

NEXT/NanoX Invited Scientists

Guest name	Cyrill Muratov
Position	Professor
Affiliation	Department of Mathematical Sciences New Jersey Institute of Technology Newark, USA
Host laboratory in NEXT/NanoX	LPCNO Nanomagnetism
NEXT/NanoX contact	Anne Bernard-Mantel
Dates of stay	July 2019



Brief Biodata

1988 - 1993	M. Sc. in Applied Mathematics and Physics, Moscow Institute of Physics and Technology
1993 - 1997	Ph. D. in Physics, Boston University
1997 - 1999	Visiting Member, Courant Institute of Mathematical Sciences, New York University
1999 - present	Faculty, Department of Mathematical Sciences, New Jersey Institute of Technology

Research project during the visit at NEXT

Modeling and analysis of competing interactions to understand and control the morphology of nano-objects and their assemblies

Long-range interactions such as electrostatic and magnetostatic interactions are well known to be notoriously difficult to account for, both at the level of modeling and in the computational treatments. This project focuses on two subjects related to long-range interactions, inside and in-between nano-objects, in systems of interest for the LPCNO. The first subject is the formation of topological spin structures in magnetic nano-objects in the presence of long-range dipolar interactions, which will be studied using micromagnetic modeling, analysis and simulations. The second subject is pattern formation in nano-object assemblies. The goal is to develop a better understanding and control of assemblies, in particular, to unveil the origin of pattern formation in nanoparticle assemblies oriented by peptide polymers and develop controlled pattern orientation using electric or magnetic fields.