



Programme – all times UTC

Please note that this programme is scheduled in UTC time zone.

Monday April 11

- 13:50 **Introduction to FNANO 2022**
Andrew Turberfield, Programme Chair
Chair: Hao Yan
Session 1: Commemoration of Ned Seeman
- 14:00 **Introduction: Commemoration of Ned Seeman**
Hao Yan, Arizona State University, USA
- 14:10 **(Invited) The Simple Side of DNA Self-Assembly**
Chengde Mao, Purdue University, USA
- 14:35 **(Invited) Decorating Ned Seeman's DNA Constructs with Organic Molecules**
James Canary, New York University, USA
- 15:00 **(Invited) DNA nanostructures for precision cancer therapy**
Hanadi Sleiman, McGill University, Canada
- 15:25 **Break**
- 15:40 **(Invited) Multi-micron crisscross structures grown from DNA-origami slats**
William Shih, Dana-Farber Cancer Institute, USA
- 16:05 **(Invited) DNA nanotechnology: from functional devices to DNA materials**
Tim Liedl, LMU Munich, Germany
- 16:30 **(Invited) The power of spatial organization in molecular systems**
Lulu Qian, Caltech, USA
- 16:55 **Poster Session 1: flash presentations**
- 17:20 **Poster Session 1**
Chair: Ralf Jungmann
Session 2: Nanophotonics and Superresolution
- 18:15 **(Invited) Localization Atomic Force Microscopy**
George Heath, University of Leeds, UK
- 18:40 **Tunable plasmonic metamolecules and metasurfaces through bottom-up self-assembly**
Mihir Dass, LMU Munich, Germany
- 18:55 **Molecular cryptography enabled by DNA origami, DNA-PAINT, and machine learning**
Gde Bimananda Mahardika Wisna, Arizona State University, USA
- 19:10 **Break**

Key dates

Abstract submission deadline:

18 February 2022

Registration deadline:

6 April 2022

Organised by the **IOP**
Biological Physics Group

IOP Institute of Physics
Biological Physics Group

Chair: Rebecca Schulman

Session 3: Principles and Theory of Self-Assembly

19:25 **(Invited) Reconstitution of dynamical structure formation processes in colloidal and cytoskeletal systems**

Andreas Bausch, Technische Universität München, Germany

19:50 **(Invited) Synthetic multicellular assemblies differentiate in morphogen gradients**

Aurore Dupin, Weizmann Institute, Israel

20:15 Break

20:20 ISNSCE Business Meeting

Tuesday April 12

Chair: Hao Yan

Session 4: DNA Nanostructures: Semantomorphic Science

14:00 **Actuating tension-loaded DNA clamps drives membrane tubulation**

Longfei Liu, Yale University, USA

14:15 **Control and monitor assembly kinetics of synthetic capsids made from DNA origami**

Wei-Shao Wei, Brandeis University, USA

14:30 **High-resolution structures and conformational dynamics of RNA origami during folding**

Ewan McRae, Aarhus University, Denmark

14:45 **Discussion - Nucleic Acid Nanostructure Assembly**

Chairs: Hao Yan and Rebecca Schulman

15:20 **Poster Session 2: flash presentations**

15:45 **Poster Session 2**

Chair: Nicole Steinmetz

Session 5: Biomedical Nanotechnology

16:40 **(Invited) DNA origami-based vaccine platform against infectious diseases**

Remi Veneziano, George Mason University, USA

17:05 **Sonopharmacology and Sonogenetics: Activating drugs, proteins and genes by ultrasound mediated by polynucleic acid scaffolds**

Andreas Herrmann, DWI - Leibniz Institute for Interactive Materials, Germany

17:20 **Stimuli-responsive DNA particles underpin three-agent signaling networks with live bacteria and synthetic cells**

Michal Walczak, University of Cambridge, UK

17:35 **Poster Session 3: flash presentations**

18:00 **Poster Session 3**

Chair: Friedrich Simmel

Session 6: DNA Nanosystems: Programmed Function I

18:55 **(Invited) Rapid DNA four-way branch migration with a bulge in the toeholds**

Wooli Bae, University of Surrey, UK

19:20 **Multi-state soft machine programmed by DNA codes**

Ruohong Shi, Johns Hopkins University, USA

19:35 **Patterning DNA-based artificial cells with reaction-diffusion**

Lorenzo Di Michele, Imperial College London, UK

19:50 Break

20:00 Robert Dirks Prize

Wednesday April 13

Chair: Friedrich Simmel

Session 7: DNA Nanosystems: Programmed Function II

14:00 **Self-assembled RNA origami-based codes for exploring RNA diversity**

Filip Boskovic, University of Cambridge, UK

14:15 **Engineering Multifunctional DNA-Based Cytoskeletons for Synthetic Cells**

Kevin Jahnke, Max Planck Institute for Medical Research, Germany

14:30 **Parallel and in-memory computation with data stored in DNA**

Boya Wang, The University of Texas at Austin, USA

14:45 **Discussion - Nucleic Acid Nanostructure Function**

Chairs: Andrew Ellington and Friedrich Simmel

15:20 **Poster Session 4: flash presentations**

15:45 **Poster Session 4**

Chair: Yamuna Krishnan

Session 8: Nucleic Acid Nanostructures in Vivo

16:40 **(Invited) A DNA-based voltmeter for organelles**

Anand Saminathan, Harvard Medical School, USA

17:05 **(Invited) Democratizing Mechanobiology with Force Sensing Nucleic Acids**

Khalid Salaita, Emory University, USA

17:30 **CRISPR guide transducers: control of CRISPR activity through direct sensing of microRNA-argonaute complexes by dynamic RNA devices**

Antonio Garcia-Guerra, University of Oxford, UK

17:45 **Poster Session 5: flash presentations**

18:10 **Poster Session 5**

Chair: Andrew Ellington

Session 9: Chemical Tools for DNA Technology

19:05 **(Keynote) Directed evolution of xenobiotic nucleic acid processing enzymes: polymerases and ligases**

Vitor Pinheiro, KU Leuven, Belgium

19:45 **(Invited) Dynamic control of DNA condensates via strand displacement**

Elisa Franco, The University of California, Los Angeles, USA

20:10 **Guided Self-Assembly of Conductive Metal-Organic Filaments and Electrodes**

Eric Szmuc, University of Texas at Austin, USA

Thursday April 14

Chair: William Shih

Session 10: Computational Tools for Self-Assembly

14:00 **(Invited) Learning to grow: control of materials self-assembly using evolutionary reinforcement learning**

Stephen Whitelam, Lawrence Berkeley National Lab, USA

14:25 **Accelerated AFM characterization of DNA origami shape and properties via deep-learning-based image super-resolution**

Do-Nyun Kim, Seoul National University, South Korea

- 14:40 **Facilitating sharing, simulations, and design of DNA/RNA/protein nanostructures**
Erik Poppleton, Arizona State University, USA
- 14:55 **Break**
- Chair: Jeremiah Gassensmith**
Session 11: Integrated Chemical Systems
- 15:15 **(Invited) Supramolecular PEGylation as an Innovative Approach to Biopharmaceutical Delivery**
Eric Appel, Stanford University, USA
- 15:40 **Highly Ordered Arrays of Gold Nanorings Assembled on Tobacco Mosaic Virus Coat Protein**
Ismael Abu-Baker, McGill University, Canada
- 15:55 **(Invited) Functional Soft Materials via Host–Guest Interactions**
Matthew Webber, University of Notre Dame, USA
- 16:20 **Break**
- Chair: Andrew Turberfield**
Session 12: Molecular Machinery
- 16:40 **(Invited) Two-dimensional positioning and patterning with DNA origami printer devices**
Erik Benson, University of Oxford, UK
- 17:05 **Storing digital data on DNA via CRISPR mediated base editing**
Afsaneh Sadremomtaz, North Carolina Agricultural and Technical State University, USA
- 17:20 **(Invited) Structure and dynamics of active interface and active liquid-liquid phase separation**
Zvonimir Dogić, The University of California, Santa Barbara, USA
- 17:45 **Conference Close**