

Dear Readers,

Welcome to the second FP7 NANOSSENS project newsletter!

The aim of the FP7 NANOSSENS project is to upgrade the research and innovation capacity of the National Institute of Research and Development for Technical Physics (NIRDTP) to the highest European level in microsensors for medical applications and biosensors based on magnetic nanoparticles and barcode nanowires.

The project activities are focused on following research sub-topics:

- Acoustic microsensors based on nano- and microwires for medical applications;
- Implantable magnetic microsensors based on nanostructured materials for medical applications;
- Sensors based on nanosized detection elements for applications in nanomedicine;
- Biosensors based on multilayered nanowires for the detection of biomolecules.

In this newsletter we will highlight the project's progress made during August 2014 until October 2015 in terms of the events held, twinning visits conducted and research publications produced.

The FP7 NANOSSENS team wishes you Happy reading!

Consortium Partners

COORDINATOR



National Institute of Research and Development for Technical Physics
Romania
www.phys-iasi.ro



Sheffield Centre for Advanced Magnetic Materials and Devices within the Department of Engineering Materials, University of Sheffield, UK
www.magnetics.group.shef.ac.uk



Department of Materials for Information Technologies in the Instituto de Ciencia de Materiales de Madrid, Spain
www.icmm.csic.es



Instituto de Engenharia de Sistemas e Computadores para os Microsistemas e as Nanotecnologias (INESC MN), Portugal
www.inesc-mn.pt



Nanobioelectronics & Biosensors Group in the Institut Català de Nanotecnologia, Barcelona, Spain
www.icn.cat



Solid State Physics group within the Department of Physics and Astronomy, University of Glasgow, UK
www.gla.ac.uk/schools/physics/



ulm university universität
uulm

Materials Science Electron Microscopy Department at the University of Ulm, Germany
www.uni-ulm.de/en/einrichtungen/

ANMM 2015 – 7th International Workshop on amorphous and nanostructured magnetic materials

On 21-24 September 2015 the NANOSSENS project coordinator, National Institute of Research and Development for Technical Physics (NIRDTP), hosted the 7th international workshop on amorphous and nanostructured magnetic materials – ANMM 2015. The event took place in Iași, Romania.

The four-day conference gathered 85 scientists working on amorphous and nanostructured magnetic materials research and optimisation for specific applications from across all over the world. More than 30 presentations covering the most recent developments in the given field have been delivered during the event. The NIRDTP team also presented their work “Anomalous Electrodeposition of NiFe and CoFe Nanowires and Control of Composition and Magnetic Properties”.

The second day of the event finished with a poster session, where 41 participants had a chance to present their research activities and achievements to the colleagues. At the end of the conference, the attendees were offered a tour in NIRDTP.

According to the participants’ feedback, the event was extremely successful. It contributed to establishing contact between fundamental research and technological needs for applications.

In addition, the FP7 NANOSSENS project Satellite Meeting was organised within the ANMM'2015 Workshop.

Organised jointly by the National Institute of Research and Development for Technical Physics (Iași, Romania) and the Institute for Materials Research of Tohoku University (Sendai, Japan)



Topics:

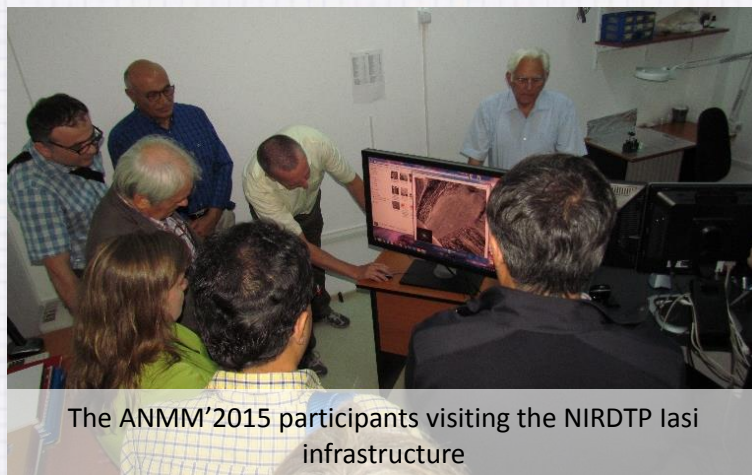
- Preparation and processing
- Structural characterization
- Magnetic properties
- Applications
- Other



Participants of ANMM'2015



ANMM'2015 Poster session



The ANMM'2015 participants visiting the NIRDTP Iasi infrastructure



Prof. Cowburn giving his Plenary Talk on "Perpendicular Magnetic Anisotropy: From Ultralow Power Spintronics to Cancer Therapy"



Audience



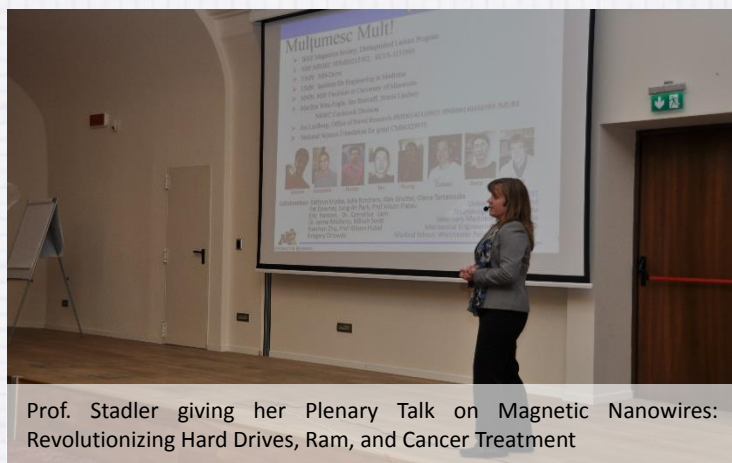
Prof. Schultz giving his Plenary Talk on "Ferromagnetic and Superconducting Permanent Magnets: Superconducting Levitation"

Satellite Meeting of the FP7 NANOSSENS project

The one day Satellite Meeting of the FP7 NANOSSENS project was held on the 22nd of September, in conjunction with the ANMM 2015 workshop. The meeting was focused on the following topics: microsenors for medical applications and biosensors based on nanomaterials and nanostructured materials.

The aim of the meeting was to promote the exchange and dissemination of information from the NANOSSENS project - research results, information on facilities, expertise, and research interests.

Contributions given by the IEEE Distinguished lecturers, as well as by the invited speakers, including the NANOSSENS twinning partners, have been observed by the audience with a considerable interest.



Prof. Stadler giving her Plenary Talk on Magnetic Nanowires: Revolutionizing Hard Drives, Ram, and Cancer Treatment

Topics covered during the Satellite Meeting:

- "Perpendicular Magnetic Anisotropy: From Ultralow Power Spintronics to Cancer Therapy" (P.R. Cowburn)
- "Interaction of Ferromagnetic and Superconducting Permanent Magnets: Superconducting Levitation" (L. Schultz),
- "Magnetoresistive Sensors with Picotesla Sensitivity for Biomedical Applications" (S. Cardoso)
- "Magnetic Nanowires: Revolutionizing Hard Drives, Ram, and Cancer Treatment" (B. Stadler)
- "Development of pT Resolution Magnetoimpedance Sensor Towards Medical Use" (T. Uchiyama)
- "Functional Magnetic Nanoparticles for Tunable rf and Biomedical Applications" (H. Srikanth)

General Progress

Organisation of bilateral seminars to discuss potential joint research projects

The second bilateral seminar involving the twinning partners took place during the 27-28 April 2015 at NIRDTP. The seminar provided NIRDTP and the partners the opportunity to discuss joint proposal ideas for the Horizon 2020 work programmes 2016-2017.

Organisation of dissemination workshops with the regional sensing sector

The first dissemination workshop was organised on October 22, 2014. It attracted 40 participants including experts from four local companies (SC GEA Strategy & Consulting SA, Antibiotice SA, Gradient SRL, and Chemical Company SA) and six research and academic institutions („Al.I. Cuza” University of Iasi, „Gh. Asachi” Technical University of Iasi, „Gr.T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering, „Petru Poni” Institute of Macromolecular Chemistry of Romanian Academy, and National Institute for Research and Development in Microtechnologies - IMT Bucharest). Fruitful discussions were held on microsensors for medical applications and biosensors based on magnetic

Twinning Visits

During the second year of the project, the NIRDTP researchers made over 11 months of secondments to the twinning partners – University of Sheffield (UK), Instituto de Engenharia de Sistemas e Computadores para os Microsistemas e as Nanotecnologias (Portugal), Institut Català de Nanotecnologia (Spain), and University of Glasgow (UK). In return, the twinning partners made 1,5 months of short term visits to NIRDTP. More secondments and visits are planned for the third year of the project.

Spotlight on our New Employees

Prof. Ibko Tabakovic has made substantial contributions to NIRDTP's R&D activities in the field of nanowires and nanoparticles prepared using electrodeposition techniques. He has produced electrodeposited nanowires with controllable Bs from 0.4T to 2.4T, by modifying the composition (NiFe and/or CoFe). He has also initialized a common project with the University of Minnesota, Department of Electrical and Computer Engineering – Prof. Bethanie Stadler – on nano magnetic and photonic materials and devices.



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Recently Published Papers from NIRDTP

- *Influence of Cr on the nanoclusters formation and superferromagnetic behavior of Fe-Cr-Nb-B glassy alloys*, H. Chiriac, L. Whitmore, G. Ababei, M. Grigoras and N. Lupu, Journal of Applied Physics 05/2015
- *Tailoring the magnetic properties of new Fe-Ni-Co-Al-(Ta,Nb)-B superelastic rapidly quenched microwires*, F. Borza · N. Lupu · V. Dobrea · H. Chiriac, Journal of Applied Physics 05/2015
- *As-cast nanocrystalline glass-coated microwires*, S. Corodeanu · G. Ababei · N. Lupu · T.-A. Óvári · H. Chiriac, Journal of Alloys and Compounds 12/2014
- *Development of Magnetostrictive Energy Harvester*, N. Morley, C. Nshuti, G. Backmann, N. Rackham and N. Lupu, IEEE Transactions on Magnetism 11/2014