

Workshop on

DVR 0065528

**“Chromatin Modeling: Integrating Mathematics, Physics, and Computation for
Advances in Biology and Medicine”**

March 4 - 8, 2024

organized by

Anton Goloborodko (IMBA, Vienna), Tamar Schlick (NYU, New York), Jan Smrek (U of Vienna)**• Monday, March 4th, 2024**10:00 – 11:00 **Registration & Welcome**11:00 – 11:35 **Alexander Grosberg (NYU, New York)***Scaling, Topology, and Hydrodynamics in Polymer Models of Chromatin*11:35 – 12:10 **Wilma Olson (Rutgers U)***Contributions of nucleosomal DNA architecture to higher-order chromatin organization*12:10 – 12:45 **Anna Panchenko (Queen’s U)***High-resolution exploration of chromatin dynamics using integrative approaches*12:45 – 14:00 **Lunch Break**14:00 – 14:35 **Modesto Orozco (IRB, Barcelona)***Exploring chromatin structure and dynamics through experiments and simulations.*14:35 – 15:10 **Stephen Levene (U Texas, Dallas)***DNA Dynamics and Chromatin Landscapes in the Circulome*15:10 – 15:45 **Ivet Bahar (Stony Brook U, New York)***Insights into 4D Genome from Leveraging Hi-C technology with Elastic Network Models*15:45 – 16:45 **Discussion and Coffee Break****• Tuesday, March 5th, 2024**10:00 – 10:35 **Kerstin Bystricky (U Toulouse Capitole)***Real time in situ chromatin dynamics tracking at nanoscale resolution during transcription activation in human cells*10:35 – 11:10 **Lars Nordenskiöld (NTU Singapore)***Columnar Nucleosome Stacking Dictates NCP and (Telomeric) Chromatin Condensation*11:10 – 11:30 **Coffee Break**11:30 – 12:05 **Maria Pia Cosma (Center for Genomic Regulation, Barcelona)***Integrating imaging and genomic approaches to model 3D genome structure*12:05 – 12:40 **Sergei Grigoryev (Penn State U)***Cryo-electron tomography reveals the nanoscale anatomy of condensed native chromatin*12:40 – 14:00 **Lunch Break**14:00 – 14:35 **Ariel Kaplan (Technion Haifa)***Force spectroscopy sheds light on the structure and dynamics of nucleosomes*14:35 – 15:10 **Sarah Swygert (CSU, Fort Collins)**

Quiescent yeast: a cellular model of chromatin architecture across scales

15:10 – 15:30 **Coffee Break**

15:30 – 16:05 **Yuval Garini (Technion Haifa)**

The multi-scale organization of chromatin in the nucleus

16:05 – 16:40 **Alexey Onufriev (Virginia Tech)**

The nucleosome as the “hydrogen atom” of epigenetics.

- **Wednesday, March 6th, 2024**

09:00 – 13:00 **On your own sightseeing / Collaborative discussions at ESI**

13:00 – 13:35 **Vlad Cojocaru (Utrecht U)**

Transcription factors pioneering genomic DNA under the computational nanoscope

13:35 – 14:10 **Daniel Jost (ENS Lyon)**

On the role of polymerases in shaping the 4D Genome

14:10 – 14:45 **Vladimir Teif (U of Essex)**

Nucleosome repositioning in cancer

14:45 – 15:00 **Coffee Break**

15:00 – 15:35 **Tamar Schlick (New York U)**

TBA

15:35 – 16:10 **Helmut Schiessel (TU Dresden)**

A physical mechanism for the maintenance of epigenetic information

16:10 – 16:45 **Peter Virnau (U Mainz)**

A polymer-based approach to reconstruct 3d chromatin structures from single cell HiC and implications for knotting

- **Thursday, March 7th, 2024**

10:00 – 10:35 **Ludvig Lizana (Umeå U)**

TBA

10:35 – 11:10 **John van Noort (Leiden U)**

Unfolding chromatin fibers: how linker DNA organizes chromatin

11:10 – 11:30 **Coffee Break**

11:30 – 12:05 **Angelo Rosa (SISSA, Trieste)**

Bottom-up data integration in polymer models of chromatin organization

12:05 – 12:40 **Anton Goloborodko (IMBA, Vienna)**

Sister chromatid cohesion is asymmetric

12:40 – 14:00 **Lunch Break**

14:00 – 14:35 **Buddhapriya Chakrabarti (U of Sheffield)**

Physics of Surface Segregation: from Industrial Formulations to Chromatin Organization and Biology

14:35 – 15:10 **David Brueckner (ISTA, Klosterneuburg)**

Stochastic motion and transcriptional dynamics of pairs of distal DNA loci on a compacted chromosome

15:10 – 15:45 **Mikhail Tamm (Tallinn U)**

TBA

15:45 – 19:00 **JCP Reception & Museum Outing**

All talks take place at ESI Boltzmann Lecture Hall!