



# SynCell Global Summit 2024

Build a Synthetic Cell Together



SYNCELL  
GLOBAL  
SUMMIT



October 23-25, 2024  
Shenzhen, China

## Agenda

**Wednesday, 23<sup>rd</sup> October 2024**

**1<sup>st</sup> Floor, Building A, Guangming Life Science Park, Guangming Science City**

<b>15:30</b>	<b>Welcome &amp; Introduction to the SynCell Global Summit</b> Opening by Co-Chairs
<b>15:40</b>	<b>Lightning Introductions</b> <i>Every participant introduces themselves with a 1-slide presentation in 2 minutes:</i> <ul style="list-style-type: none"> <li>• What is my research?</li> <li>• What am I aiming at in synthetic cell research</li> </ul>
<b>17:00</b>	<b>Tour of the Shenzhen Infrastructure for Synthetic Biology</b>   Building E
<b>18:30</b>	<b>Dinner and Social Activities</b>   1 <sup>st</sup> Floor, Building A

**Thursday, 24<sup>th</sup> October 2024**

**Ballroom, Andaz Shenzhen Bay**

<b>8:30-9:00</b>	<b>Registration</b>
<b>9:00</b>	<b>SynCell EU</b> <i>EU national delegations will unveil their roadmap, strategic planning, and cutting-edge research updates in synthetic cell projects. They will also discuss cross-regional collaboration opportunities. These presentations offer personal perspectives, rather than formal representations of their governments. Max 10 minutes presentation per country plus 5 minutes questions.</i> <b>Chair: Prof. Cees Dekker</b> <i>Technical University of Delft</i> <ul style="list-style-type: none"> <li>• <b>9:00 NETHERLANDS</b>  <b>Prof. Marileen Dogterom</b> <i>Technical University of Delft</i>  • SynCell in the Netherlands: from BaSyC to EVOLF</li> <li>• <b>9:15 GERMANY</b>  <b>Prof. Petra Schwill</b> <i>Max Planck Institute of Biochemistry</i>  • MaxSynBio-and what next?</li> </ul>

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<b>9:00</b>	<ul style="list-style-type: none"> <li>• <b>9:30 FRANCE</b>  <b>Prof. Ariel Lindner</b> <i>INSERM/Université de Paris</i>  • SynCellFR</li> <li>• <b>9:45 UNITED KINGDOM</b>  <b>Prof. Lorenzo Di Michele</b> <i>University of Cambridge</i>  • SynCells in the UK</li> <li>• <b>10:00 Close Session</b></li> </ul>
<b>10:00</b>	<b>SynCell US</b> <i>US groups will share their cutting-edge research updates in synthetic cell projects. They will also discuss cross-regional collaboration opportunities. These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives from the groups, rather than formal representations of their governments.</i> <b>Chair: Prof. Kate Adamala</b> <i>University of Minnesota</i> <ul style="list-style-type: none"> <li>• <b>10:00 Prof. George Church</b> <i>Harvard University &amp; MIT, virtually</i>  • To be announced</li> <li>• <b>10:15 Prof. Vincent Noireaux</b> <i>University of Minnesota</i>  • Building synthetic cells using cell-free transcription-translation</li> <li>• <b>10:30 Prof. Kate Adamala</b> <i>University of Minnesota</i>  • Building cells and communities, safely</li> <li>• <b>10:45 Prof. Zan Luthey-Schulten</b> <i>University of Illinois Urbana-Champaign</i>  • 4D Simulations of a growing minimal cell: integration of experiments and theory</li> <li>• <b>11:00 Prof. Jay Keasling</b> <i>University of California, Berkeley, virtually</i>  • Synthetic cells for synthetic biochemistry</li> <li>• <b>11:15 Close Session</b></li> </ul>
<b>11:15</b>	<b>Tea Break</b>
<b>11:45</b>	<b>SynCell Asia</b> <i>The session will focus on boosting the multilateral research partnership in synthetic cell development with Asian and Australian counterparts. Each delegation will showcase their national roadmap, strategies, plans, and research updates. They will also explore the opportunities for working with other regions. These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives, rather than formal representations of their governments.</i> <b>Chair: Prof. Robert Speight</b> <i>CSIRO Advanced Engineering Biology Future Science Platform</i>

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11:45	<ul style="list-style-type: none"> <li>● <b>11:45 JAPAN</b> <b>Prof. Yoshihiro Shimizu</b> <i>RIKEN</i> • Towards full reconstitution of a translation system</li> <li>● <b>12:00 KOREA</b> <b>Prof. Kwanwoo Shin</b> <i>Sogang University</i> • Korea's Quest for the Origin of Life: Collaborative Advances in Energy Generation, Self-Shaping, and Regenerative Artificial Cells</li> <li>● <b>12:15 SINGAPORE</b> <b>Prof. Matthew Chang</b> <i>National University of Singapore</i> • Synthetic Biology in Singapore: Advancing Synthetic Cells Together</li> <li>● <b>12:30 CHINA</b> <b>Prof. Chenli Liu</b> <i>Shenzhen Institutes of Advanced Technology, CAS</i> • Synthetic Cells in China</li> <li>● <b>12:45 Close Session</b></li> </ul>
12:45	Lunch   West Room
14:00	<p><b>SynCell Australia and Africa</b></p> <p><i>This session will feature in the introduction of synthetic cell research activities and policies in Australia and Africa, and possible synergistic interaction within Africa and with other regions of the globe. These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives, rather than formal representations of their governments.</i></p> <p><b>Chair: Prof. Matthew Chang</b> <i>National University of Singapore</i></p> <ul style="list-style-type: none"> <li>● <b>14:00 SynBio Australia</b> <b>Prof. Robert Speight</b> <i>CSIRO Advanced Engineering Biology Future Science Platform</i> • Synthetic cell related research and policies in Australia</li> <li>● <b>14:15 SynBio Africa</b> <b>Mr. Geoffrey Otim</b> <i>Founder &amp; CEO of SynBio Africa</i> • SynCell Africa: Pioneering Synthetic Cell Research</li> <li>● <b>14:30 Close Session</b></li> </ul>
14:30	<p><b>Discussion 1: Challenges for Building a Synthetic Cell from the Bottom Up</b></p> <p><i>What are the minimal requirements for a synthetic cell to exhibit life-like properties? How should different biological modules be coordinated to build coherent and functional synthetic cell? What are the physicochemical factors that need to be maintained within a synthetic cell? How can the spatial and temporal organization of the synthetic cell components be regulated? These are 10-min presentations (with 5-min Q&amp;A) that offer personal perspectives.</i></p>

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14:30	<p><b>Moderator: Prof. Marileen Dogterom</b> <i>Technical University of Delft</i></p> <ul style="list-style-type: none"> <li>● <b>14:30 Prof. Matthew Good</b> <i>University of Pennsylvania</i> • Constructing Synthetic Organelles via Protein Condensation</li> <li>● <b>14:45 Prof. Roy Bar-Ziv</b> <i>Weizmann Institute of Science</i> • Assembly of synthetic cells in 2D</li> <li>● <b>15:00 Prof. Xiaojun Han</b> <i>Harbin Institute of Technology</i> • Phospholipid assembly based artificial cells and their collective behaviors</li> <li>● <b>15:15 Short Break (10 mins)</b></li> <li>● <b>15:25 Prof. Norikazu Ichihashi</b> <i>University of Tokyo</i> • Sustainable regeneration of all 20 aminoacyl-tRNA synthetases in PURE system</li> <li>● <b>15:40 Prof. Kerstin Göpflich</b> <i>Heidelberg University</i> • Engineering synthetic cellular hardware with RNA origami</li> <li>● <b>15:55 Prof. Cees Dekker</b> <i>Technical University of Delft</i> • Challenges for building a synthetic cell</li> <li>● <b>16:10 Short Break (10 mins)</b></li> <li>● <b>16:20 Panel Discussion</b></li> <li>● <b>17:00 Close Session</b></li> </ul>
17:00	Tea Break
17:30	<p><b>Discussion 2: Society &amp; SynCell</b></p> <p><i>How can we use scientific narratives to communicate the research and applications of synthetic cells with the public? What are the specific governance challenges and opportunities for synthetic cells? How can we design a scientific and democratic regulatory landscape for synthetic cells that balances innovation and responsibility? How can we ensure that synthetic cells will contribute to a fair and sustainable future for all? These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives.</i></p> <p><b>Moderator: Prof. Benjamin Gregg</b> <i>University of Texas at Austin</i></p> <ul style="list-style-type: none"> <li>● <b>17:30 Prof. Lotte Asveld</b> <i>Delft University of Technology</i> • Responsible Research and the synthetic cell: a global endeavor</li> <li>● <b>17:45 Prof. Benjamin Gregg</b> <i>University of Texas at Austin</i> • Synthetic Cell Research and Application: Bioethical Perspectives on Political Challenges</li> <li>● <b>18:00 Panel Discussion</b></li> <li>● <b>18:30 Close Session</b></li> </ul>
19:30	Banquet and Social Activities   Ballroom

Friday, 25<sup>th</sup> October 2024

Ballroom, Andaz Shenzhen Bay

9:00	<p><b>Discussion 3: Artificial Intelligence (AI) &amp; SynCell</b></p> <p><i>How can AI-driven optimization algorithms be used to accelerate the design and construction of a synthetic cell? Could AI be used as a tool for building a synthetic cell using directed evolution? In what ways can AI assist in predicting and simulating the behavior of synthetic cells? These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives.</i></p> <p><b>Moderator: Prof. Wilhelm Huck</b> Radboud University</p> <ul style="list-style-type: none"> <li>● <b>9:00 Prof. David Baker</b> University of Washington, virtual <ul style="list-style-type: none"> <li>• To be announced</li> </ul> </li> <li>● <b>9:15 Prof. Andela Saric</b> Institute of Science and Technology Austria <ul style="list-style-type: none"> <li>• In silico cell: reshaping and division</li> </ul> </li> <li>● <b>9:30 Prof. Daisuke Kiga</b> Waseda University <ul style="list-style-type: none"> <li>• Design automation of genetic network using AI inference engine</li> </ul> </li> <li>● <b>9:45 Prof. Wilhelm Huck</b> Radboud University <ul style="list-style-type: none"> <li>• Building evolutionary workflows to construct synthetic cells</li> </ul> </li> <li>● <b>10:00 Panel Discussion</b></li> <li>● <b>10:30 Close Session</b></li> </ul>
10:30	Coffee Break
11:00	<p><b>Discussion 4: SynCell Applications</b></p> <p><i>The proposed discussion topics include biomedical/therapeutic/diagnostic technologies, bioenergy, biomaterials, bioremediation, smart agriculture, crop enhancement, biosensing technologies, and sustainable production. These 10-min presentations (with 5-min Q&amp;A) offer personal perspectives.</i></p> <p><b>Moderator: Prof. Matthew Good</b> University of Pennsylvania</p> <ul style="list-style-type: none"> <li>● <b>11:00 Prof. Yuval Elani</b> Imperial College London <ul style="list-style-type: none"> <li>• The SynCell value proposition: Aligning potential with economic realities</li> </ul> </li> <li>● <b>11:15 Prof. Sierin Lim</b> Nanyang Technological University <ul style="list-style-type: none"> <li>• Protein as Pickering Agent: Emulsion in “Life”</li> </ul> </li> <li>● <b>11:30 Prof. Yan Qiao</b> Institute of Chemistry, Chinese Academy of Sciences <ul style="list-style-type: none"> <li>• Communicating synthetic cellularity based on self-assembly</li> </ul> </li> </ul>

11:00	<ul style="list-style-type: none"> <li>● <b>11:45 Prof. Brigitte Städler</b> Aarhus University <ul style="list-style-type: none"> <li>• The interaction of artificial cells with liver cells</li> </ul> </li> <li>● <b>12:00 Prof. Pimchai Chaiyen</b> Vidyasirimedhi Institute of Science and Technology <ul style="list-style-type: none"> <li>• Enzymes and Cofactor Enhancement for Synthetic Cells</li> </ul> </li> <li>● <b>12:15 Panel Discussion</b></li> <li>● <b>12:45 Close Session</b></li> </ul>
13:00	Lunch   Conservatory I&II
14:00	<p><b>Discussion 5: Facilitating Technologies and Global Biofoundry Alliance for SynCell</b></p> <p><i>What facilitating technologies are key? How can we leverage biofoundry resources to advance synthetic cell research? How should standards and metrics be established for synthetic cell research? How can we promote collaboration and consensus among biofoundries from regions of the world to build a synthetic cell more efficiently? How should we facilitate connections amongst the next generation of SynCell researchers? These 10-min presentations (with 5-minQ&amp;A) offer personal perspectives.</i></p> <p><b>Moderator: Prof. Vincent Noireaux</b> University of Minnesota</p> <ul style="list-style-type: none"> <li>● <b>14:00 Prof. Christophe Danelon</b> Toulouse Biotechnology Institute <ul style="list-style-type: none"> <li>• Building a Synthetic Cell via Evolution</li> </ul> </li> <li>● <b>14:15 Prof. Wataru Aoki</b> Osaka University <ul style="list-style-type: none"> <li>• Exploring the boundary between matter and life through a constitutive understanding of ribosome biogenesis</li> </ul> </li> <li>● <b>14:30 Prof. Allen Liu</b> University of Michigan <ul style="list-style-type: none"> <li>• Facilitating Technologies for SynCell - A Personal Perspective</li> </ul> </li> <li>● <b>14:45 Prof. Dong-Myung Kim</b> Chungnam National University <ul style="list-style-type: none"> <li>• Engineering Biological Reactions for Advancing Cell-Free Biosensors and Biomanufacturing Applications</li> </ul> </li> <li>● <b>15:00 Panel Discussion</b></li> <li>● <b>15:30 Close Session</b></li> </ul>
15:30	Tea Break
16:00	<p><b>Closing remarks: The Path Forward</b></p> <p><i>Next steps in continued Global Fora and promoting collaboration and coordination in the synthetic cell community; a white paper.</i></p> <p><b>Moderators: All Co-Chairs</b></p>
18:00	Dinner and Social Activities   Veranda Garden