



THE HEBREW UNIVERSITY OF JERUSALEM
ISRAEL INSTITUTE FOR ADVANCED STUDIES

The 23rd Jerusalem School in Life Sciences on: Computational and Structural Biology

January 10-14, 2016

All lectures will take place at the Israel Institute for Advanced Studies, room 130,
on the Edmond J. Safra, Givat Ram Campus

Director:

Roger Kornberg (Stanford University)

Organizers:

Nir Kalisman (The Hebrew University of Jerusalem)

Julia Shifman (The Hebrew University of Jerusalem)

Program

Sunday, 10 January

- 09:00 - 09:40 Registration
- 09:40 - 09:50 **Michal Linial** (The Hebrew University of Jerusalem)
Welcome by the IAS Director
- 09:50 - 10:00 **Roger Kornberg** (Stanford University)
Opening Remarks
- 10:00 - 11:00 **Michael Levitt** (Stanford University)
Hybrid Multiscale Models for Simulating Functional Motion in Huge Macromolecular Complexes
- 11:00 - 12:00 **Ohad Medalia** (University of Zürich)
Cellular structural biology by cryo-electron tomography
- 12:00 - 13:15 Lunch- at the Belgium House
- 13:15 - 14:15 **William M. Gelbart** (University of California, Los Angeles)
Making Viruses and Virus-Like Particles "From Scratch"
- 14:15 - 15:15 **Tomas Kirchhausen** (Harvard Medical School)
Cell Dynamics Imaged at High Resolution
- 15:15 - 15:45 Coffee Break
- 15:45 - 16:45 **Avinoam Ben Shaul** (The Hebrew University of Jerusalem)
Theory and (versus?) simulation: Examples from modeling virus energetics and assembly

16:45 - 17:45 **Rachel Kolodny** (University of Haifa)
Global View of the Protein Universe

17:45 - 19:45 Opening Reception at the IAS Lobby

Monday, 11 January

09:00 - 10:00 **Ohad Medalia** (University of Zürich)
Basic principle in three-dimensional electron
microscopy

10:00 - 11:00 **Stephen C. Harrison** (Harvard Medical School)
Virus structure and the molecular mechanisms of
viral cell entry

11:00 - 11:30 Coffee Break

11:30 - 12:30 **Tamar Schlick** (New York University)
Biomolecular Modeling and Simulation - A Field
Coming of Age

12:30 - 13:45 Lunch- at Sherman Cafeteria

13:45 - 14:45 **Gali Prag** (Tel Aviv University)
Computational and structural analysis of the of the
ubiquitin interactome landscape

14:45 - 15:15 Coffee Break

15:15 - 16:15 **Avital Shurki** (The Hebrew University of
Jerusalem)
QM/MM: the way to understand enzymes

16:15 - 17:15 **David Lukatsky** (Ben-Gurion University of the
Negev)
Design principles of protein recognition of
repetitive genomic DNA sequences

17:15 - 19:15 Poster Session

Tuesday, 12 January

- 09:00 - 10:00 **Ron Dror** (Stanford University)
Revealing the Structural Basis of GPCR Signaling
Through Atomic-level Simulation
- 10:00 - 11:00 **David Bensimon** (École Normale Supérieure)
Single cell Physiology: Using Light to Control
Protein Activity and Gene Expression
- 11:00 - 11:30 Coffee Break
- 11:30 - 12:30 **Michael Levitt** (Stanford University)
Solving Large Macromolecular Complexes with
Less Data and More Computation
- 12:30 - 13:00 Light Lunch
- 13:00 - 17:00 Tour - The Old City, Jerusalem

Wednesday, 13 January

- 09:00 - 10:00 **Daniel Harries** (The Hebrew University of
Jerusalem)
How Protective Osmolytes Stabilize Biological
Macromolecules
- 10:00 - 11:00 **Gideon Schreiber** (Weizmann Institute of Science)
Assessing the effects of crowding on binding and
enzyme reaction rates in vitro
- 11:00 - 11:30 Coffee Break
- 11:30 - 12:30 **Sarel Fleishman** (Weizmann Institute of Science)
Principles of designing new protein folds
- 12:30 - 13:45 Lunch- at the Belgium House
- 13:45 - 14:45 **Sarel Fleishman** (Weizmann Institute of Science)
Principles of designing biomolecular function

- 14:45 - 15:35 **Julia Shifman** (The Hebrew University of Jerusalem)
Computational Protein Design – Design of Protein-Protein Interactions
- 15:35 - 16:05 Coffee Break
- 16:05 - 16:35 **Ilan Samish** (Weizmann Institute of Science)
Dynamic Fold Space of the Membrane Proteome
- 16:35 - 17:15 **Nir Kalisman** (The Hebrew University of Jerusalem)
Elucidating large molecular architectures by cross-linking and mass-spectrometry

Thursday, 14 January

- 09:00 - 10:00 **Emmanuel Levy** (Weizmann Institute of Science)
Proteins Evolve on the Edge of Uncontrolled Self-assembly
- 10:00 - 11:00 **Ada Yonath** (Weizmann Institute of Science)
What was first, the genetic code or its products?
- 11:00 - 11:30 Coffee Break
- 11:30 - 12:30 **Ada Yonath** (Weizmann Institute of Science)
Critical issues in contemporary medicine, the microbiome and environmental aspects.
- 12:30 - 13:45 Lunch- at Sherman Cafeteria
- 13:45 - 14:45 **Roger Kornberg** (Stanford University)
The Molecular Basis of Eukaryotic Transcription