

# THE Alan G. MacDiarmid NanoTech Institute PRESENTS

Dmitry Zakharov

Ph.D. Candidate

National University of Science and Technology  
"MISiS" (Moscow, Russia) and  
Grenoble Institute of Technology (France)

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ECS North 2.704



Dmitry Zakharov is a 3<sup>rd</sup> year Ph.D. student at National University of Science and Technology "MISiS" (Moscow, Russia) and Grenoble Institute of Technology (France). He received a B.S. and M.S. in Condensed Matter Physics from NUST "MISiS". He also received a M.S. in Material Science from National Polytechnic University of Lorraine (Nancy, France) and Lulea University of Technology (Lulea, Sweden).

His current research focuses on the fabrication, characterization and application of new composite shape memory materials and developing new technologies for harvesting and storing waste thermal energy.

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## "New shape memory composite materials for nanomanipulation and energy harvesting"

The talk is devoted to recent achievements made by our Russian (NUST "MISiS", Moscow) and French (G2Elab, Grenoble) groups in application of original shape memory composites for both microactuation and thermal energy harvesting. Novel pre-strained scheme of shape memory composite allows creating actuators able to giant reversible bending deformation. Micro-sized nanotweezers were fabricated and experimentally tested in manipulation of nano-objects of a different nature (group in Moscow, see <http://smwsm.org/microactuators/nanotweezers.html>). Combined with a piezoelectric, such composites can be applied to harvest small and slow temperature variations, which are hard to exploit with usual pyro- and thermoelectrics (group in Grenoble). This concept was experimentally proved on sub-millimeter scale, MEMS harvester fabrication is now in progress.