

# **ФИЗИКА И МЕХАНИКА МАТЕРИАЛОВ**

## **Materials Physics and Mechanics**

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### **Proceedings of the Fourteenth International Workshop on Nano–Design, Technology, and Computer Simulations**

**22-26 August, 2011, Espoo, Finland**

**Organized by**

**Department of Applied Physics, School of Science, Aalto University  
(Finland)**

**St. Petersburg Academy of Sciences on Strength Problems (Russia)**

**Edited by**

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## Preface

The Fourteenth International Workshop on Nano-Design, Technology and Computer Simulations (NDTCS-2011) took place on 22-26 August 2011 in the Silicon Valley of Finland, Otaniemi (Espoo). The workshop NDTCS-2011 was organized jointly by Aalto University School of Science (Finland) and the St. Petersburg Academy of Sciences on Strength Problems (Russia). All sessions took place at the Aalto University Otaniemi Campus, in Auditorium AS1 of the TUAS building. Posters were held in the lobby of the building, Otaniementie 17, Espoo. Fifty three scientists and graduate students attended the workshop representing Belarus, Brazil, China, Czech Republic, Estonia, Finland, France, Germany, Japan, Lithuania, Poland, Russia, Spain, Sweden, South Korea, and UK.

The Fourteenth Workshop was focused on the synthesis, properties and applications of novel materials, and modern computational methods for their structure and property investigations. New experimental and theoretical results were presented by world leading specialists. Invited tutorial lectures preceded the special sessions. The main goal of the conference was to provide inspiring conditions for scientific discussions between material and computational scientists, to share scientific and technical information, to establish international cooperation among scientists and engineers and to promote applications.

The contributions to the workshop program were organized into three oral/poster sessions:

- Synthesis of Nanomaterials  
(graphene, nanotubes, nanoparticles, nanowires, etc.)
- Applications of Nanomaterials  
(composites, thin film electronics, electron emitters, optical applications, biological applications, etc.)
- Molecular Dynamics and DFT calculations

Workshop NDTCS-2011 is a continuation of the previous annual international workshops, which were held in:

- 1997-2005, St. Petersburg (Russia)
- 2006, Olsztyn (Poland)
- 2007, Bayreuth (Germany)
- 2008, Minsk (Belarus)
- 2009, Vilnius (Lithuania)

The previous nine workshops, which took place in Russia, had the name “Nondestructive Testing and Computer Simulations in Science and Engineering.” These two distinct areas have much in common and make the quest for improved technology easier. Today, due to the great improvements in experimental and computational methods, it is possible to solve a variety of complex practical problems accurately and efficiently. The workshops incorporated a set of all-union specialized symposia that were established by St. Petersburg State Polytechnical University. The wide participation of scientists from Central and Eastern Europe provided useful insight into the beneficial ideas generated in the geographically diverse scientific schools. These conferences have created strong base for the wide 'cross-links' between the different fields of science that allows consider important, common problems from different angles.

However, eventually the focus of the meetings gradually moved towards Nanoscience and Nanotechnology. To support this tendency, it was decided at the Tenth International Workshop (NDTCS-2006) to conserve the abbreviation, which became a brand of those annual workshops, but to change the name. The following workshops (2007-2009) had the new name “International Workshop on New Approaches to High-Tech: Nano-Design, Technology and Computer Simulations” what reflects better their profile.

The contributions to the previous Workshops were published in English as Preprints:

- Proceedings of St. Petersburg Academy of Sciences on Strength Problems (SPAS), vols. 2-11 (1998–2007);
- Proceedings of NDTCS, vols. 12–13 (2008, 2009);

as Papers:

- Proceedings of the International Society for Optical Engineering (SPIE), vols. 3345, 3687, 4064, 4348, 4627, 5127, 5400, 5831, 6253, 6597, 7377 (1998–2008);

International Journals

- Modelling and Computer Simulation in Materials Science and Engineering, vol. 6, No. 4 (1998);
- Reviews on Advanced Materials Science, vol. 20, Nos. 1–2 (2009);
- Materials Physics and Mechanics, vol. 9, Nos. 1-3 (2010).

This issue of Materials Physics and Mechanics Journal contains the selected papers presented at the Workshop. All the papers presented here have been peer-review prior to publication. The issue will be of interest to researchers and graduate students in the field of nanotechnology, physics, chemistry, and mechanics.

The scientific discussions continued informally with a series of social events, including welcome party, city reception, an excursion, a conference dinner, and a sauna party. Monday evening session finished with the welcome party at Nanohouse (Puumiehkuja 2, Espoo) and laboratory tour. The city of Espoo expressed the hospitality to the participants of NDTCS-2011 by organizing a reception on Tuesday, 23 August at 18:00-19:30 pm at the Karhusaari Art Center (Karhusaaren taidekeskus). The second part of Wednesday was devoted to bus and boat tours. The city tour included a comprehensive basic tour taking in the most important and interesting parts of Helsinki, such as the historical center, the Presidential Palace, City Hall, the Parliament building, Finlandia Hall, the Opera House, and others. The excursion was followed by a boat tour from the Market Square. The boat tour offered the best views including the inner bay of the Suomenlinna sea fortress, the beautiful shores of old city districts, famous historical buildings, churches, icebreakers, harbors, villas, saunas and the zoo. The conference dinner was on Thursday at Uunisaari Island in downtown Helsinki. The conference ended the refreshments at a traditional Finnish sauna party, which was held at the Rector’s sauna in T building, next door to the conference venue.

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## Supporting Organizations and Sponsors

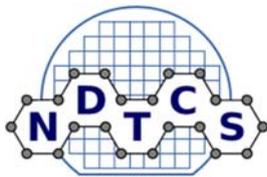
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## Workshop Committees

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### Organizing Committees

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Kimmo Mustonen  
Toma Susi

Other details related to the conference and the conference book can be downloaded from the official web site of the Workshop:

<http://tfy.tkk.fi/nanomat/NDTCS.htm>

