

# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## MEETING CANCELLED: Single Cell Biology: Pushing New Frontiers in the Life Sciences (F1)

May 4-8, 2020 • Firenze Fiera-Palazzo dei Congressi • Florence, Italy

Scientific Organizers: Charles Ansong, Nikolaus Rajewsky and Massimiliano Pagani

Organized in collaboration with the Menarini International Foundation

Sponsored by Cell Research

Discounted Abstract & Scholarship Deadline: January 8, 2020 / Abstract Deadline: February 5, 2020 / Discounted Registration Deadline: March 4, 2020

### MONDAY, MAY 4

#### Arrival and Registration

### TUESDAY, MAY 5

#### Welcome and Keynote Address

**Eileen E.M. Furlong**, European Molecular Biology Laboratory, Germany  
*Dissecting Regulatory Principles of Embryonic Development One Cell at a Time*

#### Interrogating Disease Models at Single Cell

**Barbara Treutlein**, ETH Zürich, Switzerland  
*Understanding Organoids by Disassembling and Analysing Component Lineages Using Single-Cell RNA Sequencing*

**Ido Amit**, Weizmann Institute, Israel  
*The Power of ONE: Immunology in the Age of Single Cell Genomics*

**Maike Sander**, University of California, San Diego, USA  
*Insights into Pancreatic Islet Cell Gene Regulation and Disease Mechanisms of Diabetes from Single-Cell Analyses*

**Teresa G. Krieger**, Berlin Institute of Health / Charité, Germany  
*Short Talk: Patient-Derived PDAC Organoids Recapitulate Tumor Cell State Heterogeneity and Functional Hierarchy in vitro*

**Erin F. McCaffrey**, Stanford University, USA  
*Short Talk: Constructing an Atlas of Human Tuberculosis Granulomas with Multiplexed Ion Beam Imaging*

#### Poster Session 1

#### Workshop 1: Emerging Technologies for Unbiased Single Cell Analysis

**Charles Ansong**, Pacific Northwest National Laboratory, USA

**TongSeng Lim†**, Menarini Biomarkers Singapore, Singapore  
*Application of Single Cell Analysis to Disease Diagnosis*

**Andreas-David Brunner**, Max Planck Institute of Biochemistry, Germany  
*Leveraging Trapped Ion Mobility Spectrometry and PASEF for Single Cell Proteomics*

**David Ruff**, Mission Bio, USA  
*An Innovative Multimodal Single-Cell High-Throughput Microfluidic Workflow to Characterize Cell States and Pathway Responses*

**Christopher S. McGinnis**, University of California, San Francisco, USA  
*Advances and Applications of Single-Cell Genomics Sample Multiplexing Technology*

**Francesca Meschi**, 10x Genomics, USA  
*Massively-Parallel Simultaneous Profiling of the Transcriptomic and Epigenomic Landscape at Single-Cell Resolution*

#### Single Cell Computational Biology to Molecular Mechanisms

**Sarah Teichmann**, Wellcome Sanger Institute, UK  
*Cell States and Transcriptional Programmes in the Adult Human Heart*

**Fabian Theis**, Helmholtz Zentrum München, Germany  
*Computational Approaches in Single Cell Trajectory Analysis and Modeling*

**Matthias Mann**, Max Planck Institute of Biochemistry, Germany  
*Proteomics and Systems Biology in the Age of Single Cell Analysis*

**Ivan Gesteira Costa Filho**, RWTH Aachen, Germany  
*Short Talk: Chromatin Accessibility and Transcription Factor Activity Estimation on Single Cells*

**Hyun Jae Lee**, QIMR Berghofer, Australia  
*Short Talk: Transcriptome and Epigenome Dynamics of CD4+ T Cells during Malaria Maps Progressive Transition from Effector to Memory*

### WEDNESDAY, MAY 6

#### Development and Cell Fate at Single Cell Resolution I

**Jeffrey A. Whitsett**, Cincinnati Children's Hospital Medical Center, USA

*LungMAP: Systems Biology Approaches Supporting Study of Perinatal and Postnatal Lung Development and Disease*

**Nikolaus Rajewsky**, Max Delbrück Center for Molecular Medicine, Germany  
*Design Principles of Gene Expression by Single Cell-Sequencing*

**Alexander F. Schier**, Harvard University, USA  
*Cellular Biographies: Reconstructing Zebrafish Development*

**Sten Linnarsson**, Karolinska Institutet, Sweden  
*Molecular Architecture and Development of the Human Brain*

**Stefano Piccolo**, University of Padua, Italy  
*Combined Single-Cell and Histopathology Datasets Reveal Spatial Location of Glioblastoma Stem Cells and New Plasticity Determinants*

#### Poster Session 2

#### Workshop 2

**Nikos Karaiskos†**, Germany  
*Gene Expression Cartography*

**Tamim Abdelaal**, Delft University of Technology, Netherlands  
*SpaGE: Spatial Gene Enhancement using scRNA-seq*

**Constanza Martinez**, McGill University, Canada  
*Spatial Mapping of Single-Cell RNA Sequencing Populations in Primary and Metastatic Breast Cancer*

**Steffen Rulands**, Max Planck Institute for the Physics of Complex Systems, Germany  
*From Sequence to Space and Time: Inferring Emergent Epigenetic Processes From Single-Cell Multi-Omics*

**Anne L. Plant†**, National Institute of Standards and Technology, USA  
*Fluctuations in Fluorescent Reporters of Gene Expression Provide Insight Into the Thermodynamics of Cellular Networks*

#### Spatially-Resolved Omics at Single Cell Resolution

**Julia Laskin**, Purdue University, USA  
*Spatial Lipidomics and Metabolomics by Mass Spectrometry Imaging*

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**Bernd Bodenmiller**, University of Zürich, Switzerland  
*Highly Multiplexed Imaging of Tissues with Subcellular Resolution by Imaging Mass Cytometry*

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

**Lars Borm**, Karolinska Institutet, Sweden  
*Short Talk: Transcriptome Mapping With High Spatial Throughput by RNA Transfer to a Surface in the Human Embryo*

**Fabian Coscia**, NNF Center for Protein Research, University of Copenhagen, Denmark  
*Short Talk: Deep Visual Proteomics – Image Guided Cell Characterization to Unravel Functional Cell Heterogeneity at the Single Cell Level*

### THURSDAY, MAY 7

#### Single Cell Analysis in Tumor Microenvironment

**Massimiliano Pagani**, La Fondazione Istituto Nazionale di Genetica Molecolare - INGM, Italy  
*Deciphering the Tumor Microenvironment by Multiomics Analyses*

**Evan W. Newell**, Fred Hutchinson Cancer Research Center, USA  
*Using Antigen Specificity to Parse the High Dimensional Profiles of Tumor Infiltrating T Cells*

**Peter Lichter**, Deutsches Krebsforschungszentrum, Germany  
*Experiences in Assessing Intra-Tumor Heterogeneity by Single Cell Sequencing*

**Kara L. Davis**, Stanford University, USA  
*Single-Cell Developmental Classification of B Cell Precursor Acute Lymphoblastic Leukemia Using Mass Cytometry at Diagnosis Reveals Predictors of Relapse*

**Jeffrey M. Granja**, Stanford, USA  
*Short Talk: Single-Cell Multiomic Analysis Identifies Regulatory Programs in Mixed-Phenotype Acute Leukemia*

**Matteo Maria Naldini**, Fondazione Telethon, Italy  
*Short Talk: Deconvolution of Acute Myeloid Leukemia Intra-Tumor Heterogeneity Through Single-Cell RNA Sequencing*

**Laura Llaó Cid**, German Cancer Research Center, Germany  
*Short Talk: Deciphering the Complexity of Tumor-Associated T Cell Exhaustion by Integrative Single-Cell RNAseq and Mass Cytometry Analyses*

**Sarah Elisabeth Pierce**, Stanford University, USA  
*Short Talk: Single-Cell Resolution of Chromatin Accessibility in Lung Adenocarcinoma Reveals Genotype-Specific Dependencies*

#### Development and Cell Fate at Single Cell Resolution II

**Alexander van Oudenaarden**, Hubrecht Institute, Netherlands  
*Whole-Organism Clone-Tracing Using Single-Cell Sequencing*

**Iannis Aifantis**, New York University School of Medicine, USA  
*Translating Single Cell Data to Therapies: Targeting the Immune System in Leukemia*

**Aron B. Jaffe**, Third Rock Ventures, USA  
*Mechanisms Regulating Epithelial Progenitor Cell Fate Decisions*

**Rachel M. Agoglia**, Stanford University, USA  
*Short Talk: Exploring Cis-Regulatory Evolution of the Human Brain with Human-Chimpanzee Hybrid Cortical Organoids*

### Poster Session 3

### FRIDAY, MAY 8

#### Single Cell Analysis in Neuroscience

**Ana Pombo**, Max-Delbrück-Centrum für Molekulare Medizin, Germany  
*3D Genome Topology in Specific Neuronal Subtypes*

**Liqun Luo**, Stanford University, USA  
*Differential Encoding in Prefrontal Cortex Projection Neuron Classes Across Cognitive Tasks*

**Yue Huang**, Boston Children's Hospital, USA  
*Short Talk: Parallel RNA and DNA Analysis After Deep-Sequencing (PRDD-Seq) Reveals Cell Type-Specific Lineage Patterns in Human Brain Development*

**Fabian Müller**, Stanford University, USA  
*Short Talk: Single-Cell Chromatin Dynamics of the Developing Human Cerebral Cortex*

**Ethan Richman**, Stanford University, USA  
*Short Talk: Simultaneous Transcriptional, Anatomical, and Functional Characterization of Single Cells in Frontal Cortex During Motivated Behavior*

#### Workshop 3

**Giorgia Alvisi**, Humanitas Research Hospital, Italy  
*scRNAseq-Guided High-Dimensional Flow Cytometry Profiling Reveals An Effector Molecular Program Governing the Suppressive Activity of Tregs in Human Cancer*

**Alex Bashore**, Columbia University, USA  
*Novel Monocyte Subpopulations Revealed by Single-Cell RNA Sequencing*

**Anthony R. Cillo**, University of Pittsburgh, USA  
*Dissection of Germinal Center Reactions by Single-Cell RNAseq*

**David R. Glass**, Stanford University, USA  
*An Integrated Multi-Omic Single Cell Atlas to Redefine Human B Cell Memory*

**David Scott Johnson**, GigaGen Inc., USA  
*Massively Parallel Interrogation and Mining of Natively-Paired Human TCRab Repertoires*

**Laura Kolb**, TRON - Translational Oncology, Germany  
*Antigen-Specific CD4+ T Cell Heterogeneity Upon Antigen-Encoding mRNA-LPX-Induced Tolerance in EAE*

**Joshua M. Peters**, Massachusetts Institute of Technology, USA  
*Integration of Single-Cell Macrophage Transcriptomics Reveals Conserved Features Across Disease and Tissue Contexts*

**Maria Xydia**, RCI Regensburg Center for Interventional Immunology, Germany  
*Single-Cell Transcriptomics Reveals Common Clonal Origin of Conventional and Regulatory T Cells in Breast Cancer Patients*

#### Single Cell Analysis in Infection Biology

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**David Van Valen**, Caltech, USA

*Single Cell Biology in a Software 2.0 World*

**Emmanuel Saliba**, University of Würzburg, Germany

*Regulatory and Virulence Mechanisms in Host-Pathogen Interactions*

**Angela Ciuffi**, Institute of Microbiology - CHUV/UNIL, Switzerland

*Single Cell Analysis of Viral Pathogenesis*

**Emily Speranza**, National Institutes of Health, USA

*Short Talk: Analyzing the Spatial and Transcriptomic Response to RNA Virus Infection at Single Cell Resolution*

**Emanuel Wyler**, Max Delbrück Center for Molecular Medicine, Germany

*Short Talk: Single-Cell RNA-Sequencing of HSV-1 Infected Human Brain Organoids*

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

### SATURDAY, MAY 9

#### Departure