Preface

10th International Conference on High-Performance Computing Systems and Technologies in Scientific Research, Automation of Control and Production (HPCST-2020). May 15-16, 2020, Barnaul, Russia

The 10th International Conference on High-Performance Computing Systems and Technologies in Scientific Research, Automation of Control and Production (HPCST-2020) took place at the Altai State University on May 15 - 16, 2020. Altai State University (AltSU) is located in the center of Barnaul city - the capital of Altai region of the south-west of Siberia.

Figure 1. Main Complex of Two Joint Buildings of Altai State University: left - Learning Campus; right - University Administration Building.

HPCST is a regular scientific meeting that is held annually since 2011. It attracts specialists in the various fields of modern computer and information science, and their applications in automation of control and production, in mathematical modelling and computer simulation of processes and phenomena in natural sciences by means of parallel computing.

The aim of the traditional annual conference is to present state-of-art approaches and methods for solving contemporary scientific problems, to exchange the latest research results obtained by scientists both from universities and research institutions. All the results are valuable contributions to the modern computer and information science and to their applications and technology.

Taking into account the COVID-19 pandemic, the HPCST-2020 conference was held in the remote mode as a video conference with a presentation of materials on the conference's online resources. HPCST-2020 virtual meetings took place in the conference room (figures 2-3) of the university administration building using the Zoom remote videoconferencing system (figure 4).
The conference began with plenary reports by the chairmen of the main three sessions, who informed the audience about current problems, the latest achievements and promising developments in the fields of modern computer and information science.

Figure 2. Conference room of the university administration building.

Figure 3. Conference moderators from AltSU: Alexander V. Kalachev (left) and Vladimir I. Jordan (right) at the discussion on a session meeting.
At the opening of the conference, Vladimir I. Jordan as the Organizing Committee Chairman addressed the conference participants with a welcoming speech. In addition, he made the plenary report at the second conference session "Parallel programming and computer simulation of processes and phenomena in natural sciences with using of parallel computing".

Moderator Alexander V. Kalachev (AltSU, Barnaul) made the plenary report at the first conference session "Multi-processor computing systems, multi-core processors and programmable logic structures, digital signal processing". Dr. Ilya E. Tarasov (Russian Technological University, Moscow) as chairman of the first conference session "Multi-processor computing systems, multi-core processors and programmable logic structures, digital signal processing" made another plenary report using remote videoconferencing system. Dr. Victor N. Sedalishchev (AltSU, Barnaul) as chairman of the third conference session "Robotics, control automation, production automation and automation of scientific experiment" made one more plenary report.

Following the plenary sessions in the course of the two-day event, communication was established between seasoned scholars and PhD students in various fields of computer and information science.

Figure 4. Dr. Pavel Yu. Gulyaev broadcasts the report via Zoom.

Sessions of the conference are devoted to the relevant scientific topics: architecture and design features of the multi-processor computing systems, architecture and design features of the hardware on the basis of FPGA, signal (DSP) and multi-core processors, IP-cores for FPGA, processing and synthesis of signals, technologies of distributed processing and distributed computing using multiprocessor computer systems, GRID-technologies and cloud computing and services, neuronal network technologies, high-performance and multi-scale predictive computer simulation in natural sciences, robotics and artificial intelligence systems, control automation and mechatronics, production control automation, scientific experiment automation. Distinguished reports by young researchers were awarded with the honorary certificates.

The conference was attended by 112 scholars with more than forty qualified reports. Best reports were selected for these proceedings by the programme committee and the moderators of the sessions. The main criterion for selection of articles was scientific novelty and relevance of the results achieved
in the fields of modern computer and information science. Besides the selection, all 34 accepted manuscripts were reviewed by two referees.

The organizing committee would like to express our sincere appreciation for the organizational support to the administration of Altai State University and to the staff of Institute of Digital Technologies, Electronics and Physics of Altai State University.

The editors’ deep appreciation for the opportunity of international publication of the volume is offered to IOP Publishing.

With best regards,

Vladimir I. Jordan