

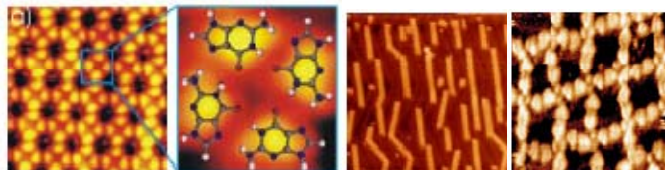
SONS Self-Organised NanoStructures

SONS are among the most innovative and challenging domains of basic nanoscience today a frontier field at the forefront of chemistry, physics, biology, medicine and material science. It encompasses a wide variety of self-assembling mechanisms and building blocks. SONS and single-molecule applications range from computer and communication technologies to molecular medicine, bioinformatic and molecular motors applications that have the potential to revolutionise every aspect of our lives

Research Focus

The projects undertaken within the SONS programme focus on the utilisation of supramolecular interactions and complementary nanotools for the synthesis and positioning of functional assemblies, macromolecules and nanoparticles. An essential focal point is the link of molecular scale processes and phenomena to macroscopic- electric, photonic, chemical-properties. This research field is a strong interdisciplinary combination of organic, macromolecular, polymer, supramolecular and inorganic chemistry and physics, with engineering from nano to mesoscopic length scale, theoretical modelling.

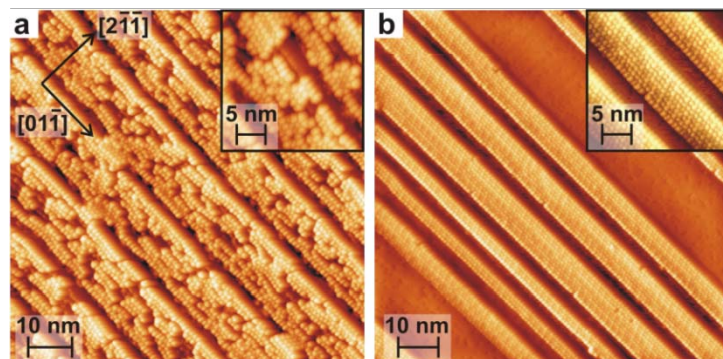
Ultimately, self-assembled nanostructures investigated in SONS projects will lead to applications in advanced technologies such as molecular opto-electronics, bio-sensors, data storage, bio-engineering with novel functionalities.



(a) G-quartet network on Au(111); (b) Molecular strings on Au(111); (c) Fe-coordinated nanospheres of diazobenzene

Funding organizations supporting SONS

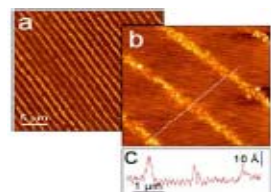
- Fonds zur Förderung der Wissenschaftlichen Forschungs (FWF), Austria
- Fonds National de la Recherche Scientific (FNRS), Belgium
- Fonds voor Wetenschappelijk Onderzoek (FWO), Belgium
- Forskningsradet for Natur og Univers (FNU), Denmark
- Suomen Akatemia (AKA), Finland
- Grantová agentura České Republiky (GACR), Czech Republic
- Commissariat à l'Energie Atomique / (CEA), France
- Deutsche Forschungsgemeinschaft (DFG), Germany
- Országos Tudományos Kutatási Alapprogramok (OTKA), Hungary
- Magyar Tudományos Akademia (MTA), Finland
- Enterprise Ireland, Ireland
- Consiglio Nazionale delle Ricerche (CNR), Italy
- Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), Netherlands
- Norges Forskningsrad (NF), Norway
- Polska Akademia Nauk (PAN), Poland
- Fundação para Ciencia e Tecnologia (FCT), Portugal
- Slovenska Akademia Vied, Slovak Republic
- Ministerio de Educación y Ciencia (MEC), Spain
- Vetenskapsradet (VR), Sweden
- Schweizerischer Nationalfonds zur Förderung der wissenschaftlichen Forschung (SNF), Switzerland
- Turkiye Bilimsel ve Teknolojik Kurum (TÜBİTAK), Turkey
- Engineering and Physical Sciences Research Council (EPSRC), United Kingdom



Constant-current STM images of 0.5 ML of C60 deposited at room temperature on Au(433) without (a) and with (b) subsequent annealing at $T = 500$ K for 15 min.

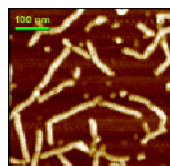
2006 EURYI Awardee

Dr. Massimiliano Cavallini is one of the winners of the 2006 EURYI Awards. He has been working on the FUN-SMARTs Project on the deposition of nanoscopic magnetic materials, which can be used for ultrahigh-density information storage.

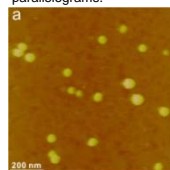


AFM images of nanostructured M12 molecules deposited on a polycarbonate film (PC)

Bridging the gap with Biology

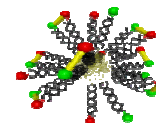


AFM image of self-assembled rigid rail-like DNA nanostructures made of DNA parallelograms.



SFM topographical image of DNA-block copolymer micelle (shown right)

BIONICS is investigating bio-organic hybrid architectures with nanometer sized dimensions using as scaffolds nucleic acids which are decorated with small organic molecules, dyes, oligomers and polymers. They have prepared a DNA nanomotor which is able to switch between two molecular conformations in response to an external stimulus. The nanomotor is based on a DNA conformational duplex-triplex transition, and it is triggered by changes in the pH.



Further information

Dr. Antonella Di Trapani
EUROCORES Programme Coordinator for SONS
Email: sons@esf.org
www.esf.org/sons