

SONS 2 Review Panel

Consensus Report

Strasbourg, 24 September 2010

The programme of Self-Organised Nanostructure (SONS2) has been very successful in bringing together world-class research groups and in producing high level and innovative scientific achievements.

There was excellent progress throughout the three years achieving a substantial amount of the original proposed objectives. Major publications appeared in high quality journals, and numerous invited lectures were given at international conferences during the duration of the programme. Networking activities played an important role in facilitating a high number of common publications, improving information sharing, and organising many symposia. The Review Panel also noted six patent applications.

The seven Collaborative Research Projects (CRPs) covered a broad range of scientific topics within the area of supramolecular approaches to functional materials. They brought together interdisciplinary skills of synthetic, physical and theoretical chemists, biologists, and physicists. The main achievements, both in the fundamental and applied fields, are at the forefront of current activities in self-organised nanostructured systems.

1. Specific scientific achievements

The CRPs were successful in realising several internationally-competitive breakthroughs. Notable examples, with potential for interesting future applications, include:

- Achievement of a spatial structural elucidation of disordered coordination architecture using STM for probing the pertaining molecular-level arrangement and revealing the divergent assembly of random string networks on planar surfaces.
 - Realisation of a pre-programmed control over the inter-chromophore interactions making use of macromolecular scaffolds in order to control the position of functional units
 - Development of a new technological platform by the combination of polymer science with biotechnology and biological engineering, in particular bio-functional homopolymers and copolymers.
 - Devise of new self-assembly strategies in order to design fine-structured magnetic architectures by controlled modification of the magnetic anisotropy in molecular arrays.
 - Synthesis of super- and supramolecular systems which are formed by deploying a nanoparticle as a central scaffold and surrounding it with a coat of liquid crystals.
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- Induced charge separation and recombination in self-organized nanostructured donor-acceptor block copolymer films reducing losses in solid state dye sensitized solar cells.
- Design of space-partitioned mesostructures with various periodicities and discovery of critical order-disorder transitions between multicolor and monochrome tilings in liquid crystals.

2. Networking, training and dissemination

Self-organisation in nanoscience and nanotechnology is a broad and worldwide rapidly developing field of research. Efficient networking, training and dissemination of results are vital to maintain momentum and to avoid duplication of activities. The many achievements of the CRPs were possible through extensive exchanges, sharing of resources and complementary expertise.

Networking in the CRPs was generally excellent and well organised by sharing experimental resources and theoretical expertises, or by promoting interactions between chemists and physicists. Knowledge, sometimes between CRPs, was also shared by progress meetings, brain storming sessions, joint experiments, organisation of symposia and workshops. The involvement of early stage researchers confirms the importance of networking, although there are differences between CRPs.

An overview of the networking activities organised in the framework of the SONS2 programme is given in the Table.

SONS 2 Type of Network Activity	Title of Event	Dates	Place	Co-organisation CRPs	Participation CRPs
Symposium	Frontiers of Chemistry	21/05/2010	Paris, France		All CRPs
Workshop	Functional Multiscale Architectures	05-07/05/2010	Bologna, Italy	SUPRAMATES, FunSMARTs II	
Conference	SONS2 Final Conference	19-21/10/2009	Prague, Czech Republic	All CRPs	All participants members of SONS 2 CRPs
Symposium	SONS2 Functional Materials for Organic Electronics and Nanotechnology, ICAM Conference	20-25/09/2009	Rio de Janeiro, Brazil	All CRPs	Invited talks
Meeting	EUROCORES SONS2 Meeting	07/2009	Falenty, Poland	SCALES	
School	Nanostructures in Spintronics	03/2009	Jülich, Germany	SANMAG	
Conference	SONS 2 Session during the MRS Fall Conference	01-05/12/2008	Boston, USA	All CRPs	
School	First European School in Molecular Nanoscience	10/2008	Valencia, Spain	SOHYD	
Workshop	Magnetism at Surfaces	28/09/2008- 01/10/2008	Baden-Baden, Germany	FunSMARTs II, SANMAG, LC-NANOP	
Symposium	Self Organised Nano-structures in Liquid Crystals	15-18/09/2008	Cetraro, Italy	SCALES, LC-NANOP	Participants from 6 CRPs
Symposium	SONS2 Symposium at the EMRS Spring Meeting 2008 - Functional Supramolecular Architectures for Organic Electronics and Nanotechnology	26-30/05/2008	Strasbourg, France	FunSMARTs II; SUPRAMATES	SANMAG; SOHYD

School	Supramolecular and Plastic Electronics	04/2008	Stresa, Italy	SUPRAMATES	
Workshop	EUROCORES Workshop on Self-Organised NanoStructures (SONS2) at the EMRS Spring Meeting 2007	31/05/2007-01/06/2007	Strasbourg, France	FunSMARTs II	
Workshop	EUROCORES-SONS 2 Workshop - Molecular Nanoelectronics	03/2007	Veilbronn, Germany	FunSMARTs II, SUPRAMATES	

Training activities were generally very good, with PhD students and postdoctoral researchers benefitting from the opportunities to visit other groups in the CRP and to attend conferences, workshops, and training schools organised both within and outside the SONS2 programme.

Dissemination of the research results varied from very good up to excellent. It was naturally variable in nature as might be expected from very diverse projects that are mainly fundamental oriented. Researchers targeted high impact journals and gave an impressive number of invited talks and conference presentations.

The recipients of dissemination should also include a wider audience for the public understanding of science and technology, but this was seldom the case. There were only a few examples where the excitement of the research activities was presented to a general audience through press releases, TV appearances, and popular scientific communications. More of these outreach activities should be activated and would be welcome if the CRP intends to gain and maintain the support of the European taxpayers.

In summary, the collaborative SONS2 activities had a significant impact on the fundamental research activities of Self-Organised Nanostructures and stimulated follow-up collaborations and projects.

3. Realisation of the SONS2 programme's potential

The EUROCORES SONS2 programme has stimulated much activity among the project partners. The impact on the various research domains, in view of the relatively modest funding level, was very positive, initiating many innovative ideas. A well organised and focused programme such as SONS2 succeeded in making a significant contribution to the European research portfolio.

Enhanced interaction and pooling of resources

Very important is the activation of collaboration between the partners within the CRPs, combining theoretical and experimental research in order to lay the foundations for new nanostructured functional systems.

In general, all participants made excellent use of the SONS2 programme which had a very positive impact on the various topical domains under examination. There was a variation in the level of collaboration within each CRP. The Review Panel noted excellent interaction activities in the CRPs FunSMARTs II, SUPRAMATES, SOHYD and SCALES, which contributed much to their scientific success.

The programme enabled different communities, each with their own expertise, to pool and enhances their resources. This created conditions for the stimulation of research activities throughout Europe.

Innovation

The SONS2 brought together leading European researchers creating a fertile ground for the further development of innovative ideas and enhancing the dynamics and reputation of the EUROCORES programmes. This stimulated a number of proposals for new national and EU programmes as well as international collaborations.

The SONS2 programme provided the opportunity to recruit high level PhD students and postdoctoral researchers, enabling the transfer of experimental and theoretical methods between different research laboratories. It also stimulated the dissemination of results and ideas, triggering new projects.

4. Suggestions to achieve an optimal use of the EUROCORES programme's experiences in potential future initiatives in the area of Self- Organised Nanostructures

The programme was very successful, especially in the rather traditional form of interdisciplinary research, where the various groups succeeded in combining their complementary skills and working together on innovative objectives. This is an efficient way to achieve in a short term top-level results and to bring significant added value to the CRPs. It might however be of interest to train researchers with broader

interdisciplinary skills, which could be achieved by prolonged exchanges. Such visits should be well-planned and their number limited to a few cases of exceptionally talented and motivated individuals. The long-term benefits of this approach would be obvious, but need to be balanced against the short-term progress in this very competitive field.

4.1 General

- The programme could benefit from a better advertisement and from an increased integration of excellent groups from new member countries of the EU. Participation in the EUROCORES programmes should be encouraged since it opens the possibility to collaborate with some of the best groups in Europe.
- The input of the Review Panel Members could be more active and should not be limited to evaluating the proposals and the mid-term and final Reports. They should have the opportunity to participate in some “review” meetings where the activities of the CRP-SONS2 participants are discussed

4.2 Specific

Objectives and follow-up of the programme

- The Project Leaders should provide a summary of the main objectives of the programme in the Final Report. This would enable the Review Panel to better set the scene of the progress made due to the EUROCORES-SONS2 programme.
- In most CRPs future collaborations are planned or have already been finalized in EU programmes, taking advantage of the ideas developed within the CRPs. It would be of interest that all CRPs report in more details how the programme is beneficial for the start of new initiatives and especially for the future career of young researchers.
- The exchange of PhD and Postdoctoral Fellows in a CRP is one of the important aspects to enhance collaborations and to upgrade the track record of young scientists. The Final Report should provide more information on this dissemination of research activities, even if not directly funded by the ESF.
- More emphasis should be given on the long-term researcher exchanges and their joint supervision by different groups in the CRP.

Scientific output

- The list of publications in the Final Report could still be more specific in order to evaluate better the scientific output. The Review Panel suggests to include in the Report i) a list of the total scientific output of each group in the CRP; ii) a separate list of all the common publications.

Collaborations

- It is quite difficult to evaluate from the Final Reports the quality and quantity of collaborations between the partners in a CRP. Besides a list of common publications, it would be helpful to receive a more detailed overview of the exchange of personnel, PhD students and postdoctoral fellows, between the partners of the CRP.

5. Final comment

The Review Panel would like to express its appreciation for the efficient management by the ESF Staff of the SONS2 Programme and the organization of the Panel Meetings, which is professional and receptive.