

Engineering Biology Metrics and Technical Standards for the Global Bioeconomy: Asia and Australia Workshop

29-31 August 2023

*Shangri-La Rasa Sentosa
101 Siloso Rd, 098970, Singapore*

Workshop Description and Objectives:

As the bioeconomy and distributed biomanufacturing continue to expand, there is a pressing need to establish global technical standards and metrology for engineering biology. The lack of standardization in various areas of the bioeconomy innovation process may lead to significant challenges in data integration and interoperability, regulatory compliance, product quality, and consumer transactions.

This initiative aims to identify scientific, technical, operational, and semantic standards that are driven by the community and stakeholders. The goal is to enhance scalability, improve reproducibility in different locations and batches, and boost the performance of microbial factories and bio-products. Through these efforts, open voluntary standards for engineering biology can be established, which will facilitate the growth and success of the bioeconomy.

Presentations and discussions at the workshop will consider the following questions:

- *Where are we now? What is the current ecosystem for engineering biology standards and metrology? What have we learned from past efforts?*
- *What standards and metrology are needed to promote innovation and market-growth globally?*
- *What developments, technical and otherwise, are required to achieve the standards and metrology needed?*

Participants will aim to identify regional priorities and define a strategy that will lead to a roadmap for developing global standards and metrics for engineering biology. Please see the last page for definitions of key terms and confidentiality guidelines.

Tuesday, 29 August 2023

*Barnacles By the Sea Room
Shangri-La Rasa Sentosa*

1830	<p>Welcome Dinner An opportunity to build connections and begin discussions with fellow participants.</p>
------	--

Wednesday, 30 August 2023

*Barnacles By the Sea Room
Shangri-La Rasa Sentosa*

0800	Registration
0830	<p>Welcome to the Workshop <i>Matthew Chang (National University of Singapore, NUS and Singapore Consortium for Synthetic Biology, SINERGY)</i></p>
0835	<p>Overview and Objectives of the Workshop <i>Genevieve Croft (Schmidt Futures)</i></p>
0845	<p>Session 1: Engineering Biology Standards and Metrology: Opportunities and Challenges <i>Chairs: Juliette Malley (Imperial College, U.K.) and Kostas Vavitsas (SINERGY)</i></p>

	<p>0845: <i>Paul Freemont (Imperial College, U.K.)</i> Developing metrics and standards for engineering biology</p> <p>0855: <i>Sheng Lin-Gibson (National Institute of Standards and Technology, U.S.A.)</i> Engineering biology metrology and standards and current U.S. efforts</p> <p>0905: <i>Ran Wang (BGI Group, China)</i> Opportunities and challenges in advancing engineering biology metrology and standards</p> <p>0915: <i>Kanchana Wanichkorn (ASEAN, Indonesia)</i> Metrology and standards for bioeconomy policy</p> <p>0925: <i>Makiko Matsuo (University of Tokyo, Japan)</i> Policy and regulation for metrology and standards</p> <p>0935: <i>Ajay Perumal (Economic Development Board, Singapore)</i> Metrology and standards for bioeconomy</p> <p>0945: Discussion</p>
1000	Break
1030	<p>Session 2: Engineering Biology Metrology and Standards: Current State and Development <i>Chairs: India Hook-Barnard (Engineering Biology Research Consortium, U.S.A.) and Wen Shan Yew (NUS)</i></p> <p>1030: <i>Celine Tan (Enterprise Singapore)</i> Engineering biology metrology and standards in Singapore</p> <p>1040: <i>Fan Jin (Shenzhen Infrastructure for Synthetic Biology, China)</i> Engineering biology metrology and standards in China</p> <p>1050: <i>Faisal Khan (Precision Medicine Lab, Pakistan)</i> Engineering biology metrology and standards in Pakistan</p> <p>1100: <i>Haseong Kim (Korea Research Institute of Bioscience and Biotechnology)</i> Engineering biology metrology and standards in Korea</p> <p>1110: <i>Sivinee Sawatdiaree (Office of National Higher Education Science Research and Innovation Policy Council and National Institute of Metrology, Thailand)</i> Engineering biology metrology and standards in Thailand</p> <p>1120: <i>Robert Speight (CSIRO, Australia)</i> Engineering biology metrology and standards in Australia</p> <p>1130: <i>Wataru Mizunashi (New Energy and Industrial Technology Development Organization, Japan)</i> Engineering biology metrology and standards in Japan</p> <p>1140: Discussion</p>
1200	<p>Lunch Silver Shell Café, Shangri-La Rasa Sentosa</p>

1330	<p>Session 3: Metrology and Standards in Industry: Engineered Biology as the Product <i>Chairs: Emily Aurand (Engineering Biology Research Consortium, U.S.A) and Wataru Mizunashi (New Energy and Industrial Technology Development Organization, Japan)</i></p> <p>1330: <i>Santanu Dasgupta (Reliance Industries, India)</i> Metrology and standards in the biotechnology industry</p> <p>1340: <i>Laura Navone (EdenBrew, Australia)</i> Metrology and standards in the agri-food industry</p> <p>1350: <i>Lei Dai (SynBiome, China)</i> Metrology and standards in the microbiome industry</p> <p>1400: <i>Soichiro Tsuda (bitBiome, Japan)</i> Metrology and standards in the microbiome industry</p> <p>1410: <i>Chionh Yok Hian (GenScript, Singapore)</i> Metrology and standards in the gene synthesis industry</p> <p>1420: <i>Jungjoon Lee (ToolGen, Korea)</i> Metrology and standards in the genome-editing industry</p> <p>1430: <i>Ramon Gonzalez (Mojia Bio, Singapore)</i> Metrology and standards in the biomanufacturing industry</p> <p>1440: Discussion</p>
1500	Break
1530	<p>Session 4: Metrology and Standards in Industry: Engineering Biology as the Process <i>Chairs: Cynthia Ni (Engineering Biology Research Consortium, U.S.A) and Ran Wang (BGI Group, China)</i></p> <p>1530: <i>Seokmyung Lee (CJ CheilJedang, Korea)</i> Metrology and standards in biomanufacturing processes</p> <p>1540: <i>Tomohisa Hasunuma (Kobe University, Japan)</i> High-throughput analytics and automation for engineering biology metrology and standards</p> <p>1550: <i>Jianzhi Zhang (Chinese Academy of Sciences)</i> Biofoundry for engineering biology metrology and standards</p> <p>1600: <i>Koichi Yoshioka (Bacchus Bio, Japan)</i> Metrology and standards in the biofoundry industry</p> <p>1610: <i>Chueh Loo Poh (NUS, Singapore)</i> Metrology and standards in the bioimaging industry</p> <p>1620: <i>Donghyuk Kim (UNIST, Korea)</i> Biological data management and sharing</p> <p>1630: <i>Erhan Simsek (Agilent, Singapore)</i> Metrology and standards in the bioanalytics industry</p>

	1640: Discussion
1700	Discussion and Summary <i>Kostas Vavitsas (SINERGY)</i> Engineering biology metrology and standards: Current state, opportunities, and challenges
1730	Adjournment
1830	Banquet Dinner Shangri-La Rasa Sentosa

Thursday, 31 August 2023*Barnacles By the Sea Room**Shangri-La Rasa Sentosa*

0830	Welcome to Day 2 <i>Matthew Chang (NUS and SINERGY)</i> Overview and Objectives; Instructions for Breakout Sessions; Introduction of Discussion Leads
0835	Breakout Session 1 <ul style="list-style-type: none"> • Standards and metrics for engineered biology as the product <ul style="list-style-type: none"> ○ <i>Leads: Santanu Dasgupta (Reliance Industries) & Laura Navone (EdenBrew)</i> • Best practices for data sharing and platform interoperability <ul style="list-style-type: none"> ○ <i>Leads: Chionh Yok Hian (GenScript) & Jungjoon Lee (ToolGen)</i> • Metrology and Standards that support regulations and biosecurity <ul style="list-style-type: none"> ○ <i>Leads: Kanchana Wanichkorn (ASEAN) & Makiko Matsuo (University of Tokyo)</i>
0945	Break
1000	Breakout Session 2 <ul style="list-style-type: none"> • Standards and metrics for engineering biology as the process <ul style="list-style-type: none"> ○ <i>Leads: Seokmyung Lee (CJ CheilJedang) & Ramon Gonzalez (Mojia Bio)</i> • Translating and coordinating with existing standards and benchmarks <ul style="list-style-type: none"> ○ <i>Leads: Ran Wang (BGI) & Erhan Simsek (Agilent)</i> • International partnership and engagement <ul style="list-style-type: none"> ○ <i>Leads: Kostas Vavitsas (SINERGY) & Robert Speight (CSIRO)</i>
1110	Discussion and Workshop Summary <i>Matthew Chang (NUS and SINERGY)</i> Engineering biology metrology and standards: Collaborative initiatives and action items for Asian and Australian communities
1200	Lunch Silver Shell Café, Shangri-La Rasa Sentosa
1330	End of the Workshop

Definitions:

Standards: (1) A published document that provides specifications, guidelines, characteristics, or procedures that can be used consistently, and are designed to maximize the reliability or to ensure that materials, products, processes, and services are fit for their purpose. (2) Requirements that establish the fitness of a product for a particular use and may address product features, performance, quality, compatibility, or other product attributes.

Metrics: The measurements made towards assessing the (technical, economic, social, etc) viability of a product or process.

Metrology: The science of measurement and its application.

This meeting will run under [Chatham House Rule](#).