Functional DNA Nanotechnology
25-27 May 2022
Workshop Programme

Wednesday 25th May:

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

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

12:10 - 12:40 **Invited Lecture (IL) 1**: Hao Yan "Designer Nucleic Acid Architectures for Programmable Self-assembly", Arizona State University, USA

12:40 - 12:55 **O1**: Enzo Kopperger "Engineering Electrically Driven DNA-Based Mechanisms" Technical University of Munich, Germany
12:55 - 13:10 **O2**: Anton Kuzyk, "DNA-origami-based plasmonic assemblies with tailored stimuli and optical responses", Aalto University, Finland
13:10 - 13:25 **O3**: Minke A.D. Nijenhuis, "Folding dsDNA using Triplex Forming Oligonucleotides", Aarhus University, Denmark

13:25 - 14:25 **Refreshments + poster session**

14:25 - 14:55 **IL2**: Laura Na Liu, "Dynamic plasmonic systems with controlled motion on the nanoscale", University of Stuttgart, Germany

14:55 - 15:10 **O4**: Haggai Shapira, "Development of a High-performance DNA Origami Rotary Motor, Monitored by Defocused Imaging of Gold Nanorods", Ben Gurion University of the Negev, Israel
15:10 - 15:25 **O5**: Damien Baigl, "Isothermal self-assembly of multicomponent and evolutive DNA nanostructures", Ecole Normale Supérieure (ENS), France
15:25- 15:40 **O6**: Iris Seitz, "Optically responsive protein coating of DNA origami for antigen targeting", Aalto University, Finland

15:40 – 15:50 **Flash presentations** (2 minutes each x 5)

15:50 – 16:30 **Tea Break + poster session**

16:30 - 17:00 **IL3**: Maartje M.C. Bastings, "Patterns in Biology: DNA-origami as nano-tool to control multivalent binding", École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

17:00 - 17:15 **O7:** Claudia Corti, "Hybrid gold-DNA origami nanostructures for colorimetric sensing", Institut Langevin - ESPCI-PSL , France
17:15 - 17:30 **O8:** Gregor Posnjak, "DNA-origami based diamond type lattice with visible wavelength periodicity", LMU Munich, Germany
17:30 - 17:45 **O9**: Casey M. Platnic, "A dissipative pathway for the structural evolution of DNA fibres", University of Cambridge, UK

17:45 - 18:00 **O10**: Alan Szalai, "Orientation of dsDNA relative to graphene determined by single-molecule fluorescence lifetime microscopy", Ludwig-Maximilians-Universität München (LMU), Germany

Thursday 26th May:

9:00 - 9:30 **IL4**: Itamar Willner, "Aptananozymes – A New Class of Aptamer-Modified Nanoparticles for Catalysis and Chemodynamic Medicine", The Hebrew University of Jerusalem, Israel

9:30 - 9:45 **O11**: Amelie Heuer-Jungemann, "New insights into the DNA origami silicification reaction mechanism by in situ small angle X-ray scattering", Max Planck Institute of Biochemistry, Martinsried, Germany
9:45 - 10:00 **O12:** Joel Spratt, "Tuning the insulin receptor signalling pathway response using insulin-DNA origami nanostructures", Karolinska Institute Stockholm, Sweden
10:00 - 10:15 **O13**: Felix J. Rizzuto,"DNA sequence and length dictate the assembly of nucleic acid block copolymers", School of Chemistry, University of New South Wales, Australia
10:15 - 10:30 **O14**: Michael Pinner, "A DNA-based artificial membrane budding system", Technical University of Munich, Germany

10:30 - 10:45 **Flash presentations** (2 minutes each x 5)

10:45 - 11:40 **Coffee break + poster session**

11:40 - 12:10 **IL5**: Lorenzo Di Michele, "A three-agent communication pathway triggered by bacterial metabolism (that uses DNA nanotechnology)", Imperial College London, UK

12:10 - 12:25 **O15:** Yongzheng Xing, "Designer DNA-based Membrane Nanopores for Portable Sensing of Diagnostic Proteins", University College London, UK
12:25 - 12:40 **O16:** Barbara Saccà, "Thermodynamic and kinetic properties of DNA-confined enzymes", University Duisburg-Essen, Essen, Germany
12:40 - 12:55 **O17:** Adrian Leathers, "Reaction-diffusion patterning of DNA-based artificial cells", University of Cambridge, UK
12:55 - 13:10 **O18:** Juliette Bucci, "Temporal control of DNA strand displacement reaction", University of Rome, Tor Vergata, Italy

13:10 - 14:10 **Lunch**

14:10 - 14:40 **IL6**: Elisa Franco, "Dynamic control of DNA condensates via strand displacement" University of California, Los Angeles, USA

14:40 - 14:55 **O19:** Alexander J. Speakman, "Electrically Directed Gene Expression (EDGE): using switchable DNA triplexes and electrolysis to modulate transcription in a cell-free medium", University of Edinburgh, UK
14:55 - 15:10 **O20:** Aleksandra Adamczyk, "Orienting single molecules in DNA origami constructs", University of Fribourg, Switzerland
15:10 - 15:25 **Flash presentations** (2 minutes each x 5)

15:25 - 15:40 Irene Ponzo, "switchSENSE and proFIRE - a DNA-based technology to discover molecular interactions and preparation of pure protein-DNA conjugates", Dynamic Biosensor, Germany

15:40 - 16:40 **Coffee Break + informal discussion**
16:40 - 20:00 **Social programme (tour to Nemi – lake and town)**
20:00 **Social dinner + Award Ceremony**

Friday 27th of May

9:00 - 9:30 **IL7:** Andreas Walther, "Metabolic DNA Systems Inspired from Life: Protocells and Systems with Lifecycles", University of Mainz, Germany

9:30 - 9:45 **O21:** Matteo Castronovo, "Enzymatic DNA ligation within two-dimensional DNA origami depends on nanostructure shape", University of Leeds, UK
9:45 – 10:00 **O22**: Alexis Vallée-Bélisle, "Bio-inspired DNA switches for sensing and drug delivery applications", University of Montreal, Canada
10:00 - 10:15 **O23**: Giovanni Nava, "Probing the conformational dynamics of long unstructured single stranded DNA chains", University of Milan, Italy
10:15 - 10:30 **O24**: Ioanna Smyrlaki, "DNA Origami nano-patterns as a Precise Tool to study clustering of Notch receptor" Karolinska Institute, Sweden
10:30 - 10:45 **O25**: Guillaume Gines, "DNA-enzyme neural networks enabling nonlinear concentration profile classification", Gulliver Laboratory,Université Paris Sciences et Lettres, France

10:45 - 11:30 **Coffee break**

11:30 - 11:45 **O26**: Christoph Wälti, "Counting individual molecules: DNA nanostructures for diagnostic applications", University of Leeds, UK
11:45 - 12:00 **O27**: Adrian Keller, "Hierarchical self-assembly of DNA origami lattices at solid-liquid interfaces", Paderborn University, Germany
12:00 - 12:15 **O28**: Rakesh Mukherjee, "Kinetic proofreading in a DNA strand displacement network", Imperial College London, UK

12:15- 12:45 **Award presentations + closing remarks**

13:00 **Light lunch**

Posters

P-1: **Adam Dorey**, University College London, “Synthetic protein-conductive membrane nanopores built with DNA” .

P-2: **Aleksandra Bednarz,** Aarhus University, “Ion-dependent structural integrity and reconfigurability of DNA origami nanostructures.

P-3: **Alessandro Cecconello,** University of Padova, “Regulating in vitro transcription using RNA/DNA triplex-based biosynthetic machineries”.

P-4: **Alexander M. Kloosterman,** Karolinska Institutet**, “**Spatial inference of barcoded transcripts from sequencing data”.

P-5: **Alexia Rottensteiner,** University College London (UCL), “A Light-Actuated DNA Channel for Controlled Transport Across Membranes”.

P-6: **Ali Khoshouei,** Technical University Munich, “CryoEM structure determination using DNA nanotechnology”.

P-7: **Ana Martins,** University of Porto, “Neuronal targeting with functionalized tetrahedral DNA nanostructures”.

P-8: **Andreas Peil**, University of Stuttgart; Max Planck Institute for Solid State Research, “DNA Assembly of Modular Components into a Rotary Nanodevice”.

P-9: **Andrew Stannard**, Imperial College London, “Mechanically-modulated toehold mediated strand displacement“.

P-10: **Annelies Dillen,** University of Leuven, “Duplexed aptamers on fiber optic surface plasmon resonance sensors: a winning combination for continuous biosensing”.

P-11: **Bhanu Kiran Pothineni,** Paderborn University, “Novel vancomycin-conjugated DNA origami-based nanoantibiotics” .

P-12: **Chalmers Chau,** University of Leeds, “Single biomarker detection with affimer conjugated DNA origami through solid-state nanopore”.

P-13: **Coline Kieffer**, Université Paris Sciences et Lettres, “Tunable-gain amplifier in DNA-enzyme reaction circuits and its applications in microRNA biosensing”.

P-14: **Wooli Bae**, University of Surrey, “Building an RNA-Based Toggle Switch Using Inhibitory RNA Aptamers”.

P-15: **Christoph Pauer**, Ludwig-Maximilians-Universität München (LMU), “Propulsion of magnetic beads asymmetrically covered with DNA Origami appendages”.

P-16: **Volodymyr Mykhailiuk,** Technical University Munich, “DNAzymes for mass production of DNA oligonucleotides”.

P-17: **Christopher Frank,** Technical University Munich, “Cell surface-mediated conformational changes of DNA-Origami objects“.

P-18: **Diana Morzy,** EPFL, Switzerland, “Valency and entropic costs determine the cation-mediated DNA/lipid binding”.

P-19: **Elena-Marie Willner,** Technical University Munich, “Virus neutralization using icosahedral DNA origami shells”.

P-20: **Elija Feigl,** Technical University Munich, “WaffleCraft: Fully Automated Blocky DNA Origami Design Tool”.

P-21: **Fabian Kohler,** Technical University of Munich, “Precision Design and Characterization of DNA Origami Corner Motifs using Cryo-EM”.

P-22: **Farah El Fakih,** Ecole Normale Supérieure, “Reversible Supra-Folding of User-Programmed Functional DNA Nanostructures on Fuzzy Cationic Substrates”.

P-23: **Florian Rothfischer,** Technical University of Munich/ Ludwig-Maximilians-Universität München, “Control of enzyme activity by a DNA nanoscale robotic arm”.

P-24: **Francesca Smith,** Imperial College London, “Characterisation of RNA/DNA hybrid strand displacement kinetics”.

P-25: **Gerrit Wilkens,** Jagiellonian University, Malopolska Centre of Biotechnology, “Blowing “bubbles” with DNA origami”.

P-26: **Giacomo Fabrini**, Imperial College London, “Cation-Responsive and Photocleavable Hydrogels from Noncanonical Amphiphilic DNA Nanostructure”.

P-27: **Viktorija Kozina,** Technical University Munich, “Targeting antigen patterns with programmable T-cell engagers”.

P-28: **Igor Baars,** Karolinska Institutet, “Spatial reconstruction using barcoded DNA sequences”.

P-29: **Jacky Loo,** Aalto University, “Colorimetric Visualization with Visible Chirality”.

P-30: **Jing Huang,** CENIDE and ZMB, University of Duisburg-Essen, “A DNA-confined unfoldase/protease nanomachine”.

P-31: **Viktorija Glembockyte**, LMU Munich, “Self-regeneration and self-healing in DNA nanostructures”.

P-32: **Nada Farag,** University of Rome Tor Vergata, “Programmable decoration of DNA-based scaffold through dynamic exchange of structural motifs”.

P-33: **Kevin Jahnke,** Max Planck Institute for Medical Research; Heidelberg University, Rational engineering of DNA cytoskeletons for synthetic cells”.

P-34: **Lena Stenke**, University Duisburg-Essen, Germany, “Dynamics of DNA origami filaments growth from a ditopic monomer”.

P-35: **Lorena Baranda**, University of Rome Tor Vergata, “Protein-Templated Reactions Using DNA-Antibody Conjugates”.

P-36: **Ulrich Kemper,** University of Leipzig, “DNA mold-based fabrication of palladium nanostructures”.

P-37: **Ludwig Rotsen**, Univ. Grenoble Alpes, “Substrate-assisted self-assembly of DNA origamis for lithographic applications”.

P-38: **James Vesenka,** University of New England and Leibniz-IPHT Biophotonics, “AFM analysis of G-wire DNA structure and nanoparticle decoration”.

P-39: **Marcel Hanke**, Paderborn University, “Salting-out of DNA Origami Nanostructures by Ammonium Sulfate”.

P-40: **Tania Patino**, University of Rome Tor Vergata, “Bioengineering DNA-based enzyme-powered nanoswimmers”.

P-41: **Sara Bracaglia**, University of Rome Tor Vergata, “Programmable cell-free transcriptional switches for antibodies detection”.

P-42: **Marcus Fletcher**, University of Cambridge, “G-Quadruplex DNA based fluorescent sensing for quantification of potassium ion flux across giant proteoliposomes”.

P-43: **Matthew Aquilina**, University of Edinburgh, “Multiplexed Label-Free Biomarker Detection by Targeted Disassembly of Variable-Length DNA Payload Chains”.

P-44: **Maximilian Nicolas Honemann,** Technical University of Munich, “A novel lattice design for scaffolded DNA origami structures”.

P-45: **Michal Walczak**, University of Cambridge, “Stimuli-responsive DNA particles underpin three-agent signaling networks with live bacteria and synthetic cells”.

P-46: **Daniela Sorrentino**, University of Rome Tor Vergata, “Allosteric regulation of DNA-based nanodevices using in vitro transcription”.

P-47: **Nathanv Wu**, University of Edinburgh, “A DNA Nanotechnology Assay to Detect Double-Stranded DNA for Medical Applications”.

P-48: **Nico Alleva,** Max-Planck Institute for Polymer Research, “Diverse, highly efficient grafting to strategy for the patterning of DNA-origami”.

P-49: **Richard Kosinski**, University of Duisburg-Essen, “The role of DNA nanostructures in the catalytic properties of an allosterically regulated protease”.

P-50: **Roger Rubio Sanchez**, Imperial College London, “A modular, dynamic, DNA-based platform for regulating cargo distribution and transport between lipid domains”.

P-51: **Sabrina Gambietz**, University Duisburg-Essen, Germany, “Thermal and mechanical properties of topologically identical origami domains at the ensemble and single-molecule level”.

P-52: **Sayantan De,** University Duisburg-Essen, Essen (Germany), “A DNA logic gate to sense molecular distances”.

P-53: **Seppe Driesen**, University of Leuven, “Towards DNA-only digital biosensing with DNA nanosensors”.

P-54: **Sergii Rudiuk**, Ecole Normale Supérieure, “DNA-protein nanogels as transfectable multienzymatic nanoreactors“.

P-55: **Sofia Julin**, Aalto University, “pH-Responsive DNA Origami Lattice”.

P-56: **Steffan Møller Sønderskov**, Aarhus University, “High-resolution surface charge density visualization of DNA nanostructures”.

P-57: **Serena Gentile,** University of Rome Tor Vergata, “Spontaneous reorganization of DNA-based polymers in higher ordered structures fueled by RNA”.

P-58: **Teun Huijben**, Technical University of Denmark, “Fast and exact reduction of mislocalizations near spherical nanoparticles by a fully analytical PSF”.

P-59: **Miguel Paez-Perez**, Imperial College London, “Effect of lipid composition on the efficiency of fusogenic DNA nanostructures”.

P-60: **Ken Sachenbacher,** Technical University Munich, “Triple-stranded DNA as a structural element in DNA origami”.

P-61: **Marco Lolaico,** Karolinska Institute, “Enhanced stiffness of wireframe DNA nanostructures with square lattice edges”.

P-62: **Neda Bagheri**, University of Rome Tor Vergata, “Enhancement of CRISPR/Cas12a trans-cleavage Activity Using Hairpin DNA Reporters”.