

ISSUE

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Sinergy
Singapore Consortium for
Synthetic Biology

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SINERGY Seminars/ Webinars 2020

Sex Determination in
Agricultural Pest Insects and
Genetic Control Strategies

Giuseppe Saccone, University
of Naples - Federico II

Protein and metabolic
engineering as an enabling tool
for Synthetic Biology

Edward Wong, GenScript

Molecular Programming Using
De Novo Designed Proteins

Zibo Chen, Caltech

Engineering Synthetic
Regulatory Systems Using
Naturally Inspired Design
Principles

Caleb Bashor, Rice University

Upcoming:

10 Nov

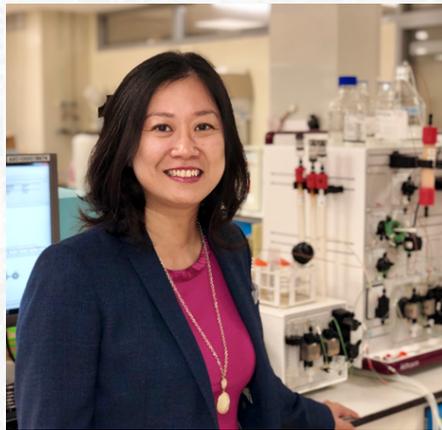
Detection of Clinically Relevant
RNA Transcripts Using RNA-
toehold Switch Sensors

Melissa Takahashi, California
State University, Northridge

27 Nov

Gaining dynamic control of
synthetic biology with a theory-
experiment hybrid approach

Chelsea Hu, Caltech



Spotlight on Researchers

Sierin Lim:

**Biotechnology taking on
environmental and health
challenges**

Our group is developing biological solutions to tackle problems in the environment and health. To do this, we engineer biology to repurpose natural materials or organisms.

For the environment, our current efforts are focused on reducing PET waste. With a production rate of 1M PET bottles/min and 450 years to degrade, PET waste is one of the most important environmental problems our time. We are developing both **enzymes to degrade the PET waste** and **microbes to convert the enzymatic degradation products to value-added molecules**. This will be achieved by directed evolution and the development of high-throughput screening platform for selecting the best enzyme. We also perform metabolic engineering of three types of microbes that are cyanobacteria, cellulose-producing bacteria, and yeast to enable them to use the degradation products as carbon sources. We will also explore process scale-up from bench to pilot.

For health, we are developing formulations for skin health and treatment that are based on natural materials. Current **skincare formulations have limited penetration of the active**

ingredients. We have engineered **protein nanocages** to target melanocytes in the skin, and also expanded its utility as an emulsion stabilizer which provides an advantage for skincare product formulation. Another challenge for skin health is **epidermal wound healing**, especially in wet environment. Current solutions such as gel and ointment require multiple applications. To this end, we have **functionalized bacterial cellulose with bioadhesives** to allow it to stick to the wet environment. This approach allows for extended drug release and reduce the number of applications. We have filed a number of patents that are in the national entry and a technology disclosure. We also garnered some interests from the industry and look forward to actually translating the technology to real-life solutions.

We cultivate **out-of-the-box thinking and innovative approaches**. Anyone who has cool ideas is encouraged to bounce it with me and the lab until they are ready for testing. To achieve this, we foster open communication and collaborative culture. I always encourage my students and staffs to learn from each other and to share what they know with the community.



NTU School of Chemical and Biomedical Engineering, December 2019



Featured Industry Partner

Agilent Technologies: Inspiring Discoveries Since 1939

Starting out from a small garage in Palo Alto, California in 1939, and with a working capital of just \$538, a company called Hewlett-Packard was born. Fast forward to 1999 and Agilent Technologies was spun out from HP with a record-breaking initial public offering coming from a Silicon Valley company. During the next 30 years, Agilent focused on high-growth markets including life-sciences and is now seen as a leading innovator of a number of analytical measurement technologies. Agilent Research Laboratories – known as Agilent Labs – was established to provide a platform to power the growth of the company through breakthrough science and research. Synthetic biology is one of the research programs that is seen by Agilent Labs as being of worldwide economic importance and it is through extensive collaboration with global research leaders that some breakthrough developments have been made.

Through Agilent's global engagement with academic institutions, there is a strong culture of collaboration which

has maintained the development of methodology, applications and even new technologies. The opportunity for Agilent to collaborate within SINERGY's partnership scheme was a perfect fit and is a great example of where academia-industry as well as industry-industry relationships can flourish. The focus of the current collaboration is in the use of a high-throughput sampling device called RapidFire. Optimization in synthetic biology often requires thousands of individual clones to be tested for their output and this requires the same measurement to be repeated over and over in order to find the best option. RapidFire addresses exactly what is needed in the SynCTI lab by collecting a sample, applying a solid-phase extraction to clean it up and then transferring the sample to a mass spectrometer for analysis – all in a few seconds.

With Agilent's considerable presence in Singapore, including the manufacturing of the RapidFire system, it means that there can be a strong engagement with academia and collaborations through direct interactions.



SINERGY Events Calendar

3 July
ISAAA Webinar
Genome Editing 101 - Getting Ready for Business

29 July
SGInnovate Webinar
Navigating the biotech startup landscape in Singapore

30 September
SGInnovate Webinar
Bio-manufacturing in APAC

Upcoming

13 November
ASBA Webinar
Synthetic Biology in Asia: Meet the Authors

15 December
SGInnovate Webinar
Microbes as Therapeutics

Want to join SINERGY mailing list for future events? Email Hana Sulaiman via suhana.s@nus.edu.sg

SINERGY Membership

As a SINERGY member, an industry partner is entitled to apply for NRF grants, access select lab facilities at members' rate, and has other benefits such as marketing and licensing opportunities, advice and consultancy from top-notch scientists, among others.

For inquiries, please contact sinergy@nus.edu.sg



SINERGY Seed Grant Calling for Submissions

SINERGY provides a one-year S\$50,000 seed grant for selected academic-industry collaboration research projects.

The grant call is open throughout the year with submission deadlines on 31 March and 31 October respectively.

Interested PIs and companies can check out more details at Sinergy.sg/grant and submit to sinergy@nus.edu.sg

Service & Product Promotions for Researchers



Twist Bioscience offers a special promotion for **Gene Fragments at 3ct per bp**. Promotion ends 31st Jan, 2021.

Contact Meng Lye See at msee@twistbioscience.com



28 Medical Drive
Singapore 117456
+65 6601 2449

For any inquiries or issues, please contact Hana Sulaiman via suhana.s@nus.edu.sg

Recruitment Information



Sierin Lim's research group at NTU's School of Chemical and Biomedical Engineering is hiring for a project that develops **novel biological solutions to convert plastic waste into industrially relevant materials**.

Positions open for:

- Research Fellow (SRF/RF)
- Research Assistant
- Project Officer

Candidates in the following disciplines are welcome to apply at slim@nut.edu.sg. More details about the roles can be found through [this link](#).

- Synthetic biology
- Metabolic engineering
- Material science
- Protein engineering



Allozymes is a deep tech company revolutionizing the way industry uses enzymes for manufacturing chemicals and natural compounds. Our rapid discovery and evolution of **custom-designed enzymes** enables breakthrough developments for sustainable production of ingredients for pharmaceuticals, cosmetics, F&B.

Allozymes is hiring distinctive **Scientists/Engineers** for its microbiology and microfluidics teams. Working in a highly collaborative and dynamic environment. Candidates in **Microfluidics, Microbiology, Synthetic biology, Metabolic engineering, or Protein engineering** are welcome to apply through Allozymes LinkedIn page (Jobs).

GenScript is a new SINERGY member and provides research products and services to serve the synthetic biology community.



GenScript is recruiting for multiple roles in their Singapore team: **Technical Solution Expert (PhD)**, **Field Application Scientist (PhD)**, **Sales Account Manager (Masters and above)**, **Business Development Manager (Masters and above)** in the following service areas catering to synthetic biology research.

Interested candidates can contact audrey.xue@genscript.com

- **Pathway engineering solutions**
 - High-throughput Gene Synthesis
 - Precision Mutant Libraries
 - Combinatorial DNA Assembly Libraries
 - Recombinant Protein Expression
- **Antibody & Protein Engineering**
 - Custom Mouse and Rabbit Monoclonal Antibody
 - Recombinant Protein and Antibody Expression
 - High-throughput Gene to Antibody Expression
 - High Density Transient Expression
- **CRISPR genome editing solution**
 - CRISPR sgRNA Services
 - gRNA Libraries
 - Single-Stranded DNA Synthesis
 - CRISPR Cell Lines

SINERGY is looking to recruit a new *Consortium Manager*. Interested candidates can check out more information through [this link](#).

