Young researchers advancing computational science: Perspectives of the Young Scientists Conference 2015

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Abstract

We present an annual international Young Scientists Conference (YSC) on computational science http://ysc.escience.ifmo.ru/, which brings together renowned experts and young researchers working in high-performance computing, data-driven modeling, and simulation of large-scale complex systems. The first YSC event was organized in 2012 by the University of Amsterdam, the Netherlands and ITMO University, Russia with the goal of opening a dialogue on the present and the future of computational science and its applications. We believe that the YSC conferences will strengthen the ties between young scientists in different countries, thus promoting future collaboration. In this paper we briefly introduce the challenges the millennial generation is facing; describe the YSC conference history and topics; and list the keynote speakers and program committee members. This volume of Procedia Computer Science presents selected papers from the 4th International Young Scientists Conference on Computational Science held on 25 June − 3 July 2015 in Athens, Greece.

Keywords: computational science, international conference, young scientists, leading scientist program

1 Introduction: millennial generation takes up the challenge

Modeling, simulation and systems thinking are paving the way to understanding and improving the intrinsically complex world we are living in. By collecting empirical data and developing computational models, scientists find solutions to critical urban and societal problems, such as the transportation systems optimization, pandemics spread, or individual susceptibility to drug addiction.

The penetration of modeling and simulation in diverse fields of everyday life gave birth to a new generation of computational scientists. These young researchers are fascinated by the challenging interdisciplinary projects and strongly motivated to learn the best tricks in high-performance and high-throughput computing, data-driven modeling and simulation of large-scale complex systems. Education and training in computational science is gaining momentum around the globe and consolidating the efforts of leading scientific schools, launching joint-degree educational programs. A unique example is the double-degree Master's Programme in Computational Science [1] offered by the University of Amsterdam, the Netherlands and ITMO University, Russia.

International conferences and summer schools play a crucial role in raising the Generation-Y professionals. Our annual Young Scientists Conference (YSC) is discussing the present and the future of computational science, by bringing together renowned experts and young researchers working in high performance computing, modeling and simulation.

This volume presents selected papers from the 4th International Young Scientists Conference on Computational Science held on 25 June − 3 July 2015 in Athens, Greece. In addition, several invited papers are included, among which are the best papers from three other scientific conferences: "Big Data and Advanced Computing" (18-19 December 2014, St. Petersburg), "Big Data processing and analysis challenges in mega-science experiments" (29-30 January 2015, Moscow) and "Distributed computing systems and data processing in XXI century" (26-27 May 2015, Dubna). These events in Russian Federation hosted a national youth competition that nominated the winners for participation in the YSC-2015.

We believe that the YSC conferences will strengthen the ties between young scientists in different countries, thus promoting future collaboration in the field of computational science.

2 Young Scientists Conference (YSC) short history & stats

The YSC conference http://ysc.escience.ifmo.ru/ was launched in 2012 in the framework of the Russian Leading Scientist Program (LSP) [2] by the Advanced Computing Lab of ITMO University, supervised by the LSP-winner Prof. Sloot from the University of Amsterdam. Further, this initiative was supported by another LSP-awardee, Prof. Klimentov from CERN and Brookhaven National Lab, who also leads a lab in Kurchatov Research Institute, Russia.

The first event, YSC-2012, was held in Amsterdam, the Netherlands. The best papers of the first conference were published in the Journal of Computational Science, Elsevier [3]. The second conference, YSC-2013, was organized in Barcelona, Spain, in conjunction with the International Conference on Computational Science http://www.iccs-meeting.org/. The third event, YSC-2014, was again organized in Amsterdam. The forth event, YSC-2015, was held in Athens, Greece.

YSC-2015 was organized by a consortium of four institutions:
− National Technical University of Athens, Greece;
− eScience Institute of ITMO University, Russia;
− Complexity Institute, Nanyang Technological University, Singapore;
− University of Amsterdam, the Netherlands.

Over 60 Master students, PhD students and young postdocs from Russia, Greece, the Netherlands and several other countries participated in the YSC-2015.

3   Conference topics

Research topics presented at the YSC-2015 encompassed:
–   Mathematical modeling and simulation of real-world systems;
–   Modern numerical analysis and its applications;
–   Computational technologies, problem-oriented software and virtual environments;
–   Data-driven systems, methods and models;
–   Supercomputing and distributed computing for large-scale simulations;
–   Big Data and eScience infrastructures;
–   Advanced scientific visualization.

4   YSC-2015 keynote speakers

YSC is well known for its excellent line up of keynote speakers. The keynotes for 2015 are:
–   Prof. Gerassimos Athanassoulis, National Technical University of Athens, Greece
–   Prof. Alexander Boukhanovsky, ITMO University, St. Petersburg, Russia
–   Prof. Alfons Hoekstra, University of Amsterdam, The Netherlands
–   Prof. Petros Koumoutsakos, ETH Zurich, Switzerland
–   Dr. Mike Lees, University of Amsterdam, The Netherlands
–   Prof. Peter M.A. Sloot, ITMO University, St. Petersburg, Russia, University of Amsterdam, The Netherlands, and Nanyang Technological University, Singapore
–   Prof. Doros Theodorou, National Technical University of Athens, Greece
–   Prof. Stefan Thurner, Medical University of Vienna, Austria
–   Prof. Athanasios Tzavaras, KAUST, Saudi Arabia

5   Program committee and reviewers

We would like to thank all program committee members and reviewers for their contribution to ensure a high standard for the accepted papers:

Aksenov, Andrey	Ivanov, Sergey	Masich, Grigoriy
Aphanasiev, Alexander	Jansson, Fredrik	Melnikova, Natalia
Athanassoulis, Gerassimos	Kalyuzhnaya, Anna	Nasonov, Denis
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Butakov, Nikolay	Klimentov, Alexei	Sloot, Peter
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Dijkstra, Louis	Kosukhin, Sergey	Svitenkov, Andrey
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Gershenson, Carlos	Kovalchuk, Sergey	Thurner, Stefan
Gorbunov, Nikolay	Kryukov, Alexander	Tzavaras, Athanasios
Har Shemesh, Omri	Krzhizhanovskaya, Valeria	Voloshin, Daniil
Hoekstra, Alfons	Lees, Michael	Zhizhin, Mikhail
Holyst, Janusz	Leonenko, Vasiliy	
Ilyin, Vyacheslav	Mamis, Konstantinos	

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[2] Attraction of the leading scientists to Russian institutions of higher learning, research organizations of the governmental academies of sciences, and governmental research centers of the Russian Federation http://p220.ru/en

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