

# Self-Assembly of Guanosine Derivatives: From Biological Systems to Nanotechnological Applications

Universitätszentrum Obergurgl (Ötz Valley, near Innsbruck) • Austria

20-25 June 2009

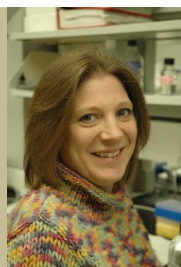
[www.esf.org/conferences/09289](http://www.esf.org/conferences/09289)

## Invited Speakers - Background & Research Interests

**Koji ARAKI** - University of Tokyo, Institute of Industrial Science, Dept. of Material and Live, JP  
**Lecture:** *How to design hydrogen bond-directed supramolecular materials of guanosine derivatives? An indirect approach toward supramolecular vesicles*  
Research Areas: Engineering - Industrial Chemistry, Industrial Organic Chemistry, Synthetic Chemistry; Interdisciplinary Area - Biological Chemistry, Biological Organic Chemistry  
Current Study Theme: Design of supramolecular systems; Artificial molecular transport systems; Organic photofunctional materials



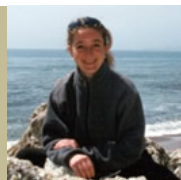
**Mihail BARBOIU** - Institut Européen des Membranes, Montpellier, FR  
**Lecture:** *Constitutional G-quadruplex self-assembly toward functional supramolecular materials*  
Research Scientist CNRS (CR1- SC - Section 16)  
Associate Professor University Politehnica of Bucharest  
Group Leader « Adaptive Supramolecular Nanosystems » NSA, Institut Européen des Membranes, Montpellier, France (IEM - ENSCM / UMII / CNRS 5635)  
Learn more from <http://www.iemm.univ-montp2.fr/IMG/pdf/CV2007EN.pdf>



**Paula BATES** - University of Louisville, School of Medicine, Department of Biochemistry and Molecular Biology, US  
**Lecture:** *G-quadruplex oligonucleotides as therapeutic agents*  
My laboratory is researching a novel class of guanosine-rich oligonucleotides that can inhibit proliferation and induce cell death in many types of cancer cells, whereas they have less effect on normal cells. One of these oligonucleotides (AGRO100, now known as AS1411) is currently being tested in human clinical trials. The G-rich oligonucleotides are capable of forming unusual structures known as G-quadruplexes and function as aptamers by binding to specific cellular proteins. Learn more from <http://louisville.edu/medschool/biochemistry/faculty-research/joint-and-associate-research/p-bates.html>



**Jeffery T. DAVIS** - University of Maryland, College Park, US  
**Lecture:** *Lipophilic G-Quadruplexes as Transmembrane Ion Transporters*  
Research Interests: Organic Chemistry, Bioorganic Chemistry, Self-Assembly, Molecular Recognition, Chirality.  
More about Davis Research Group at <http://www.chem.umd.edu/groups/davis/>



**Rosa DI FELICE** - Istituto Nazionale di Fisica della Materia, Modena, IT  
**Lecture:** *Theoretical simulation of guanin-rich DNA motifs*  
Research: Theoretical and computational condensed matter physics, with emphasis on ab-initio studies of solid surfaces and of bio/organic molecules interacting with the surfaces.  
More at <http://www.nanoscience.unimo.it/rosa.html> and <http://www.nanoscience.unimo.it/CVrosa.html>



**Alexander B. KOTLYAR** - Tel Aviv University, The George S. Wise  
Faculty of Life Sciences, Department of Biochemistry, IL

**Lecture:** *Synthesis of Long G4-DNA based Nanowires*

Research Interests: DNA-based Nanowires and Nanodevices

More at <http://www.tau.ac.il/lifesci/departments/biochem/members/kotlyar/kotlyar.html>



**Nancy MAIZELS** - University of Washington, Seattle, US

**Lecture:** *Dynamic G4 DNA in the Genome*

Professor, Immunology and Biochemistry; Director, Molecular Medicine Program

Research: B cells diversify the sequences and structure of their immunoglobulin genes, to respond dynamically to infection by pathogenic microorganisms, so these cells provide insights in real time and physiological contexts into mechanisms of DNA mutagenesis and repair in all cell types. We study these mechanisms in molecular and subcellular detail. Some projects focus on elucidating mutagenic pathways; others on harnessing natural mechanisms of mutagenesis to accelerate antibody evolution; and others on learning how alternative structures formed by G-rich regions (G4 DNA) contribute to genomic instability and cancer. We employ a great variety of experimental tools, spanning biochemistry, genetics and cell biology. Our research has defined new mechanisms of genomic instability leading to cancer, and generated new approaches to vector-free gene therapy.

More at <http://depts.washington.edu/immunweb/faculty/profiles/maizels.html>

**Jean-Louis MERGNY** - Muséum National d'Histoire Naturelle, Paris, FR

**Lecture:** *Quadruplexes. What else ?*

Nucleic acid Conformation, Telomere Structure and Telomerase inhibitors: the aim of this team is to characterize unusual nucleic acid motifs and to seek specific synthetic or natural ligands for different applications. With an historical experience regarding triple-helix and the i-motif, the team is now focusing mainly on G-quadruplexes as antitumoral or antiparasitic targets and tools for nanobiotechnology. The team is also trying to widen the G-quadruplex approach to RNA sequences. Using its solid knowledge in UV-visible spectrophotometry and fluorescence of nucleic acids, we are trying also to characterize new unusual nucleic acids structures as those adopted by trinucleotide repeats

More at <http://www.mnhn.fr/mnhn/bpy/team3.html>



**Stephen NEIDLE** - University of London, School of Pharmacy, UK

**Lecture:** *Quadruplex nucleic acids as drug targets*

Director of Cancer Research UK Biomolecular Structure Group

Director of the Centre for Cancer Medicines

Professor of Chemical Biology

Areas of Expertise: X-ray Crystallography, Drug-DNA Interactions, Rational Anticancer Drug Design, Nucleic Acid Structure, Chemical Biology of Nucleic Acids, Higher Education Management and Policy, Cancer Therapeutics, Molecular Modelling, and Computer-Aided Drug Design.

More at [http://www.pharmacy.ac.uk/stephen\\_neidle.html](http://www.pharmacy.ac.uk/stephen_neidle.html)



**Anh Tuan PHAN** - Nanyang Technological University, Singapore, SG

**Lecture:** *Structure and interaction of G- Quadruplexes*

Research Interests: We use a combination of physical, chemical and computational methods to investigate and manipulate properties of biomolecules. The research goals include:

- Structures, dynamics, interactions and functions of DNA, RNA and proteins.
- Noncanonical structures of DNA and RNA as molecular targets against diseases.
- Structural design and engineering of nucleic acids and proteins.
- Application and development of methods, including Nuclear Magnetic Resonance (NMR) and other spectroscopic techniques, as well as single-molecule manipulations, for the study of biomolecular structures and dynamics.

Learn more from <http://www3.ntu.edu.sg/home/PhanTuan/index.htm>



**Janez PLAVEC** - National Institute of Chemistry, Ljubljana, SI

**Lecture:** *Cation localization and movement studied by NMR*

Research Fields

- Studies of structure and conformational equilibria of nucleosides, nucleotides and oligomer fragments of nucleic acids in solution with the use of NMR spectroscopy.
- Studies of interaction of metal ions with nucleic acids and development of NMR methods for localization of cation binding sites in solution.
- Studies of structure of guanine-quadruplexes and folding of guanine rich DNA sequences.

More at <http://www.fkkt.uni-lj.si/en/?475>



**Danny PORATH** - The Hebrew University of Jerusalem, IL

**Lecture:** *tba*

Current Research Interests

- DNA, molecular biophysics
- Molecular electronics, single molecular wires and switches
- Mesoscopic physics, quantum transport
- Scanning probe microscopy
- Nanoscience and nanotechnology

More at [http://chem.ch.huji.ac.il/~porath/CV\\_brief%2029\\_9\\_01.html](http://chem.ch.huji.ac.il/~porath/CV_brief%2029_9_01.html)

**Antonio RANDAZZO** - Università degli Studi di Napoli, IT

**Lecture:** *G-quadruplex DNA: a new target for groove binding agents*

More at <http://www.unina.it/ateneo/organigramma/dettaqli.jsp?cod=10004>

**Ross RINALDI** - Università degli Studi di Lecce, IT

**Lecture:** *tba*

Ross Rinaldi graduated in Physics at the University of Bari (Italy) on July 1991. During her PhD she worked on the optical and electronic properties of semiconductor quantum wires. She joined the group of Prof. J. Ryan at Clarendon Laboratory of Oxford (U.K) for resonant Raman spectroscopy and time resolved spectroscopy experiments performed on Quantum Wire heterostructures in 1992 and 1993. She joined the group of Prof. Klitzing at Max Planck Institute of Stuttgart for resonant spectroscopy measurements on quantum wires heterostructures in 1992. She got her PhD in 1994. From 1994 she has been working at the Material Science Department of University of Lecce, where she build up the facility for the fabrication of low dimensional structures and photonic structures based on patterned materials. In May 1997 she was appointed lecturer in Condensed Matter Physics at the Material Science Department of the University of Lecce. In 1998 R.R. started a new research activity for the realization of optical devices and laser based on self-organized InGaAs quantum dots grown by MOCVD. She joined the new Department of Innovative Engineering (DIE) at the University of Lecce in 1999. She set up the new laboratory of UHV Scanning Tunnelling Microscopy and Scanning Tunnelling Spectroscopy at cryogenic temperatures at DIE. In January 2001 she was appointed Professor in Condensed Matter Physics at the department of Innovative Engineering of the University of Lecce. In 2001 she set up a Clean-Room for advanced nanoprocessing of materials and realization of nanostructures based on Electron Beam Lithography, Galvanic Electrodeposition of metals and Soft Lithographies. In the mean time she opened a new research line on nano-biotechnology and nano-bioelectronics. In 2002 she set up a small biology laboratory to handle proteins, DNA and cells. She is responsible of the "NANO-BIO-MOLECULAR ELECTRONICS & NANOBIO TECHNOLOGY" division at the NNL-INFN-Lecce. She was appointed full professor at ISUFI (International Institute for the Interdisciplinary University Formation on December 2006.



**Raphael RODRIGUEZ** - University of Cambridge, UK

**Lecture:** *Raphaine A Alters Shelterin Integrity and Triggers a DNA-Damage Response at Telomeres*

Postdoctoral Associate - Balasubramanian Group

More at <http://www.shankar.ch.cam.ac.uk/raphael.html>



**Paolo SAMORÌ** - Université Louis Pasteur, Strasbourg, FR

**Lecture:** *The nanochemistry of surfaces and interfaces: mastering the supramolecular approach*

Scientific activities:

- Materials Chemistry
- Nanochemistry e nanophysics of interfaces
- Hierarchical self-assembly of hybrid systems
- Nanoscale multifunctional structures
- Characterization of hybrid nanostructures with Scanning Force Microscopy and Scanning Tunnelling Microscopy based set-ups
- Scale dependent physico-chemical properties
- Nanofabrication and nanopatterning
- Study of the electronic structure of organic thin films with Photoelectron Spectroscopies
- Electronic properties and doping of organic thin films
- Charge transfer in conjugated molecular systems
- Fabrication supramolecular electronic devices, in particular nanowires
- Physical-chemistry phenomena of macromolecules at surfaces
- Fractals and surface roughness of organic thin films

More at <http://www.isof.cnr.it/ppage/samori/paolo1.htm>

**Naděžda ŠPAČKOVÁ** - Institute of Biophysics, Brno, CZ

**Lecture:** *tba*

More at <http://www.muni.cz/people/18512/teaching>

**Naoki SUGIMOTO** - Konan University, Kobe, JP

**Lecture:** *Development of Functional Nucleic Acids*

Field of Research: Biomolecular Chemistry, Nanobiotechnology

More at <http://www.konan-u.ac.jp/english/konan/science/chemistry.html>



**Mateus WEBBA DA SILVA** - University of Ulster, Coleraine, UK

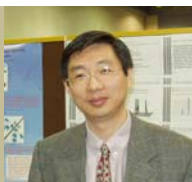
**Lecture:** *Control of Quadruplex Self-Assembly*

General interests in Nucleic Acids Structural & Chemical Biology. The principal research experimental tools employed are biomolecular NMR spectroscopy, nucleic acid chemistry, coupled with biochemical, cellular & molecular biology tools. Current areas of interest include:

- (i) Modulation of gene expression through guanine-rich regions;
- (ii) Design of nucleic acid architectures for biomedical and biotechnological applications.

More at <http://www.ulster.ac.uk/staff/mm.webba-da-silva.html> and

<http://www.genomics.ulster.ac.uk/-Dr-Mateus-Webba-Da-Silva-.html>



**Gang WU** - Queen's University, Kingston, CA

**Lecture:** *Guanosine 5'-Monophosphate Self-Assembly: 100 Years Later*

Our primary research interests are concerned with the development of nuclear magnetic resonance (NMR) techniques in studying molecular structure, dynamics, and chemical bonding in chemically and biologically important systems. Currently, we are focused on the development and application of NMR in the following major directions: (a) Oxygen-17 NMR as a new probe to study biological solids, (b) Direct detection of alkali metal ions in DNA, and (c) Cation transport through ion channels

More at <http://www.chem.queensu.ca/people/faculty/Wu/>