

Functional DNA Nanotechnology, 6-8 June 2018

Workshop Programme

Wednesday 6th June:

10:30- 12:00 **Registration**

12:00 - 12:10 **Opening**

12:10 - 12:40 **Invited Lecture:** Nadrian C. Seeman, New York University: "DNA: Not Merely the Secret of Life"

12:40 - 13:00 **O1:** Thomas Gerling, Technical University of Munich: "High-Symmetry DNA Objects and Methods to Increase their Structural Stability"

13:00 - 13:20 **O2:** Veikko Linko, Aalto University: "DNA Origami for Biophysical Devices"

13:20 - 13:40 **O3:** Lorenzo di Michele, University of Cambridge: "Highly porous responsive crystalline frameworks self-assembled from amphiphilic DNA nanostructures"

13:40 - 14:40 **Refreshments + poster session**

14:40 - 15:10 **Invited Lecture:** Ralf Jungmann, Max Planck Institute and LMU

15:10 - 15:30 **O4:** Barbara Saccà, University of Duisburg-Essen: "The role of the edges in the folding pathway of DNA origami"

15:30 - 15:50 **O5:** Alexis Vallée-Bélisle, University of Montreal: "Thermodynamics and kinetics of DNA switches and DNA assembly"

15:50 - 16:00 **Flash presentations** (2 minutes each x 5)

16:00 – 16:45 **Coffee Break + poster session**

16:45 - 17:15 **Invited Lecture:** Alexander A. Green, Arizona State University: "RNA Nanodevices for Biocomputing and Diagnostics"

17:15 - 17:25 **O6 (short):** Davide Mariottini, University of Rome, Tor Vergata: "Making order of DNA nanodevices through disorder"

17:25 - 17:35 **O7 (short):** Andrew J. Lee, University of Leeds: "Direct in situ observation of RecA mediated homologous recombination"

17:35 - 17:55 **O7:** Jonathan R. Burns, University College London: "Determining the Orientation of DNA Nanostructures in Membranes"

17:55 - 18:15 **O8:** Jonathan Doye, University of Oxford: "Mechanical properties of DNA nanostructures"

Thursday 7th June:

- 9:00 - 9:30 **Invited Lecture:** Hanadi Sleiman, McGill University
- 9:30 - 9:50 **O9:** Sébastien Bidault, PSL Research University (Paris): “DNA-templated plasmonic nanostructures to enhance single molecule fluorescence emission”
- 9:50 - 10:10 **O10:** Eyal Nir, Ben-Gurion University of the Negev: “Computer Controlled DNA Bipedal Walker that Perform Several Steps a Minute”
- 10:10 - 10:30 **O11:** Amelie Heuer-Jungemann, Ludwig-Maximilians-Universität: “Silica encapsulation of DNA Origami”
- 10:30 - 10:45 **Flash presentations** (2 minutes each x 5)
- 10:45 - 11:40 **Coffee break + poster session**
- 11:40 - 12:10 **Invited Lecture:** Tom de Greef, Technische Universiteit Eindhoven: “Programmable DNA-based Communication in Populations of Artificial Cells”
- 12:10 - 12:20 **O12 (short):** Christin Möser, University of Potsdam: “Using DNA nanostructures to present and potentiate peptides in an oligovalent manner”
- 12:20 - 12:30 **O13 (short):** Nayan Agarwal, Technische Universität Dresden: “Structural transformation of wireframe DNA Origami via DNA polymerase assisted gap-filling”
- 12:30 - 12:40 **O14 (short):** Emanuela Torelli, Newcastle University, “Isothermal folding of a light-up bio-orthogonal RNA origami nanoribbon”
- 12:40 - 12:50 **O15 (short):** Alexander Ohmann, University of Cambridge: “A synthetic DNA-built enzyme flips 107 lipids per second in biological membranes”
- 12:50 - 13:00 **O16 (short):** Erik Benson, Karolinska Institutet: “Evolutionary refinement of DNA nanostructures using coarse-grained molecular dynamics simulations”
- 13:00 - 14:00 **Lunch**
- 14:00 - 14:30 **Invited Lecture:** Andrew J. Turberfield, Oxford University: “Kinetic control of DNA hybridization reactions”
- 14:30 - 14:50 **O17:** Matteo Palma, Queen Mary University of London: “DNA-Programmed Assembly of Nanohybrids for Single-Molecule Investigations: from Optoelectronics and Sensing to Cancer Cell Adhesion”
- 14:50 - 15:10 **O18:** Naama Lahav, Weizmann Institute of Science: “Oligonucleotide-Small Molecule Conjugates as Tools for Programming Bacterial Behavior”
- 15:10 - 16:00 **Publishing presentations + discussion**
Invited publisher: Chiara Pastore, Associate Editor *Nature Nanotechnology*: “Publishing in Nature Nanotechnology”
Invited publisher: Julia Eckhoff, *Nature Communications*
- 16:00 - 17:00 **Coffee Break + informal discussion**
- 17:00 - 20:00 **Social programme (guided tour to the catacombs of San Callisto or bike tour of the Appian way)**
- 20:00 **Social dinner + Award Ceremony**

Friday 8th of June

9:00 - 9:30 **Invited Lecture:** Yannick Rondelez, CNRS, Paris, France: "DNA-programmable dissipative communities"

9:30 - 9:50 **019:** Irina Nesterova, Northern Illinois University: "Analytical power of DNA i-motif: pH and beyond"

9:50 - 10:10 **020:** Michael Mertig, Technische Universität Dresden: "DNA origami-based nanostructures in motion"

10:10 - 10:20 **021: (short):** Elena Ambrosetti, Karolinska Institutet: "Deciphering protein clusters at the cell membrane with DNA nanotechnology"

10:20 - 10:30 **022: (short):** Robert Oppenheimer, University of Oxford: "Architectures for DNA-templated chemical synthesis"

10:30 - 10:40 **023: (short):** Francesca Garbarino, Technical University of Denmark: "On-chip optomagnetic detection and discrimination of single base mutation in *Mycobacterium tuberculosis*"

10:40 - 10:50 **024: (short):** Andrea Idili, University of California Santa Barbara: "Continuous, real-time measurement of a cancer chemotherapeutic in a living body using electrochemical aptamer-based sensors and a novel drift correction approach"

10:50 - 11:00 **025: (short):** Turkan Bayrak, TU Dresden: "Functionalized DNA Origami Nanostructures for Molecular Electronics"

11:00 - 11:30 **Coffee break**

11:30 - 12:00 **Invited Lecture:** Ralf Seidel, Universität Leipzig: "DNA origami templated metal nanostructures"

12:00 - 12:20 **026:** Adrian Keller, Paderborn University: "Pharmacophore nanoarrays on DNA origami substrates as a single-molecule assay for fragment-based drug discovery"

12:20 - 12:40 **027:** Alessandro Desideri, University of Rome Tor Vergata: "Functionalized octahedral DNA nanocages for a targeted drug delivery"

12:40 - 13:00 **028:** Marco Todisco, University of Milan: "RNA supramolecular liquid-crystalline order catalyzes its own polymerization"

13:00 - 13:20 **029:** Andrew Houlton, Newcastle University: "A coordination chemistry approach to the assembly and functionalisation of DNA-based materials"

13:20 **Refreshments + closing remarks**

LIST OF POSTERS

- P1:** Abimbola. F. Adedeji, University of Udine: “Spatially-confined DNA-peptide conjugates for biomarker detection”
- P2:** Yasaman Ahmadi, AIT Austrian Institute of Technology GmbH: “Gene-therapy inspired polycation coating for protection of DNA origami nanostructures”
- P3:** Miguel Angel Aleman Garcia, Eindhoven University of Technology: “Unravelling the properties of hybrid DNA-Supramolecular Polymers”
- P4:** Omar Amjad, University of Cambridge: “Electrochemical Surface Impedance Spectroscopy of Adhering Lipid Vesicles: A Sensing Technology for the Quantification of Ligands”
- P5:** Shah Nawaz A. Baba, Indian Institute of Technology: “Aptamer Functionalised Nanomaterial for Detection of antibiotic resistant *Acinetobacter baumannii*”
- P6:** Alexandre Baccouche, University of Tokyo: “Kinetic study of CRISPR-Cas9 for dynamic DNA nanotechnology”
- P7:** Tom Bamford, Newcastle University: “Inkjet printing of DNA-based semiconducting nanowires”
- P8:** Marianne Bauer, Arnold Sommerfeld Center for Theoretical Physics: “Spatial clusters in two species systems”
- P9:** Tommaso Bellini, Università di Milano: “Network-forming DNA nanostars for the investigation of condensed matter physics”
- P10:** Alessandro Bertucci, University of Rome Tor Vergata: “Programmable DNA and RNA technologies for binding-responsive sensing of target biomolecules”
- P11:** Ryan Brady, University of Cambridge: “Flexibility defines structure in amphiphilic DNA crystals”
- P12:** Alessandro D’Urso, University of Catania: “Structure beyond sequences: miRNAs a rich variety of conformations”
- P13:** Elisa De Llano, Austrian Institute of Technology: “Adenita: A Software Toolkit for the Visualization and Modeling of DNA Nanostructures”
- P14:** Ankit Dodla, Indian Institute of Technology: “DNA Three Way Junction Assisted Controlled Immobilization Strategy”
- P15:** Emilien Dubuc, Eindhoven University of Technology: “Toward in vitro implementation of dCas9-based regulatory networks”
- P16:** Florian Engert, Leipzig University: “A Hierarchical Carrier System Based on DNA Nanostructures and Layer-by-Layer Microcarriers”
- P17:** Elise Y. Gayet, CNRS Paris: “Colorimetric monitoring of nanoscale actuation in DNA-templated plasmonic nanostructures”

P18: Marisa A. Goetzfried, Technical University Munich: “Introducing reversible hydrophobic and magnetic properties to DNA nanostructures using proteins”

P19: Seham Helmi, University of Oxford: “Towards DNA-Templated Molecular Electronic Devices”

P20: Stefan Howorka, University College London: “DNA Nanostructures that Target and Rupture Bacterial Membranes”

P21: Yike Huang, Aalto University School of Science: “DNA origami for circular dichroism-based sensing”

P22: Stephanie Hwu, ETH Zurich: “Biosensing based on weak molecular interactions”

P23: Federico Iacovelli, University of Rome “Tor Vergata”: “MD simulations capture the subtle structural features of a DNA origami nanovault”

P24: Heini Ijäs, University of Jyväskylä: “Hybrid DNA origami – protein devices as sensors and cellular transport vehicles”

P25: Alex Joesaar, Eindhoven University of Technology: “Programmable DNA-based Communication in Populations of Artificial Cells”

P26: Sofia Julin, Aalto University: “DNA Origami-Directed 3D Nanoparticle Superlattice”

P27: Adam M. Kabza, Texas A&M University: “Heterochiral DNA Nanotechnology”

P28: William Kaufhold, University of Cambridge: “Interfacing DNA Nanotech with Membranes to Optimize Detection”

P29: Dinesh C. Khara, Ilse Katz Institute for Nanoscale Science and Technology: “Experimental and Theoretical Study of DNA Bipedal Motor Walking Dynamics and Origami-based Force-clamp System”

P30: Charlotte Kielar, University of Paderborn: “Stability of DNA Origami Nanostructures in Low-Magnesium Buffers”

P31: Massimo Kube, Technische Universität München: “Cryo Electron Microscopy of DNA Origami Nanostructures”

P32: Hanh Luong La, Eindhoven University of Technology: “The knowledge evolution of DNA Nanoscience and DNA Nanotechnology: similarities, complementarities and differences”

P33: Roberta Lanfranco, University of Cambridge: “Use of multivalent interactions to achieve super-selective targeting in biological systems”

P34: Dominic Lauzon, Université de Montréal: “Thermodynamics and Kinetics of the Regulation and Self-Assembly of DNA Polymolecular Nanomachines”

P35: Ling Sum Liu, City University of Hong Kong: “ α -L-Threose Nucleic Acids as Biocompatible Antisense Oligonucleotides for Suppressing Gene Expression in Living Cells”

- P36:** Omer Lustgarten, Weizmann Institute of Science: “Asymmetric DNA Scaffolds and their Application as Combinatorial Sensors and Molecular Security Systems”
- P37:** Steven W. Magennis, University of Glasgow: “Sub - Ensemble Monitoring of DNA Strand Displacement Using Multiparameter Single - Molecule FRET”
- P38:** Anastasia Maslova, The Hong Kong University of Science and Technology: “Thiol-free oligonucleotide surface modification of gold nanoparticles for nanostructure assembly”
- P39:** Gabriel Antonio S. Minero, Technical University of Denmark: “Catalyzed hairpin assembly of magnetic nanoclusters with single nucleotide discrimination”
- P40:** Aboulfazl Mirzapoor, Tarbiat Modares University: “DNA and DNA like polymer based self-assembled and hierarchical nanostructures for biosensing”
- P41:** Andrea Miti, University of Bologna: “Dual amplification strategy triggered by triple helix probe for the detection of microRNAs”
- P42:** Ismael Mullor-Ruiz, Imperial College London: “Design and development of DNA-based synthetic push-pull networks”
- P43:** Behnam Najafi, University of Oxford: “Modelling the Folding Pathway of DNA Origami”
- P44:** Irina V. Nesterova, Northern Illinois University: “Quantitation without calibration: a new approach to nucleic acids’ measurement”
- P45:** Fernanda A. Pereira, Technische Universität München: “Photo-switchable artificial nucleosides for DNA origami machines”
- P46:** Caroline Rossi-Gendron, Ecole Normale Supérieure: “Photocontrol of DNA origamis melting and formation: towards light-controlled isothermal nanomachines”
- P47:** Fabian Schneider, Technische Universität München: “Resolving the Sequence of Events in the Folding of DNA Nanostructures”
- P48:** Boxuan Shen, University of Jyväskylä: “Plasmonic nanostructures through DNA-assisted lithography”
- P49:** Joell Spratt, University of Oxford: “DNA-Templated Assembly of the Bacterial Flagellar Motor’s Cytoplasmic Ring”
- P50:** Darko Stefanovic, University of New Mexico: “A Microsphere-Supported Lipid Bilayer Platform for DNA Reactions on a Fluid Surface”
- P51:** Yuki Suzuki, Tohoku University: “Complexing DNA origami frameworks through sequential self-assembly based on directed docking”
- P52:** Andrea Taladriz-Sender, University of Strathclyde: “Nucleic acid assembly mediated by the fluoros effect”
- P53:** Dick Yan Tam, City University of Hong Kong: “G-Quadruplex-Mediated Molecular Switching of Self-Assembled 3D DNA Nanocages”

P54: Saurabh Umrao, Indian Institute of Science: “Protein induced fluorescent enhancement based thrombin DNA aptasensor”

P55: Luka Vanjur, Università di Milano: “Strength and kinetics of DNA hybridization on a surface measured by Reflective Phantom Interface”

P56: Christoph Wälti, University of Leeds: “Direct Single-Molecule Observation of Mode and Geometry of RecA-Mediated Homology Search”

P57: Richard Weichelt, Technische Universität Dresden: “DNA-origami mediated self-assembly of nanoelectronic circuits”

P58: Jingjing Ye, Universität Leipzig: “Nano-electronic components built from DNA templates

P59: Tao Ye, University of California: Surface Seeded Self-assembly of DNA Nanostructures”

P60: Giuliano Zanchetta, Università di Milano: “Quantifying specific and non-specific interactions between proteins and DNA via an optical label-free technique based on reflectivity”

P61: Guichi Zhu, Université de Montréal: “Kinetically Programmed, One-Pot DNA Reactions for Molecular Detection Directly in Whole Blood”