



Defining Structure and Function of the Nucleus

July 2 - 7, 2017

Chair

Wange Lu

Vice Chairs

David M. Gilbert and Yijun Ruan

The Hong Kong University of Science and Technology

Clear Water Bay, Kowloon

Hong Kong, CN

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Conference Description

Accumulating evidence suggest that genomes are organized non-randomly into complex 3D configurations that vary according to cell type, stage of development, differentiation and disease status. The principles, which guide higher order organization, the mechanisms responsible for establishment, maintenance and alterations of higher order genome, and the functional consequences of aberrant genome and nuclear organization have become areas of intense interest. The higher-order spatial and temporal organization of genomes in the cell nucleus is rapidly emerging as a driver of biological function in differentiation, development and disease and the incorporation of information on higher order genome organization add an additional level of complexity in our understanding of genome regulation. These studies bring together several cutting edge fields including genomics, epigenetics, big data analysis, imaging and clinical cell and molecular biology. The 2017 conference on Genome Architecture in Cell Fate and Disease aims to foster a new community that is devoted to the understanding of nuclear architecture in cell fate determination, development, disease modeling, stem cell biology and regenerative medicine. Particularly emphasis will be placed on genome organization, epigenetic remodeling, chromatin folding, structural elements of the nucleus and its relevance in gene transcription. Another angle is to promote cutting edge tools that allow us to visualize the



nucleus. We seek to unify and integrate chemical, biological, physiological as well as physical parameters into a coherent picture of the nucleus, especially the human one.

Conference Program

Sunday	
2:00 pm - 8:00 pm	Arrival and Check-in
6:00 pm - 7:00 pm	Dinner
7:30 pm - 7:40 pm	Introductory Comments by GRC Site Staff / Welcome from the GRC Chair
7:40 pm - 9:30 pm	Structure of the Nucleus Discussion Leader: Wange Lu (University of Southern California, USA)
7:40 pm - 7:50 pm	Opening Remarks
7:50 pm - 8:30 pm	Thomas Misteli (National Cancer Institute, NIH, USA) "Deep Imaging of the Genome"
8:30 pm - 8:40 pm	Discussion
8:40 pm - 9:20 pm	Duanqing Pei (Guangzhou Institute of Biomedicine and Health, Chinese Academy of Sciences, China) "Chromatin Remodeling During Somatic Cell Reprogramming"
9:20 pm - 9:30 pm	Discussion
Monday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	3D Nuclear Structure and Human Diseases Discussion Leader: Thomas Misteli (National Cancer Institute, NIH, USA)
9:00 am - 9:40 am	Ali Shilatifard (Northwestern University, USA) "Principles of Epigenetics and Chromatin in Development and Human Disease"



9:40 am - 9:50 am	Discussion
9:50 am - 10:30 am	Woojin An (University of Southern California, USA) "Chromatin Reorganization During Osteoclast Differentiation and Bone Metastases"
10:30 am - 10:40 am	Discussion
10:40 am - 11:10 am	Group Photo / Coffee Break
11:10 am - 11:50 am	Jane Skok (New York University, USA) "The Impact of Endogenous Retroviruses on Nuclear Organization in Mammalian Cells"
11:50 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Bjoert Kragestein (Max Planck Institute for Molecular Genetics, Germany) "Chromatin Architecture at the Pitx1 Locus Translates Pan-Limb Enhancer Activity into Hindlimb Specific Transcriptional Output"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Mariana Ruiz-Velasco (European Molecular Biology Laboratory, Germany) "CTCF-Mediated Intragenic Chromatin Looping Regulates Alternative Exon Usage"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:30 pm - 9:30 pm	Dynamics of 3D Nuclear Architecture Discussion Leader: Wouter De Laat (Hubrecht Institute, The Netherlands)



7:30 pm - 8:10 pm	Peter Fraser (Florida State University, USA) "The Dynamic 3D Organization of the Genome"
8:10 pm - 8:20 pm	Discussion
8:20 pm - 9:00 pm	Bing Ren (University of California, San Diego, USA) "Analysis of Chromatin Organization After Acute Loss of CTCF in Mouse Embryonic Stem Cells"
9:00 pm - 9:10 pm	Discussion
9:10 pm - 9:25 pm	Xiaoyuan Song (University of Science and Technology of China, China) "The Higher Order Chromatin Reorganization During Mammalian Spermatogenesis"
9:25 pm - 9:30 pm	Discussion
Tuesday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Organization of Chromatin Discussion Leader: Peter Fraser (Florida State University, USA)
9:00 am - 9:40 am	Wouter De Laat (Hubrecht Institute, The Netherlands) "Multi-Contact 4C to Discern Cooperative and Non-Cooperative Interactions Between Genes and Regulatory Sequences"
9:40 am - 9:50 am	Discussion
9:50 am - 10:30 am	Yuichi Taniguchi (RIKEN, Japan) "3D Nucleosome Organization of the Genome"
10:30 am - 10:40 am	Discussion
10:40 am - 11:10 am	Coffee Break
11:10 am - 11:50 am	Bing Zhu (Institute of Biophysics, Chinese Academy of Sciences, China) " <i>De Novo</i> Establishment of DNA Methylation During Oocyte Maturation"



11:50 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Marina Lusic (University Hospital Heidelberg, Germany) "HIV Explores Genomic Organization to Integrate and Persist"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Bo Wen (Fudan University, China) "An Endoderm-Specific lncRNA, linc-FoxA2, Maintains 3D Genome Architecture in Liver Cells"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
2:00 pm - 4:00 pm	Poster Session
4:00 pm - 6:00 pm	Genome Structure, Epigenetics and Gene Transcription Discussion Leader: Jing-Dong Han (CAS-MPG Partner Institute for Computational Biology, China)
4:00 pm - 4:40 pm	Rafael Casellas (National Institute of Arthritis and Musculoskeletal and Skin Diseases, NIH, USA) "Architectural Striptes Facilitate Transcription and Recombination of Ig Genes"
4:40 pm - 4:50 pm	Discussion
4:50 pm - 5:30 pm	Hiroshi Kimura (Tokyo Institute of Technology, Japan) "Chromatin Modification Dynamics During Gene Activation in Living Cells"
5:30 pm - 5:40 pm	Discussion
5:40 pm - 5:55 pm	Jiao Sima (Florida State University, USA) "Genetic Dissection of Functional Elements in Replication Timing Control"
5:55 pm - 6:00 pm	Discussion
6:00 pm - 7:00 pm	Dinner



7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Chromatin Structure, Stem Cells and Development Discussion Leader: Bing Zhu (Institute of Biophysics, Chinese Academy of Sciences, China)
9:00 am - 9:40 am	Victor Corces (Emory University, USA) "Evolutionarily Conserved Principles Predict 3D Chromatin Organization"
9:40 am - 9:50 am	Discussion
9:50 am - 10:30 am	Wei Xie (Tsinghua University, China) "Dynamic Chromatin Reprogramming in Early Mammalian Development"
10:30 am - 10:40 am	Discussion
10:40 am - 11:10 am	Coffee Break
11:10 am - 11:50 am	Ryan Lister (University of Western Australia, Australia) "Conserved TET-Mediated Regulation of Enhancer Activity and Accessibility During Development"
11:50 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Danny Leung (Hong Kong University of Science and Technology, Hong Kong SAR China) "Delineating Cis-Regulatory Function of Endogenous Retroviruses"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Brian Chadwick (Florida State University, USA) "A Novel Super Enhancer-Like Element Embedded Within the X-Linked IL1RAPL1 Gene Is Linked to Chromatin Compaction of the Inactive X Chromosome"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time



4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:00 pm - 7:30 pm	Business Meeting <i>Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair</i>
7:30 pm - 9:30 pm	Chromatin Structure and Single Cell Epigenome Discussion Leader: Yijun Ruan (Jackson Laboratory for Genomic Medicine, USA)
7:30 pm - 8:10 pm	Fuchou Tang (Peking University, China) "Single Cell Epigenome Sequencing of Human Early Embryos"
8:10 pm - 8:20 pm	Discussion
8:20 pm - 9:00 pm	Guohong Li (National Laboratory of Biomacromolecules, Chinese Academy of Sciences, China) "Structure and Dynamics of the 30-nm Chromatin Fiber in Gene Regulation and Epigenetic Inheritance"
9:00 pm - 9:10 pm	Discussion
9:10 pm - 9:25 pm	Ichiro Hiratani (RIKEN Center for Developmental Biology, Japan) "Single-Cell DNA Replication Timing Profiling and the 3D Genome Organization Dynamics"
9:25 pm - 9:30 pm	Discussion
Thursday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Tools and Technology to Study 4D Nucleome Discussion Leader: Rafael Casellas (National Institute of Arthritis and Musculoskeletal and Skin Diseases, NIH, USA)
9:00 am - 9:40 am	Qiang Wu (Shanghai Jiao Tong University, China) "Dissection of Chromatin Looping by DNA Fragment Editing"
9:40 am - 9:50 am	Discussion



9:50 am - 10:30 am	Jing-Dong Han (CAS-MPG Partner Institute for Computational Biology, China) "Cell Identity Marking and Interactions of Enhancer-Like Transposable Elements"
10:30 am - 10:40 am	Discussion
10:40 am - 11:10 am	Coffee Break
11:10 am - 11:50 am	Jian Ma (Carnegie Mellon University, USA) "Modeling Nuclear Compartmentalization and Chromatin Interaction Using Machine Learning"
11:50 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Jonas Paulsen (University of Oslo, Norway) "Computational Modeling Reveals 4D Genome Reorganization During Stem Cell Differentiation"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Stefanie Morgan (Stanford University School of Medicine, USA) "Manipulation of Nuclear Architecture Through CRISPR-Mediated Chromosomal Looping"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Imaging of the Nucleus Discussion Leader: David Gilbert (Florida State University, USA)
4:00 pm - 4:40 pm	Kazuhiro Maeshima (National Institute of Genetics, Japan) "Dynamic Organization of Chromatin Domains Revealed by Super-Resolution Live-Cell Imaging"
4:40 pm - 4:50 pm	Discussion
4:50 pm - 5:30 pm	Clodagh O'Shea (The Salk Institute for Biological Studies, USA) "Visualizing the Higher Order Coding Structures of DNA"



5:30 pm - 5:40 pm	Discussion
5:40 pm - 5:55 pm	Hanhui Ma (University of Massachusetts Medical School, USA) "CRISPR-Based Imaging Reveals Cell-Cycle-Dependent Chromosome Dynamics in Living Cells"
5:55 pm - 6:00 pm	Discussion
6:00 pm - 7:00 pm	Dinner
Friday	
7:30 am - 8:30 am	Breakfast
9:00 am	Departure

Contributors

		
		

