

# Dynamics of Genome Structure

ERC Synergy Project “4DGenome”

Workshop

September 22 & 23, 2016

Barcelona

PRBB Auditorium, Dr. Aiguader 88

Organizers:

**Miguel BEATO** (CRG)

**Thomas GRAF** (CRG)

**Luciano Di CROCE** (CRG)

**Marc A. MARTI-RENOM** (CNAG-CRG)

**Guillaume FILION** (CRG)

**François LE DILY** (CRG)

Invited Speakers:

**Frank ALBER** (USA)

**Peter BECKER** (Germany)

**Kerstin BYSTRICKY** (France)

**Victor G. CORCES** (USA)

**Denis DUBOULE** (Switzerland)

**Peter FRASER** (UK)

**Luca GIORGETTI** (Switzerland)

**Frank GROSVELD** (The Netherlands)

**Edith HEARD** (France)

**Ivan JUNIER** (France)

**Ana LOSADA** (Spain)

**Tom MISTELI** (USA)

**Stefan MUNDLOS** (Germany)

**Cornelis MURRE** (USA)

**Daan NOORDERMEER** (France)

**Sandra PEIRÓ** (Spain)

**Ana POMBO** (Germany)

**Sergey V. RAZIN** (Russia)

**Amos TANAY** (Israel)

**Ting WU** (USA)

# PRELIMINARY PROGRAM

## Thursday, 22 September

08:15-08:45 Registration

08:45-09:00 Welcome

### 09:00-11:00 Session 1 – CHAIR: MIGUEL BEATO

09:00-09:30 **Victor G. CORCES**, Department of Biology, Emory University, Atlanta USA

*“Mammalian sperm exhibit epigenetic priming of embryonic and adult regulatory landscapes”*

09:30-10:00 **Daan NOORDERMEER**, Institute for Integrative Biology of the Cell (I2BC), University Paris-Saclay, Gif-sur-Yvette, FR

*“Paternally imprinted gene loci are dynamically organized into allele-specific sub-TADs”*

10:00-10:30 **Ana LOSADA**, Chromosome Dynamics Group, Molecular Oncology Programme, Spanish National Cancer Research Centre (CNIO), Madrid ES

*“Distinct contributions of variant cohesin complexes to genome architecture and gene regulation”*

10:30-10:45 **Aurelien BANCAUD**, LAAS-CNRS, Toulouse FR

*“Analysis of chromosome fluctuations in yeast reveals the transcription-dependent biophysical properties of chromatin”*

10:45-11:15 Coffee break and posters

### 11:15-13:00 Session 2 - CHAIR: THOMAS GRAF

11:15-11:45 **Ting WU**, Department of Genetics, Harvard Medical School, Boston USA

*“Imaging the genome: Strategies for walking along the chromosome”*

11:45-12:15 **Kerstin BYSTRICKY**, Paul Sabatier University, Toulouse FR

*“Chromatin dynamics during transcription initiation at single gene loci”*

12:15-12:45 **Frank GROSVELD**, Department of Cell Biology, Erasmus University Medical Center, Rotterdam NL

*“Transcription and the dynamics of the 3D structure of the genome”*

12:45-13:00 **Elzo de WITT**, The Netherlands Cancer Institute, Amsterdam NL

*“The WAPL-SCC4 axis acts as rheostat for chromosomal organization”*

13:00-14:30 Lunch and posters

14:30-16:30 **Session 3 – CHAIR: MARC A. MARTI-RENOM**

14:30-15:00 **Edith HEARD**, Genetics and Developmental Biology, Institut Curie, Paris FR

*“The structural and functional dynamics of the inactive X chromosome”*

15:00-15:30 **Tom MISTELI**, National Cancer Institute, NIH, Bethesda, USA

*“Deep Imaging to probe genome organization and function”*

15:30-16:00 **Ana POMBO**, Max Delbrück Center for Molecular Medicine, Berlin DE

*“Genome architecture mapping: a spatial approach to map chromatin contacts genome-wide”*

16:00-16:15 **Juan M. VAQUERIZAS**, MPI Molecular Medicine, Muenster, GE

*“Transcriptional nucleation of topological domains during early embryogenesis”*

16:15-16:30 **Valerio BIANCHI**, Hubrecht Institute, Urecht NL

*“High-resolution 3D contact map analysis in a Tet-Myc driven mouse model of liver cancer”*

16:30-17:00 *Coffee break and posters*

17:00-19:30 **Session 4 - CHAIR: GUILLAUME FILION**

17:30-18:00 **Amos TANAY**, Department of Computer Science and Applied Mathematics, The Weizmann Institute, Rehovot IL

*“Single cell analysis of genome regulation”*

18:00-18:30 **Luca GIORGETTI**, Friedrich Miescher Institute for Biomedical Research, Basel CH

*“TADs emerge as a functionally privileged scale in the complex hierarchical folding of the mouse genome”*

18:30-19:00 **Sergey V. RAZIN**, Institute of Gene Biology, RAS, Department of Molecular Biology, Lomonosov Moscow State University, Moscow RU

*“Self-organization of drosophila chromatin into topologically-associating domains”*

19:00-19:30 **Susan CLARK**, Garvan Inst. Medical Research, Darlinghurst, AU

*“Three-dimensional genetic and epigenetic disorganization of the cancer genome”*

## Friday, 23 September

### 08:30-10:30 Session 5 – CHAIR: LUCIANO DI CROCE

- 08:30-09:00 **Sandra PEIRÓ**, Hospital del Mar Medical Research Institute, Barcelona ES  
*“H3K4ox-mediated chromatin condensation protects breast cancer cells from the DNA damage repair machinery”*
- 09:00-09:30 **Denis DUBOULE**, École Polytechnique Fédérale de Lausanne CH  
*“Long-range Gene Regulation at the HoxD locus”*
- 09:30-10:00 **Stefan MUNDLOS**, Max Planck Institute for Molecular Genetics, Munich DE  
*“Pathology of Structural Variations of the Genome is Determined by Integrity of Topological Chromatin Domains”*
- 10:00-10:30 **Peter B. BECKER**, Molecular Biology, LMU University, Munich DE  
*“Marking the X chromosome for global transcription regulation”*

10:30-11:00 Coffee break and posters

### 11:00-13:00 Session 6 - CHAIR: FRANÇOIS LE DILY (CRG)

- 11:00-11:30 **Ivan JUNIER**, Université Grenoble Alpes, Grenoble FR  
*“Data analysis and physical modelling of chromosome structuring in Pseudomonas aeruginosa”*
- 11:30-12:00 **Frank ALBER**, Molecular & Computational Biology, Department of Biological, Sciences University of Southern California, Los Angeles USA  
*“Exploring the dynamic landscape of 3D genome structures”*
- 12:00-12:30 **Cornelis MURRE**, Division of Biological Sciences, UC San Diego USA  
*“The contraction of space and time in gene regulation”*
- 12:30-13:00 **Peter FRASER**, Nuclear Dynamics Programme, The Babraham Institute, Cambridge UK  
*“4D Genome Dynamics”*

13:30-15:00 Lunch and posters of the ERC “4D Genome”

### 15:00-16:15 Presentations by PIs of the “4DCellFate” and the ERC Project “4D Genome”:

#### **ERC Synergy Project “4D Genome”**

Dynamics of human genome architecture in stable and transient gene expression changes

&

#### **EU Coordinate Project “4D Cell Fate”**

Developing a global understanding of the PRC and NuRD complexes in stem cell differentiation, in health and disease

Site: Ramon y Cajal Meeting Room

15:00-15:20 **Luciano DI CROCE:** "Functional diversity of Polycomb complexes in stem cells"

15:20-15:40 **Thomas GRAF:** "Dynamic changes in genome topology during reprogramming of somatic cells into iPSCs"

15:40-16:00 **Guillaume FILION:** "Gene expression and genome organization in Drosophila"

16:00-16:20 **Marc MARTI-RENOM:** "Automatic modelling and visualization of HiC data"

16:20-16:40 **Miguel BEATO:** "Dynamics of genome organization in response to hormones"

16:40:17:00 *Coffee break*

17:00-17:30 **Round Table Discussion**  
Luciano DI CROCE, Thomas GRAF, Guillaume FILION, Marc MARTI-RENOM & Miguel BEATO  
*Ramon y Cajal meeting room*