The 2023 edition of the Macromolecular Structures Department Workshop at the CNB-CSIC will focus on Advanced Biophysical Approaches to foster our knowledge on protein spectrometry and sequencing, nucleic acids nanostructures, mechanisms of molecular motors, nanopores, and mechanobiology.

**TOPICS**

- Mass Photometry
- Protein Sequencing
- Optical & Magnetic Tweezers
- Atomic Force Microscopy
- Fluorescence based methods

**KEYNOTE SPEAKERS**

Philipp Kukura  University of Oxford, United Kingdom
Sonja Schmid  University of Wageningen, The Netherlands
Andra Dumitru  Spanish National Center for Cardiovascular Research, Spain

**INVITED SPEAKERS**

Sara de Bragança  National Center of Biotechnology (CSIC), Spain
Borja Ibarra  IMDEA Nanociencia, Spain
Silvia Hormeño  National Center of Biotechnology (CSIC), Spain
Silvia Hernández-Ainsa  Institute of Nanoscience and Materials of Aragon, CSIC-UZ, Spain
David Rodriguez-Larrea  Instituto Biofisika, Spain
Salvatore Assenza  Autonomous University of Madrid, Spain
Pedro J. de Pablo  Autonomous University of Madrid, Spain
Cristina Flors  IMDEA Nanociencia, Spain
Victor G. Gisbert  Materials Science Institute of Madrid (CSIC), Spain
Eva M. Martin-Cuevas  National Center of Biotechnology (CSIC), Spain

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**Funding**

[Logos and links to funding sources]
3rd Workshop on Advanced NanoBioscience. CNB-CSIC

Friday, 26th May, 2023

9:20 – 9:30 Welcome
Fernando Moreno-Herrero (CNB-CSIC, Madrid). Main organizer

Session 1: Advanced biophysical approaches based on microscopy, optical and magnetic tweezers

Chair: Fernando Moreno-Herrero (CNB-CSIC, Madrid)

9:30 – 10:15 Keynote TALK

Unravelling biomolecular structure, interactions and dynamics with mass photometry
Philipp Kukura (University of Oxford, UK)

10:15 – 10:35 Unveiling the contribution of IncRNA NIHCOLE to the repair of DNA breaks using Magnetic Tweezers and Fluorescence-correlated Optical Trapping
Sara de Bragança (CNB-CSIC, Madrid)

10:35 – 10:55 Comparative analysis of force generation by dynamin isoforms during membrane remodelling
Borja Ibarra (IMDEA-Nanociencia, Madrid, Spain)

10:55 – 11:15 Exploring DNA repair at the single-molecule level
Silvia Hormeño (CNB-CSIC, Madrid)

11.15 – 12.00 Coffee Break (sponsored by Lumicks™)

Session 2: Advanced biophysical approaches based on nanopores

Chair: Sara de Bragança (CNB-CSIC, Madrid)

12:00 – 12:45 Keynote TALK

The timing of life at the nanoscale
Sonja Schmid (Wageningen, The Netherlands)
12:45 – 13:05  DNA nanotechnology to engineer advanced nanomaterials for biomedical applications
Silvia Hernandez-Ainsa (Institute of Nanoscience of Aragon, University of Zaragoza, Zaragoza)

13:05 – 13:25  Analysis of single protein molecules with nanopores
David Rodriguez-Larrea (Instituto Biofisika, Bilbao)

13:25 – 13:45  Getting a grip on dynamic single molecules with correlative optical tweezers
Emma Verver (LUMICKS™, The Netherlands)

13:45 – 15:00 Lunch + Poster Session

Session 3: Advanced biophysical approaches based on AFM

Chair: Eva M. Martin (CNB-CSIC, Madrid)

15:00 – 15:45 Keynote TALK

Decoding mechanical fingerprints of cellular components in pathological conditions: a multiscale perspective
Andra Dumitru (CNIC, Spain)

15:45 – 16:05  Physical Virology with atomic force and fluorescence microscopies: exploring the biophysics of individual virus particles
Pedro J. de Pablo (UAM, Madrid)

16:05 – 16:25  How much force is needed to kill a single bacterium?
Cristina Flors (IMDEA-Nanociencia, Madrid)

16:25 – 16:45  Structural analysis of single-stranded RNA molecules using Atomic Force Microscopy
Eva M. Martin (CNB-CSIC, Madrid)

16:45 – 17:05  Nanorheology and Nanoindentation Revealed a Softening and an Increased Viscous Fluidity of Adherent Mammalian Cells upon Increasing the Frequency
Victor G. Gisbert (ICMM, Madrid)

17:05 – 17:25  Bridging the scales in DNA flexibility from nucleotides to single-molecule techniques via molecular simulations
Salvatore Assenza (UAM, Madrid)

17:25  Closing and farewell