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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-008-BIONICS	Title: BIo-Organics NanostructurIng for molecular electroniCS (BIONICS) Abstract: This project will bring together molecular biology and chemistry to construct new hybrid bio-organic macromolecules and nanostructures based on DNA networks. Binding between two complementary DNA-strands is a flexible and programmable specific molecular recognition process that can be employed on a synthetic scale. Macromolecules, such as conjugated oligomers or dendrimers, can be synthesised to hav e reactive functionalisations at multiple locations and a defined spatial shape spanning from the nm to the ?m scale. We propose a rational protocol for the preparation of hybrid bio-organic building blocks serving as star-shaped “corner stones” in a DNA-based architecture. Control over the functional groups of the building blocks will enable programmed functional and structural changes to the assembled mesoscopic structures and will give access to planar or three-dimensional, linear, branched or reticulated structures. Space- and time-resolved fluorescence measurements on chromophore- containing architectures as well as scanning probe microscopy will grant insights into the physico-chemical properties of the building blocks and of the mesoscopic structures, necessary for the future development of new molecular (opto)electronic devices.	**Project Leader** Dr. Klaus Müllen Max Planck Institut für Polymerforschung Mainz Germany **Principal Investigator** Professor Roeland Johannes Maria Nolte University of Nijmegen Nijmegen Netherlands **Principal Investigator** Professor Bruno Samorì Università degli Studi di Bologna Bologna Italy **Principal Investigator** Dr. Paolo Samorì Istituto di Sintesi Organica e Fotoreattività Consiglio Nazionale delle Ricerche - Bologna Bologna Italy **Principal Investigator** Professor Frans C. de Schryver University of Leuven Heverlee Belgium **Principal Investigator** Professor Richard H. Friend University of Cambridge Cambridge United Kingdom

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-023-SISAM	Title: STRUCTURE ELUCIDATION OF SHEAR ORIENTED IONIC SELF-ASSEMBLED MATERIALS (SISAM) Abstract: Self-organization is a concept to render nanoscale structures. The structure formation tends to be local only, unless additional fields are applied to mutually align the structures and to suppress grain boundaries. In this proposal a multidisciplinary approach is presented to investigate the macroscopic shear alignment of highly ordered self-organised nano-structures synthesized via the ionic self-assembly (ISA) route. This synthesis route provides the possibility to organise a variety of functional molecules into nano-structures. Dynamic rheo-optical measurements are applied to gain insight about the orientation mechanisms. In-situ and ex-situ Small Angle X-ray scattering will be applied to elucidate fine structural details of such aligned systems. The three groups (with their respective backgrounds in physics, polymer physics and colloid chemistry) have been active in the field of self-organising nano-structures over the last few years and present a research team with a variety of skills and expertise centred on supramolecular materials. It is the aim of this collaborative research effort to combine these skills to obtain further insight into the build-up of useful macroscopic properties of nanostructured materials throughout the self-organisation process from the molecular level.	**Project Leader** Professor Markus Antonietti Max Planck Institute of Colloids and Interfaces Potsdam Germany **Principal Investigator** Dr. Charl Faul Max Planck Institute of Colloids and Interfaces Potsdam Germany **Principal Investigator** Professor Olli T. Ikkala Optics and Molecular Materials Helsinki Univeristy of Technology Espoo Finland **Principal Investigator** Professor Gerrit Ten Brinke University of Groningen Groningen Netherlands

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-029-NANO-SMAP	Title: NANOCHEMICAL PATTERNING COMBINING SELECTIVE MOLECULAR ASSEMBLY SYSTEMS AND COLLOIDAL LITHOGRAPHY (“NANO-SMAP”) Abstract: The proposed project “NANO-SMAP” addresses the site-specific spontaneous molecular organization of multifunctional molecules at oxide surfaces to produce geometrically defined surface patterns of biologically functional and specific (recognition) chemistry with feature dimensions of <100 nm, ultimately <10 nm. The project combines specific expertise of the project partners in four areas: a) the controlled assembly of colloidal nano-sized particles for the production of pre-patterned inorganic substrate surfaces by colloidal lithography; b) the synthesis and characterization of multifunctional alkane phosphates and poly(ethylene glycol)-grafted polyelectrolyte copolymers that selectively assemble on TiO_2 and SiO_2 surfaces, respectively; c) the production of surface patterns with interactive areas in a non-interactive background based on the selective molecular assembly systems alkane phosphates, PEG-copolymers and supported phospholipid lipid bilayers (SPB, from vesicles); and d) the testing of the resulting surface architectures in model bioassays related to biomaterial and biosensor applications. The project is expected to deliver a novel platform technology for the cost-effective production of biologically relevant nanoscale interface architectures based on a toolbox of molecular and colloidal systems with self-organizing properties.	**Project Leader** Professor Marcus Textor Oberflächentechnik (Lab for Surface Science and Technology) ETH Zurich Schlieren Switzerland **Principal Investigator** Professor Bengt Kasemo Chalmers University of Technology and Göteborg University Göteborg Sweden **Principal Investigator** Professor Alfons Van Blaaderen Debye Institute Utrecht University Utrecht Netherlands **Principal Investigator** Professor Hans-Jürgen P. Adler Institute for Macromolecular Chemistry and Textile Chemistry Dresden University of Technology Dresden Germany

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-035-SPANAS	Title: System for Photonic Adjustment of Nano-scale Aggregated Structures (SPANAS) Abstract: Aggregation of nano-scale structures has become a subject of strong interest because the research will eventually elucidate the fundamental issues on the forces that constitute arrays of particles as well as theories on self -assembly of materials, particularly of that of crystalline structures. Equally important is the study of nano-scale colloidal structures for practical applications that describe the mechanisms in photonic crystals, large array systems, switches, micro-fluidic processes and bio-chemical sensing devices. This can, in time, be the future of nano-scale hybrid processing systems and a prelude to photonic computing devices and sensing chips. The actual applications, however, are hampered by the lack of controllability of currently developed structures that are both spatially and temporally inflexible. In this project, we aim to develop techniques for the formation and dynamic control of nano-scale assembly and manipulation of particles. The techniques will be based on patented and recently demonstrated fully dynamic multiple-beam optical tweezers for the real-time and simultaneous manipulation and control of large arrays of particles. In addition angular alignment and rotation of birefringent particles can be enforced by the use of a patented parallel light polarisation encoding method.	**Project Leader** Professor Dag Hanstorp Göteborg University/Chalmers University of Technology Göteborg Sweden **Principal Investigator** Dr. Jesper Glückstad Risø National Laboratory Roskilde Denmark **Principal Investigator** Professor Stefan Sinzinger Fakultät für Maschinenbau Technische Universität Ilmenau Ilmenau Germany **Principal Investigator** Dr. Gordon Love University of Durham Durham United Kingdom

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-045-SSA-TMN	Title: (SUPRA)-SELF-ASSEMBLIES OF TRANSITION METAL NANOCLUSTERS (SSA-TMN) Abstract: A combined experimental and theoretical effort is undertaken to clarify the mechanisms of (1) nucleation and growth of transition metal nanoclusters from in situ vapor deposition on an oxide surface under UHV or synthesis using reverse micelles as nanoreactors, and (2) supra-organization of nanoparticles in super-lattices. Information on the basic metal-support, metal-ligand and nanoparticle-nanoparticle interactions is derived from calibrated experiments and theoretical calculations, and is used to build up appropriate potentials. These potentials are utilized in molecular dynamics simulations of the various growth processes under realistic conditions, from which a direct comparison with actual growth experiments is immediately possible. The aim is to achieve control over the size distribution and morphology of nanoparticles and super-lattices. Once the structural properties are elucidated, structure-property relationships will be investigated. For clusters supported on an oxide surface, the morphology and arrangement of the particle on the substrate will be correlated with the catalytic activity, while the control over nanocrystal ordering will allow one to investigate the influence of self-organization on the collective electronic transport, optical and magnetic properties.	**Project Leader** Dr. Alessandro Fortunelli Istituto per i Processi Chimico-Fisici (IPCF) CNR Pisa Italy **Principal Investigator** Dr. Riccardo Ferrando Università di Genova Genova Italy **Principal Investigator** Dr. Gilles Renaud CEA-Grenoble Grenoble France **Associated Group** Professor Marie-Paule Pileni Universite P. et M. Curie (Univ.Paris 6) Paris France **Associated Group** Dr. Claude R. Henry CRMC 2 - CNRS Marseille France

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-051-NANOSYN	Title: TAKING STEPS TOWARDS “MOLECTRONICS”: A VENTURE ENCOMPASSING NANOTECHNOLOGY AND SYNTHETIC METHODOLOGY (NANOSYN) Abstract: Our aim is to investigate electrical transport in (single) elaborate molecular systems, which are interfaced to the macroscopic world by electric leads. The rule of the technology game alw ays is “smaller, faster, better” and, consequently, it targets the nano-scale which is the level of supramolecular structures. So, we believe that the ability to design the electronic states of a molecular device using chemical techniques, together with the ability to measure individual molecules, will be important in molecular electronics and in the study of the physics of nanometer-scale systems. As an implication, the project encompasses the interdisciplinary areas of nanoelectronics and synthesis of molecular nanostructures. Our challenging and creative project will: • Address major fundamental problems in nanoelectronics, molecular electron transport and magnetism to take molecular nanoelectronics (molectronics) into a realm beyond current silicon-based technology; • Develop and sustain strong links between expertise for chemical synthetic methodology and physics of nanotechnology.	**Project Leader** Professor Silvio Decurtins Universität Bern Bern Switzerland **Principal Investigator** Professor Jan Becher University of Southern Denmark Odense Denmark **Principal Investigator** Professor Martin Nazario Facultad de Química Universidad Complutense Madrid Spain **Principal Investigator** Professor M. Bryce University of Durham Durham United Kingdom **Principal Investigator** Professor Christian Schönenberger Institute of Physics University of Basel Basel Switzerland **Collaborator** Dr. Dirk M. Guldi University of Notre Dame Notre Dame United States **Collaborator** Dr. Lahcène Ouahab Institut de Chimie Université de Rennes 1 Rennes France

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ESF Reference	Project Title Abstract	Convenor Type

02-PE-SONS-055-SASMEC	Title: Single-Atom And Single-Molecule Electronic Components (SASMEC) Abstract: We will study atomic chains and molecular junctions both experimentally and theoretically. The experimental characterisation will be done at low temperatures using scanning tunneling microscopes (STM) and mechanically controllable break junctions (MCBJ). Firstly, we will study the single-atom chains which self-assemble during rupture of certain metals, paying attention to the formation mechanisms, structure, stability, dissipation and heat conduction, coupling of mechanical and electrical properties, influence of adsorbates on transport and hybrid chains. Secondly, we will study very simple individual molecules chemically bonded to the electrodes to form reliable, reproducible junctions. The molecule-electrode system will be characterised by vibrational spectroscopy, and attention will be given to the influence of the state of strain on transport properties. Theoretically, the structure and stability of atomic chains and molecular junctions will be investigated by density functional theory (DFT) techniques. The atomic structure of the electrodes will be taken into account explicitly, which will make possible to predict bonding configurations, atomic structure and transport properties of the systems. The electric properties in the presence of a strong non-equilibrium bias voltage will be studied using a self-consistent DFT method, which will allow direct comparison with the experiments.	**Project Leader** Professor Nicolás Agraït Universidad Autonoma de Madrid Madrid Spain **Principal Investigator** Professor Jan van Ruitenbeek Leiden University Leiden Netherlands **Principal Investigator** Professor Mads Brandbyge Technical University of Denmark (DTU) Lyngby Denmark **Principal Investigator** Dr. Marisela Vélez Facultad de Ciencias C-XVI Universidad Autónoma de Madrid Madrid Spain **Associated Group** Professor Karsten Wedel Jacobsen Technical University of Denmark Lyngby Denmark

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-063-NOMSAN	Title: NOVEL OPTICAL METHODS FOR SELF ASSEMBLED NANOSTRUCTURES (NOMSAN) Abstract: Optical tweezers offer an exciting non-invasive method for manipulating micron-sized particles with very high precision. The current proposal seeks to significantly enhance the optical toolkit and enable researchers the ability to assemble and study large arrays of tweezed particles in pre-described geometries, especially looking at creating sub-micron (nano) structures. The methodology will build upon the established expertise of both St Andrews and Barcelona on using novel light beam geometries and optical holography and diffractive optic technology to realise this end goal. We will tailor the light beam geometries to realise extended three-dimensional crystalline arrays of particles that will serve as testbeds for studying the generation of photonic bandgap crystals and other systems. We will investigate theoretically and experimentally the photonic crystal properties of the three-dimensional microstructures and nanostructures fabricated. We will also investigate the simultaneous shaping of the light beams into the desired distributions and its all-optical frequency-conversion in nonlinear crystals, with the aim to generate complex three-dimensional structures by wavelength-optimized photopolymerization of suitable materials. Additionally we will develop arrays of particles for enhanced bio-engineering studies: organ and tissue growth on systems can be implemented using this technology.	**Project Leader** Dr. Kishan Dholakia School of Physics and Astronomy University of St Andrews Fife United Kingdom **Principal Investigator** Professor Lluis Torner Institute of Photonic Sciences Barcelona Spain

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-064-SPENSA	Title: Surfactant-PolyElectrolyte Nanostructure Self-Assembly (SPENSA) Abstract: We propose to study nanoscale self-assembly in two systems. Both use surfactant micelles as a template structure to hierarchically order polyelectrolytes on several length scales. In the first system, the polyelectrolyte forms from polymerizing inorganic monomers. These interact with surfactant micelles to form well-organised nanoscale channels containing micelles encapsulated in the inorganic material. This system not only self-assembles at the nanoscale but forms emergent structures such as thin films at the air/water interface. The second system involves interactions between branched polyelectrolytes with surfactants of the same charge. We have shown that such systems also produce a thin organized film at the solution surface. Theoretical methods will aid in understanding mechanisms of self-assembly for both systems. Results from the like-charged polyelectrolyte-surfactant system will help to understand the more complex inorganic-surfactant self-assembly. Such an understanding is important to optimise & control the structure of materials from these systems. We will use the nanoscale architecture of the silicate system to investigate the effects of confinement on single stranded DNA and on the renaturation reaction.	**Project Leader** Dr. Karen Edler University of Bath Bath United Kingdom **Principal Investigator** Dr. Jean-Louis Sikorav CEA Saclay Gif-sur-Yvette France

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-070-FUN-SMARTs	Title: Assembly and Manipulation of Functional Supramolecular Nano-Architectures at surfaces (FUN-SMARTs) Abstract: The objective of the proposed studies is the investigation and deliberate steering of supramolecular self-organization using complex molecules at well-defined substrates for the fabrication of functional nanostructures. The underlying molecular self-assembly will exploit different non-covalent interactions (metal coordination, hydrogen bonding, donor–acceptor interactions) which are directly characterized at the single-molecule level by means of scanning tunneling microscopy techniques. In particular, we shall employ appropriately designed molecular building blocks for the modular construction of functional architectures and nanostructures from organic species and metal atoms at surfaces. Alternatively, the fabrication of nanostructures across multiple length scales will be pursued by directing the self-assembly by pre-patterned motifs. The envisaged functionalities comprise molecular magnetism, selective host-guest interactions and new concepts of molecular motion and conformational changes. In addition, the self-assembly of biomolecules will be investigated. Theoretical model calculations will be performed in order to obtain a comprehensive understanding of molecular recognition and self-assembly at surfaces and to guide the development of suitable design strategies towards novel supramolecular nanosystems. The synergetic combination of expertise in supramolecular chemistry, nanoscale physical science and computational modeling will open new pathways for the fabrication of functional molecular nanosystems.	**Project Leader** Dr. Mario Ruben Institut für Nanotechnologie Forschungszentrum Karlsruhe Karlsruhe Germany **Principal Investigator** Professor Flemming Besenbacher Institute of Physics & Astronomy University of Aarhus Aarhus Denmark **Principal Investigator** Professor Bjørk Hammer Institute of Physics and Astronomy Aarhus University Aarhus Denmark **Principal Investigator** Professor Jaume Veciana Miro CSIC Cerdanyola del Valles Spain **Principal Investigator** Dr. Fabio Biscarini Istituto per lo Studio dei Materiali Nanostrutturati (ISMN) CNR Bologna Italy **Principal Investigator** Professor Harald Brune Faculty for Basic Sciences Ecole Polytechnique Federale de Lausanne Lausanne Switzerland **Principal Investigator** Dr. Johannes Barth Institut de Physique des Nanostructures (IPN) Ecole Polytechnique Federale de Lausanne Lausanne Switzerland **Principal Investigator** Professor Klaus Kern Max-Planck-Institut für Festkörperforschung Stuttgart Germany

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		Principal Investigator Dr. Menko Alexander Schneider Max-Planck-Institut für Festkörperforschung Stuttgart Germany
		Principal Investigator Dr. Alessandro De Vita Università di Trieste Trieste Italy
		Principal Investigator Dr. Maria Mercedes Crego-Calama MESA- Research Institute Universiteit Twente Enschede Netherlands
		Principal Investigator Professor David Nicolaas Reinhoudt Universiteit Twente Enschede Netherlands

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-092-NEDSPE	Title: Nanoscale electronic devices via templating supramolecular polyelectrolytes (NEDSPE) Abstract: The project deals with the development of single molecule templating strategy for the fabrication of nanobjects with dedicated shape, size and properties on the base of synthetic polyelectrolytes (PE). Nanowireswill be produced via deposition of metal clusters onto the PE molecules in an extended conformation. Conductive-semiconductive nanocomposites will be fabricated by metallization of block copolymers which consist of PE and electroconductive polymer fragments. We plan to develop multiple templating methodology at the single molecule level to built up complicated structures by sequential deposition of different materials onto the same template. Control of PE molecule conformation, metal deposition, morphology and structure of the obtained nanoobjects will be performed using AFM, TEM and XPS methods of investigations. Positioning and addressing of the nanoobjects will be performed via selective adsorption of PE molecules on patterned substrates. We plan to study electron transport in the developed nanodevices.	**Project Leader** Professor Manfred Stamm Institut für Polymerforschung Dresden Germany **Principal Investigator** Dr. Sergiy Minko Institut für Polymerforschung Dresden Dresden Germany **Principal Investigator** Dr. Jean-François Gohy Université de Liège Liège Belgium **Principal Investigator** Professor Robert Jerome Université de Liège Liège Belgium **Principal Investigator** Dr. Vojislav Krstic MPI/FKF - CNRS Grenoble France

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-112-AMPHI	Title: SELF-ORGANIZED AMPHIPHILIC BLOCK COPOLYMER NANOSTRUCTURES (AMPHI) Abstract: Electrolyte polymer membranes are widely studied materials because of their extensive electrochemical applications in separation processes, energy storage and in fuel cells. Their main feature as a membrane is to separate physically two compartments, having different chemical reactions, with good mechanical properties and to allow an ionic transport between both parts. Usually, the structure of the membrane is more or less random or disordered on the microscopic scale. Yet, it is the (ionic and solvent) transport properties on these scales that ultimately determine the applicability of the membrane for the given purpose and clearly materials with regular nanoscopic structure are likely to have superior properties. In order to generate membrane materials with regular (ordered) and controlled structure, we propose to make use of existing knowledge, including our own experience, of self-ordering of hydrophobic diblock and triblock copolymers and extend the research to combinations of hydrophobic and hydrophilic blocks. We intend to investigate conditions under which ordered morphologies with different symmetries can be created as a function of polymer type, length and compositions and properties of such materials when swollen with water or an electrolyte. Nanoscale structured block copolymers with either Li+ affinity or proton exchange group will be investigated in order to study model compounds for membranes used in fuel cells or batteries.	**Project Leader** Mr. Petr Stepanek Institute of Macromolecular Chemistry Academy of Sciences of the Czech Republic Praha Czech Republic **Principal Investigator** Dr. Olivier Diat CEA-Grenoble Grenoble France **Associated Group** Professor Frédéric Nallet CNRS Pessac France

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-126-MOL-VIC	Title: One-dimensional molecular self-assembly on vicinal surfaces (MOL-VIC) Abstract: Molecular structures in the nanometer range exhibit an enormous potential for applications in future electronic data storage and processing devices. Such structures are particularly interesting when created through the process of self-assembly on suitable substrates. Vicinal surfaces are ideally suited as patterned templates for the mass fabrication of one-dimensional structures on the nanometer scale, where conventional lithographic techniques are no longer feasible or affordable. Vicinal surfaces display a two-fold symmetric morphology and, consequently, a complete anisotropy of all physical properties that is retained upon atom or molecule adsorption and thin-film growth. Furthermore, one-dimensional patterns of steps, facets and atomic rows with periodicities on a scale of 1 nm to 100 nm can be produced. We will utilize this unique opportunity to prepare templates for parallel molecular assembly of periodic structures. We combine the expertise of participating groups in nanostructured template preparation (Ortega, Michel), molecule synthesis (Gourdon) and assembly on surfaces (Berndt), in-situ molecule manipulation and spectroscopy (Berndt), electronic structure characterization (Horn, Ortega, Michel), and theoretical calculations (Joachim) to provide the scientific basis for the production of customized molecular assemblies.	**Project Leader** Dr. Jose Enrique Ortega Universidad del Pais Vasco San Sebastian Spain **Principal Investigator** Professor Richard Berndt Institut für Experimentelle und Angewandte Physik Christian-Albrechts-Universität Kiel Kiel Germany **Principal Investigator** Professor Enrique Garcia Michel Universidad Autonoma de Madrid Madrid Spain **Principal Investigator** Professor Karsten Horn Fritz Haber Institut Max Planck Gesellschaft Berlin Germany **Associated Group** Dr. Christian Joachim CEMES - CNRS Toulouse France **Associated Group** Dr. André Gourdon CEMES, CNRS UP 8011 Toulouse France

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-130-NETSOMA	Title: Nanoscale Electrical Transport in Self-Organized Molecular Assemblies (NETSOMA) Abstract: The project is focussed on exploring new electronic and optical phenomena arising in well-defined nanoscopic self-assemblies of bi-functional conjugated block copolymers. The proposal brings together four internationally leading groups with complementary expertise in conjugated polymer synthesis, polymer processing, structural characterization of polymers and conjugated polymer device fabrication and device physics. Within this highly interdisciplinary and collaborative program the partners will design, prepare, process, and characterize electrically, optically and structurally novel conjugated block copolymer architectures and self-assembled supramolecular block copolymers, and incorporate them into novel nanoscale electronic devices. We regard conjugated block copolymers as an ideal model system to study some of the fundamental interactions that control molecular self-assembly as well as to achieve sufficient control over the length scales and degree of self-organisation such that controlled electrical transport measurements and optical characterization can be performed to study the electronic and optical properties of such molecular nanoscale assemblies.	**Project Leader** Dr. Henning Sirringhaus University of Cambridge Cambridge United Kingdom **Principal Investigator** Professor Richard H. Friend University of Cambridge Cambridge United Kingdom **Principal Investigator** Professor Rene A.J. Janssen Faculteit Scheikundige Technologie Eindhoven University of Technology Eindhoven Netherlands **Principal Investigator** Professor Egbert Meijer Eindhoven University of Technology Eindhoven Netherlands **Principal Investigator** Dr. Martin M. Nielsen Risoe National Laboratory Roskilde Denmark **Principal Investigator** Dr. Klaus Bechgaard Risø National Laboratory Roskilde Denmark **Principal Investigator** Professor Paul Smith ETH-Zürich Zürich Switzerland

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ESF Reference	Project Title Abstract	Convenor Type
02-PE-SONS-136-SALDSON	Title: Self-Assembled Low-Dimensional Semiconductor Nanostructures (SALDSON) Abstract: This project will address the understanding and the demonstration of low-dimensional self-assembled quantum nanostructures obtained by organometallic chemical vapour deposition on patterned, nonplanar surfaces. The objective is to develop high quality, self-assembled quantum wire and quantum dot systems (single elements and arrays) with well-controlled positioning, dimensions, composition, and electronic spectrum. This will be achieved through the control of the surface chemical potential and hence the processes of transport and deposition of adatoms on a nonplanar surface via capillarity, strain and entropy of mixing effects. The experimental approach will include surface pattern preparation using nanolithography, monolayer-controlled epitaxial growth and structural studies using electron and scanning probe microscopy. Modelling of the self-assembly process will be implemented using advanced analytical models and numerical simulations. Optical spectroscopy will be used to evaluate the electronic structure of the obtained wires and dots, and the results will be compared with model simulations based on the structural measurements and modelling. The project is expected to yield better insight into seeded self-ordering phenomena and their application in useful nanosystems.	**Project Leader** Professor Eli Kapon Institute of Quantum Electronics and Photonics Swiss Federal Institute of Technology (EPFL) Lausanne Switzerland **Principal Investigator** Dr. Dimitri D. Vvedensky Imperial College London United Kingdom

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ESF Reference	Project Title Abstract	Convenor Type

02-PE-SONS-JA016-SONS-AMPHI	Title: Higher Levels of Self-Assembly of Ionic Amphiphilic Copolymers: Strategies Based on Multiple Molecular Interactions (SONS-AMPHI) Abstract: We propose to study the hierarchical self-assembly of ionic/non-ionic amphiphilic mac-romolecules driven by multiple types of interactions both in aqueous solution and at interfaces. The spectrum of molecular architectures will range from simple linear struc-tures (e.g., block copolymers) to branched structures (e.g. graft copolymers) and more complex nanoparticles (core-shell and Janus type).We aim to understand how self-organization, the resulting structures and interfacial patterns are controlled by the inter-play of macromolecular architecture of building blocks with different types and ranges of competing interactions, particularly hydrophobic and electrostatic interactions. Our ultimate goal is to create systems that can self-assemble in a hierarchical way. The present project will explore possible approaches in this challenging direction. The ex-pertise of the participating groups (advanced synthetic techniques, a wide range of experimental characterization methods and the combination of analytical and computa-tional theoretical modeling) is strongly complementary and their coordinated efforts will lead to a new level of understanding of self-organization of amphiphilic macromolecular systems.	**Project Leader** Professor Axel Müller Universität Bayreuth Bayreuth Germany **Principal Investigator** Dr. Helmut Schlaad Max Planck Institute of Colloids and Interfaces (MPI-KGF) Golm Germany **Principal Investigator** Professor Matthias Ballauff Polymer-Institut Universität Karlsruhe Karlsruhe Germany **Principal Investigator** Professor Gerhard Findenegg Technische Universität Berlin Berlin Germany **Principal Investigator** Professor Martinus Abraham Cohen Stuart Wageningen University Wageningen Netherlands **Principal Investigator** Dr. Mohamed Daoud CEA-Saclay Gif-sur-Yvette France **Principal Investigator** Dr. Avraham Halperin CEA-Grenoble Grenoble France **Associated Group** Dr. Claudine Williams Collège de France CNRS Paris France **Associated Group** Dr. Günter Reiter Institut de Chimie des Surfaces et Interfaces Mulhouse France