

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

Higher-Order Chromatin Architecture in Time and Space (EK2)

November 15-17, 2021 • Virtual at your computer

Scientific Organizers: Jennifer E. Phillips-Cremins, Job Dekker and Stavros Lomvardas

Supported by the Directors' Fund

MONDAY, NOVEMBER 15

Welcoming Remarks and Keynote Address (8am Denver/Mountain Time Start)

***Jennifer E. Phillips-Cremins**, University of Pennsylvania, USA

Xiaowei Zhuang, Harvard University, USA
Imaging the 3D Organization of the Genome

Visualizing Genome Folding in Single Cells (8:40am Denver/Mountain Time Start)

***Alistair Boettiger**, Stanford University, USA

***Karen L. Reddy**, Johns Hopkins University, USA

Clodagh C. O'Shea, The Salk Institute for Biological Studies, USA
ChromEAT: Visualizing 3D Chromatin Structure and Compaction of the Human Genome in Interphase and Mitotic Cells

Ting (C.-ting) Wu, Harvard Medical School, USA
Such a Lot of Genome to See...

Yodai Takei, California Institute of Technology, USA
Short Talk: Integrated Spatial Genomics Across Cell Types in the Mouse Brain Cortex

Anders Sejr Hansen, Massachusetts Institute of Technology, USA
Short Talk: Dynamics of 3D Genome Organization in Live Cells at Single-Molecule Resolution

Andrew B. Stergachis, University of Washington, USA
Short Talk: Single-molecule Chromatin Architectures of Human Centromeres and Telomeres

Eric F. Joyce, University of Pennsylvania, USA
Short Talk: High-throughput Oligopaint Screen for Druggable Targets that Regulate Chromatin Looping

Poster Session 1 (11:30am Denver/Mountain Time Start)

Meet the Editors (12:30pm Denver/Mountain Time Start)

Tiago Faial, Nature Genetics, USA

Maria Polychronidou, EMBO Press, Germany

Dan Simon, Journal of Cell Biology, Rockefeller University Press, USA

Genome Reconfiguration in Development (3pm Denver/Mountain Time Start)

***Luca Giorgetti**, Friedrich Miescher Institute for Biomedical Research, Switzerland

***Gerd A. Blobel**, Children's Hospital of Philadelphia, USA

Ana Pombo, Max Delbrück Centre for Molecular Medicine, Germany
Cell-Type and Cell-State Specialization of Chromatin Contacts

Amos Tanay, Weizmann Institute, Israel
Single Cell Hi-C Deconvolutes Proliferation and Differentiation in Embryonic Cell Populations

Benoit G. Bruneau, Gladstone Institutes, USA
Chromatin Organization in Heart Development

Danylo J. Villano, Columbia University, USA

Short Talk: 3D Genome Organization and Programmed Genome Rearrangement in the Ciliate Oxytricha Trifallax

Douglas H. Phanstiel, University of North Carolina at Chapel Hill, USA

Short Talk: Phase Separation Drives Aberrant Chromatin Looping and Cancer Development

Special Session: Mother-Daughter in Nuclear Architecture (5:05pm Denver/Mountain Time Start)

***Stavros Lomvardas**, Columbia University, USA

Terumi Kohwi-Shigematsu, University of California, San Francisco, USA

Short Talk: Deeply Hidden Layers of Functional Genome Organization by SATB1

Minoree Kohwi, Columbia University, USA

Short Talk: Regulation of Nuclear Architecture Dynamics Underlying Neural Progenitor Competence in vivo

TUESDAY, NOVEMBER 16

Causes and Consequences of Genome Folding on Genome Function (8am Denver/Mountain Time Start)

***Elzo de Wit**, Netherlands Cancer Institute, Netherlands

***Marieke Oudelaar**, Max Planck Institute for Biophysical Chemistry, Germany

Bas van Steensel, Netherlands Cancer Institute, Netherlands
Dynamics of Lamina-Associated Domains

Jennifer E. Phillips-Cremins, University of Pennsylvania, USA
Engineering the Repetitive 3D Genome in Human Disease

Gary Karpen, University of California, Berkeley, USA
Dissecting Roles for Condensate Properties in Heterochromatin Domain Formation & Function

Daniele Canzio, University of California, San Francisco, USA
The Role of Chromosome Architecture in Generating a Code for Neural Self-Recognition

Daan Noordermeer, Institute for Integrative Biology of the Cell, France
Short Talk: A Complex CTCF Binding Code Defines TAD Boundary Structure and Function

Luca Giorgetti, Friedrich Miescher Institute for Biomedical Research, Switzerland

Short Talk: Towards a Quantitative Understanding of Long-Range Transcriptional Regulation

Jane A. Skok, New York University School of Medicine, USA
Short Talk: The Impact of Cancer Associated CTCF Mutations on Chromatin Structure and Gene Regulation

Emmanuelle Fabre, Institut de Recherche St Louis, France
Short Talk: Global Chromatin Mobility Induced by a DSB is Dictated by Chromosomal Conformation and Defines the Outcome of Homologous Recombination

Nick Gilbert, University of Edinburgh, UK

Short Talk: Chromatin-Associated RNA Recycling by XRN2 Regulates Transcription and Chromosome Structure

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Career Roundtable (12pm Denver/Mountain Time Start)

Stavros Lomvardas, Columbia University, USA

Wenning Qin, eGenesis, USA

Sarah Elizabeth Johnstone, Dana-Farber Cancer Institute, USA

Poster Session 2 (1:30pm Denver/Mountain Time Start)

3D Organization of the Genome in the Cell Cycle (3pm Denver/Mountain Time Start)

***Daan Noordermeer**, Institute for Integrative Biology of the Cell, France

***Eric F. Joyce**, University of Pennsylvania, USA

Job Dekker, University of Massachusetts Medical School, USA
Re-folding the Genome after Mitotic Exit: Where are the Instructions?

Nancy E. Kleckner, Harvard University, USA
Inter-Axis Bridges are the Topological Gatekeepers of Mitotic Chromosomes

Karen L. Reddy, Johns Hopkins University, USA
Dynamic Spatiotemporal Organization of LADs and Lamins after Mitosis

Gerd A. Blobel, Children's Hospital of Philadelphia, USA
Principles of Chromatin Organization through the Lens of the Cell Cycle

Guillermo A. Orsi, INSERM - Institute for Advanced Biosciences, France
Short Talk: A Unique Mode of Higher-Order Chromatin Organization in Cricket Sperm Nuclei

Daniel Gerlich, IMBA, Austria
Short Talk: A Chromatin Phase Transition Protects Mitotic Chromosomes Against Microtubule Perforation

Gang Cheng, NIDDK, National Institutes of Health, USA
Short Talk: Extensive Genome Reorganization in Mammalian Meiotic Prophase I

WEDNESDAY, NOVEMBER 17

Mechanisms Governing Long-Range Looping (8am Denver/Mountain Time Start)

***Jennifer E. Phillips-Cremins**, University of Pennsylvania, USA

***Stavros Lomvardas**, Columbia University, USA

Bing Ren, Ludwig Institute for Cancer Research, USA
CTCF Promotes Long-Range Enhancer-Promoter Interactions and Lineage-Specific Gene Expression in Mammalian Cells

Stavros Lomvardas, Columbia University, USA
Role for Genome Folding in Olfaction

François Spitz, Institut Pasteur, France
Functions and Regulation of 3D Genome Architecture

Erez Lieberman-Aiden, Baylor College of Medicine, USA
Models and Mechanisms of Loop Extrusion

Elzo de Wit, Netherlands Cancer Institute, Netherlands
Short Talk: Patient-Specific Distal Gene Regulation in Childhood Cancers

George Spracklin, University of Massachusetts Medical School, USA
Short Talk: Heterochromatin Diversity Modulates Genome Compartmentalization and Loop Extrusion Barriers

Jumana AlHaj Abed, Harvard Medical School, USA
Short Talk: Investigating How Parental Genome Organization Shapes Regulatory Programs Using Genomic and Single-Cell Approaches

Marieke Oudelaar, Max Planck Institute for Biophysical Chemistry, Germany

Short Talk: Analysis of Sub-Kilobase Chromatin Topology Reveals Nano-Scale Regulatory Interactions with Variable Dependence on Cohesin and CTCF

Networking Lounge (2pm Denver/Mountain Time Start)

Spatiotemporal Genome Folding Dynamics Microenvironment and Signaling (3pm Denver/Mountain Time Start)

***Job Dekker**, University of Massachusetts Medical School, USA

***Douglas H. Phanstiel**, University of North Carolina at Chapel Hill, USA

Leonid Mirny, Massachusetts Institute of Technology, USA
Chromosomes Are Memory Machines

Bradley R. Cairns, HHMI/University of Utah, USA
Mechanisms for Establishing Developmental Gene Poising/Silencing and Chromosome Architecture in Early Zebrafish Embryos

Clifford P. Brangwynne, Princeton University, USA
Optical Control over Nuclear Bodies

Jeannie T. Lee, Massachusetts General Hospital / Harvard Medical School, USA
RNA Control of Chromosome Looping

Alistair Boettiger, Stanford University, USA
Short Talk: Mechanisms Behind Promoter-Enhancer Interactions across TAD Boundaries during Limb Patterning

Rachel Patton McCord, University of Tennessee, USA
Short Talk: Alterations in Spatial Genome Compartmentalization Associated with Constriction and Expansion

Sofia Quinodoz, Princeton University, USA
Short Talk: RNA Promotes the Formation of Spatial Compartments in the Nucleus

Closing Remarks (5:45pm Denver/Mountain Time Start)

***Job Dekker**, University of Massachusetts Medical School, USA