (Read Kim's article; DOI: 10.1021/acssynbio.5b00113).

MICHAEL E. LEE



Jessica Nguyen

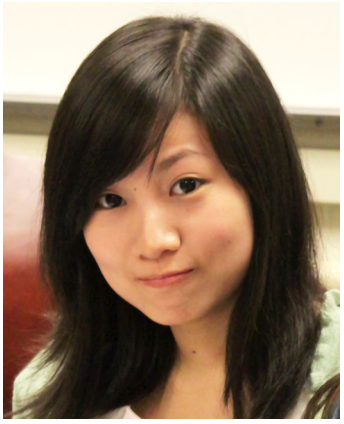
Current Position. Scientist at Bolt Threads.

Education. Ph.D. in Bioengineering from UC Berkeley, advisor: John Dueber. B.S. in Biological Engineering from MIT.

Nonscientific Interests. Skiing, hiking, soccer, food, music, traveling.

The motivation behind this paper was to make engineering yeast as straightforward as possible. It's hard enough to try to predict and understand how the cell will respond to various genetic changes we make. In comparison, spending time troubleshooting a cloning reaction seemed to me to be a waste of energy. Ironically, this thinking led to troubleshooting a lot of cloning reactions to develop the system we describe in the paper. But since we've had the system in place, we rarely need to think about the cloning because it just works. If only everything else in biology were so easy. (Read Lee's article; DOI: 10.1021/sb500366v).

YUNZI LUO



Jie Yang

Current Position. Principal Investigator, State Key Laboratory of Biotherapy/Collaborative Innovation Center of Biotherapy, West China Hospital, Sichuan University, Chengdu, P. R. China.

Education. Ph.D. in Chemical and Biomolecular Engineering, University of Illinois at Urbana and Champaign, Illinois (2014). Advisor: Dr. Huimin Zhao; B.S. in Chemical Engineering, Tianjin University, China (2008).

Nonscientific Interests. Playing basketball and badminton, traveling, watching movies and reading books.

I am interested in engineering biological systems, especially natural product biosynthetic networks *via* synthetic biology tools. Since actinomycetes serves as an inexhaustible reservoir for natural product discovery, identification and characterization of new standard biological parts that can be used in actinomycetes will lead to transformative changes in our ability to manipulate numerous natural product biosynthetic pathways. Here, we report the discovery and characterization of 32 promoters from *Streptomyces albus* by RNA-seq analysis. The use of these promoters in a plug-and-play platform led to successful activation of a cryptic gene cluster. Therefore, these promoters should be highly useful for activation, characterization and optimization of natural product biosynthetic pathways in actinomycetes. In the future, I am looking forward to uncovering novel drug candidates from nature. (Read Luo's article; DOI: 10.1021/acssynbio.5b00016).

KIAVASH MIRZADEH

Kiavash Mirzadeh

Current Position. Ph.D. student, Department of Biochemistry and Biophysics, Stockholm University. Advisor: Dr. Daniel Daley.

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Education. M.Sc. in Biochemistry from the Department of Biochemistry and Biophysics, Stockholm University.

Nonscientific Interests. Socializing with family and friends, gym, and football (I'm a mad Juventus supporter).

My Ph.D. studies aim to better understand the process of translation initiation in bacteria. This process is rate-limiting for protein synthesis and can influence production of recombinant proteins by 3 orders of magnitude. It has long been known that translation initiation is most efficient when a strong Shine–Dalgarno site is optimally placed from the AUG start codon, but it is not known why a strong Shine–Dalgarno site works for one coding sequence but not another. My research shows how to maximize the output from a strong Shine–Dalgarno so that it works for all coding sequences. The manuscript published in this edition is my first scientific contribution and I am very proud of it. I hope it is useful to the field of synthetic biology. (Read Mirzadeh's article; DOI: 10.1021/acssynbio.5b00033).

RAGAN PITNER

Vijeta Patel

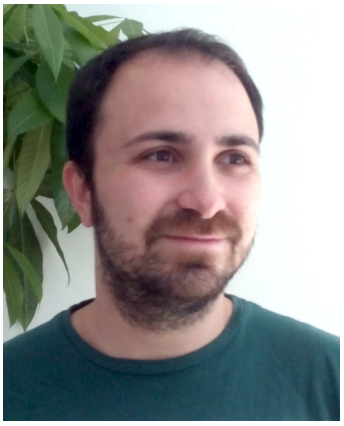
Current Position. Research Associate II at PAI Life Sciences in Seattle, WA.

Education. B.S. and M.S., Biomedical Engineering, Northwestern University. Advisors: Dr. Joshua Leonard and Dr. Matthew Glucksberg (corrected on September 22, 2015).

Nonscientific Interests. Backpacking, camping, NBA basketball (Memphis Grizzlies!), and weightlifting.

My Master's work was an investigation as to whether (1) gene expression could be controlled by the sequestration of a transcription factor to the inner membrane of *E. coli* and (2) if so, if it were possible to alleviate this *via* protease expression and cleavage of said transcription factor from membrane-bound mCherry. We found that protease-alleviate spatial sequestration, or PASS, presents a valid strategy for engineering microbial gene regulation. My current research involves the development of new vaccines for schistosomiasis, pertussis, and tuberculosis for low-income settings, as well as the development of a novel inhaled antibiotic cocktail for tuberculosis. I plan to investigate and pursue avenues for immune engineering for the treatment of autoimmune disease and development of improved adjuvants for vaccines. (Read Pitner's article; DOI: 10.1021/sb500302y).

DAVID RUANO-GALLEGO



David Ruano

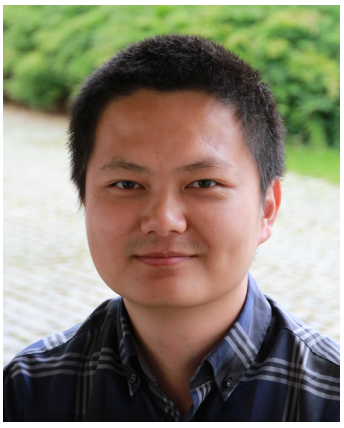
Current Position. Postdoctoral fellow, Department of Microbial Biotechnology, CNB–CSIC, Madrid, Spain. Advisor: Luis Ángel Fernández.

Education. Ph.D. in Biosciences, Universidad Autónoma de Madrid, Spain (2014). Advisor: Luis Ángel Fernández. B.S. in Biochemistry, Universidad Autónoma de Madrid (2008).

Nonscientific Interests. I am interested in traveling, listening to music, swimming and running. I have traveled to India, Venezuela, Kenya and all across Europe, which has taught me different ways of thinking and enriched my life back in my country. I like listening to music and going to music festivals, when I can meet interesting people and spend time with my friends. I play sports to release tension before or after work, so that I can better enjoy my free time.

The Synthetic Injector *E. coli* (SIEC) strain described in this article can assemble injectisomes on its membrane and can be of great use for different future treatments. These include injection of antiinflammatory molecules into the inflammed intestinal tissue, or toxins into carcinogenic cells. I really enjoy doing this type of research that is so near to translational medicine, since I feel nearer to the people that may enjoy the results of my research. For this reason, I will continue giving my best toward looking for new synthetic biology approaches for the human benefit. (Read Ruano-Gallego's article; DOI: 10.1021/acssynbio.5b00080).

YAOJUN TONG



Tilmann Weber

Current Position. Postdoctoral fellow, The Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark. Advisors: Prof. Sang Yup Lee and Dr. Tilmann Weber.

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Education. Ph.D. in Biochemistry and Molecular Biology, Institute of Microbiology, Chinese Academy of Sciences. Advisor: Lixin Zhang; B.S. in Biological Science and Technology, University of Science and Technology, Beijing.

Nonscientific Interests. Sports, photography, traveling, and always willing to try new things.

I am a fan of new technology, especially in biological areas. I have a dream that I can discover new antibiotics to treat multidrug resistant infectious diseases. One of the most important sources for antibiotics is bacteria of the *Actinomycetales* order, as more than 50% of all approved antibiotics are derived from these organisms. Many more compounds remain to be discovered from them as genome mining has revealed that they have the potential to produce many compounds that have not yet been characterized. The high GC content (>70%) of their genomes makes genetic manipulation very difficult and a bottleneck for metabolic engineering approaches, but by adapting a CRISPR-Cas9 system for use in these organisms, I had the great opportunity to develop a highly efficient genetic manipulation system, which might help to overcome these limitations. (Read Tong's article: DOI: 10.1021/acssynbio.5b00038).

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