

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Organoids as Tools for Fundamental Discovery and Translation (Q4)

Scientific Organizers: Jason R. Spence, Melissa Little and Barbara Treutlein

Supported by the Directors' Fund

## Engineering Multi-Cellular Living Systems (Q3)

Scientific Organizers: Roger D. Kamm, Nuria Montserrat Pulido and Jianping Fu

February 7-11, 2021 • Keystone Resort • Keystone, CO, USA

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Scholarship Deadline: October 27, 2020 / Abstract Deadline: November 10, 2020 / Discounted Registration Deadline: December 8, 2020

### SUNDAY, FEBRUARY 7

#### Arrival and Registration

### MONDAY, FEBRUARY 8

#### Welcome and Keynote Session (Joint)

**Paola Arlotta**, Harvard University, USA  
*Programming, Reprogramming and Modeling of the Mammalian Cerebral Cortex*

**Matthias Lutolf**, EPF Lausanne, Switzerland  
*Engineering Epithelial Organoid Development*

#### Embryoids and Gastruloids for Early Development (Joint)

**Jianping Fu**, University of Michigan, Ann Arbor, USA  
*Building Synthetic Human Embryo-Like Structures*

**Magdalena D. Zernicka-Goetz**, Caltech and University of Cambridge, UK  
*Development of Cell Lineages and Patterning in the Early Mammalian Embryo*

**Alfonso Martinez Arias**, University of Cambridge, UK  
*Gastruloids: A PSC Based Model for Mammalian Gastrulation and Body Plan Engineering*

#### Short Talks Chosen from Abstracts

#### High Content Screening with Organoids (Q4)

**Prisca Liberali**, Friedrich Miescher Institute for Biomedical Research, Switzerland  
*Regenerative Landscape of Intestinal Organoids*

**Nancy L. Allbritton**, University of Washington, USA  
*Gut Physiology in 2D and 3D Engineered Systems*

**Samira Musah**, Duke University, USA  
*Human Podocytes on a Chip for Disease Modeling*

#### Short Talks Chosen from Abstracts

#### Advanced Technologies for Engineering Multi-Cellular Living Systems: Computation (Q3)

**Yoshihiro Morishita**, RIKEN, Japan  
*Quantitative Imaging and Geometrical Analysis of Organ Morphogenetic Processes*

**Melissa L. Kemp**, Georgia Institute of Technology, USA  
*Modeling Self-Organization in Multi-Cellular Engineered Living Systems*

**Elebeoba E. May**, University of Houston, USA  
*Predictive Modeling to Enable Prescriptive Design and Programmability*

#### Short Talks Chosen from Abstracts

#### Poster Session 1

### TUESDAY, FEBRUARY 9

#### Increasing Complexity in Organoids by Leveraging Development (Q4)

**Giorgia Quadrato**, University of Southern California - USC Stem Cell, USA

*Modeling Human Brain Development and Disease at Single Cell Resolution with Brain Organoids*

**Jason R. Spence**, University of Michigan Health System, USA  
*Complex Cell-Cell Interactions in the Developing Human Lung and Gut*

**Barbara Treutlein**, ETH Zürich, Switzerland  
*Single Cell Genomics to Guide Human Stem Cell and Tissue Engineering*

**Madeline Lancaster**, Medical Research Council Laboratory of Molecular Biology, UK

*Using Brain Organoids to Identify Conserved or Unique Factors in Human Brain Size Evolution*

#### Short Talks Chosen from Abstracts

#### Microphysiological Systems and Drug Discovery Platforms (Q3)

**Roger D. Kamm**, Massachusetts Institute of Technology, USA  
*Microphysiological Models for Neurological Disease*

**Sandra J. Engle**, Biogen, USA  
*In Vitro Models to Enable Drug Discovery*

**Danilo A. Tagle**, NCATS, National Institutes of Health, USA  
*Tissue Chips for Drug Screening*

**Sylvia F. Boj**, Hubrecht Organoid Technology, Netherlands  
*Patient-Derived Organoids for Drug Development and Screening*

#### Short Talks Chosen from Abstracts

#### Organoids for Drug Discovery and Precision Medicine (Q4)

##### Speaker to be Announced

**Lorna Ewart**, Veroli Consulting, UK  
*Next Generation in vitro Systems for Drug Discovery*

**Shuibing Chen**, Weill Cornell Medical College, USA  
*A Multiplex Organoid Platform for Pancreatic Cancer Drug Discovery*

#### Short Talks Chosen from Abstracts

#### Biohybrid Systems and Biological Robotics (Q3)

**Christine L. Mummery**, Leiden University Medical Center, Netherlands  
*Biophysical Techniques for Characterization and Functional Analysis of Cardiovascular Cells*

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**Arianna Menciassi**†, Sant'Anna School of Advanced Studies, Italy  
*Biomedical Robotics and Bio-hybrid Systems*

**Rashid Bashir**, University of Illinois, USA  
*3D Printed Cellular Machines for Engineering and Biology*

**Short Talks Chosen from Abstracts**

### Poster Session 2

### WEDNESDAY, FEBRUARY 10

#### Organoids for Disease Modeling (Q4)

**Meritxell Huch**, University of Cambridge / Max Planck Institute of Molecular Cell Biology and Genetics, UK  
*Liver Organoids for Human Biology and Disease*

**Reiner Alois Wimmer**, Institute of Molecular Biotechnology Austria, Austria  
*Human Blood Vessel Organoids as a Models of Vasculopathies*

**Speaker to be Announced**

**Anna Greka**, Harvard Medical School, USA  
*Modeling Genetic Diseases in Human Kidney Organoids*

**Short Talks Chosen from Abstracts**

#### Advanced Technologies for Engineering Multi-Cellular Living Systems: Imaging, Biomaterials, and 3D Printing (Q3)

**Speaker to be Announced**

**Adam W. Feinberg**, Carnegie Mellon University, USA  
*3D Bioprinting of Collagen to Rebuild Components of the Human Heart*

**Anjelica L. Gonzalez**, Yale University, USA  
*Development of Biomaterials for Use as Investigational Tools*

**Claire G. Jeong**, insitro, USA  
*Talk Title to be Announced*

**Short Talks Chosen from Abstracts**

#### Bioengineering Ethics (Joint)

**Insoo Hyun**, Case Western Reserve University, USA  
*Bioengineering Ethics in Organoids*

**Megan Munsie**, University of Melbourne, Australia  
*Ethical, Legal and Social Implications of Stem Cell Research*

**Shobita Parthasarathy**†, University of Michigan, USA  
*Talk Title to be Announced*

**Short Talks Chosen from Abstracts**

### Poster Session 3

### THURSDAY, FEBRUARY 11

#### Bioengineering of Organoids (Joint)

**Nuria Montserrat Pulido**, Institute for Bioengineering of Catalonia, Spain  
*Engineering Solutions for Pluripotent Stem Cell Derived Kidney Organoids*

**Jennifer A. Lewis**, Harvard University, SEAS, USA  
*Vascularization of Organoids*

**Todd C. McDevitt**, Gladstone Institutes, USA  
*Engineering Stem Cell Technologies*

**Melissa Little**, Murdoch Children's Research Institute, Australia  
*Bioengineering Kidney Organoids*

**Short Talks Chosen from Abstracts**

#### Improvements in Organoid Maturation (Q4)

**J. Gray Camp**, Institute of Molecular and Clinical Ophthalmology Basel, Switzerland  
*Interrogating Evolution using Single Cell Genomics and Genome Engineering*

**James M. Wells**, Cincinnati Children's Hospital Research Foundation, USA  
*Organoids to Model Human Development and Disease*

**James Hudson**, QIMR Berghofer Medical Research Institute, Australia  
*Guiding the Form and Function of Human Cardiac Organoids*

**Short Talks Chosen from Abstracts**

#### Engineering Principles of Developmental Biology and Regeneration (Q3)

**Michael Levin**, Tufts University, USA  
*Pattern Formation and Biological Information Storage During Embryogenesis*

**Vikas Trivedi**, European Molecular Biology Laboratory, Spain  
*Talk Title to be Announced*

**Stefano De Renzi**, European Molecular Biology Laboratory, EMBL, Germany  
*Optogenetic-Guided Tissue Morphogenesis*

**Short Talks Chosen from Abstracts**

#### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Q4)

#### Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (Q3)

### FRIDAY, FEBRUARY 12

#### Departure

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