

# International Conference Russian Supercomputing Days



September 24-25, 2018, Moscow

# International Conference Russian Supercomputing Days

Supported by the Russian Foundation for Basic Research



Platinum Sponsor – Educational Partner:



Platinum Sponsors:



Golden Sponsor:



Silver Sponsors:



Conference Operator:  Top Level  
Meetings

In Cooperation with:



# Race of Exascale Projects...

<p><b>U.S.</b> </p> <p>Sustained ES*: 2022-2023 Peak ES: 2021 Vendors: U.S. Processors: U.S. (some ARM?) Initiatives: NSC/ECP Cost: \$600M per system, plus heavy R&amp;D investments</p>	<p><b>EU</b> </p> <p><u>PEAK ES</u>: 2023-2024 <u>Pre-ES</u>: 2021-2022 Vendors: Likely European Processors: Likely ARM or RISC-V Initiatives: EuroHPC Cost: Over \$350M per system, plus heavy R&amp;D investments</p>
<p><b>China</b> </p> <p>Sustained ES*: 2021-2022 Peak ES: 2020 Vendors: Chinese (multiple sites) Processors: Chinese (plus U.S.?) 13<sup>th</sup> 5-Year Plan Cost: \$350-\$500M per system, plus heavy R&amp;D</p>	<p><b>Japan</b> </p> <p>Sustained ES*: ~2022 Peak ES: Likely as a AI/ML/DL system Vendors: Japanese Processors: Japanese Cost: \$800M-\$1B, this includes both 1 system and the R&amp;D costs They will also do many smaller size systems</p>

 \* 1 exaflops on a 64-bit real application

Source: Hyperion Research

# Top50 of the most powerful Russian supercomputers (top50.supercomputers.ru)

N	Место	Кол-во CPU/ядер	Архитектура (тип процессора / сеть)	Производительность		Разработчик
				Linpack	Пиковая	
1	Москва Московский государственный университет имени М.В.Ломоносова 2018 г.	1696/64384	узлов: 1536 (Xeon E5-2697v3 [Acc: Tesla K40M]) 2.6 GHz 64 GB RAM узлов: 160 (Xeon Gold 6126 [Acc: 2x Tesla P100]) 2.6 GHz 96 GB RAM сети: Infiniband FDR/Infiniband FDR/Gigabit Ethernet	2,478.00	4,946.79	T-Платформы
2	Москва <a href="#">Главный вычислительный центр Федеральной службы по гидрометеорологии и мониторингу окружающей среды</a> 2018 г.	1952/35136	узлов: 976 (2xXeon E5-2697v4 2.3 GHz 128 GB RAM) сети: Aries/Aries + Infiniband/Aries + Gigabit Ethernet	1,200.35	1,293.00	T-Платформы, CRAY
3	Москва Московский государственный университет имени М.В.Ломоносова 2012 г.	12422/82468	узлов: 4160 (2xXeon E5-2697v3 2.93 GHz 12 GB RAM) узлов: 260 (2xXeon E5-2697v3 2.93 GHz 24 GB RAM) узлов: 640 (2xXeon E5-2697v3 2.93 GHz 24 GB RAM) узлов: 40 (2xXeon E5-2697v3 2.93 GHz 48 GB RAM) узлов: 30 (2xPowerXCell 8i 3.2 GHz 16 GB RAM) узлов: 777 (2xXeon E5630 [Acc: 2xTesla X2070]) 2.53 GHz 12 GB RAM узлов: 288 (2xXeon E5630 [Acc: 2xTesla X2070]) 2.53 GHz 24 GB RAM узлов: 4 (4xXeon E7650 2.26 GHz 512 GB RAM) сети: Infiniband QDR/Gigabit Ethernet/Gigabit Ethernet	901.90	1,700.21	T-Платформы
4	Москва НИЦ "Курчатовский Институт" 2018 г.	1070/21146	узлов: 148 (2xXeon E5-2650v2 [Acc: 2x Tesla K80]) 2.6 GHz 128 GB RAM узлов: 23 (2xXeon E5-2680v3 [Acc: 3x Tesla K80]) 2.5 GHz 128 GB RAM узлов: 364 (2xXeon E5-2680v3 2.5 GHz 128 GB RAM) сети: Infiniband FDR/Gigabit Ethernet/Gigabit Ethernet	755.53	1,100.55	НИЦ "Курчатовский Институт", Supremico, Борлас, T-Платформы
5	Санкт-Петербург <a href="#">Суперкомпьютерный центр Санкт-Петербургский политехнический университет</a> 2017 г.	1468/20552	узлов: 623 (2xXeon E5-2697v3 2.6 GHz 64 GB RAM) узлов: 56 (2xXeon E5-2697v3 [Acc: 2xTesla K40]) 2.6 GHz 64 GB RAM узлов: 36 (2xXeon E5-2697v3 2.6 GHz 128 GB RAM) узлов: 8 (2xXeon E5-2697v3 [Acc: NVIDIA K1]) 2.6 GHz 128 GB RAM узлов: 8 (2xXeon E5-2697v3 [Acc: NVIDIA K2]) 2.6 GHz 128 GB RAM узлов: 3 (2xXeon E5-2697v3 2.6 GHz 256 GB RAM) сети: Infiniband FDR/Gigabit Ethernet/Gigabit Ethernet	715.94	1,015.10	Группа компаний РСК
6	Москва CDISE Сколковский институт науки и технологий Сколтех 2018 г.	172/10616	узлов: 44 (2xXeon Gold 6136 3 GHz 192 GB RAM) узлов: 26 (2xXeon Gold 6140 [Acc: 4xTesla V100]) 2.3 GHz 384 GB RAM узлов: 4 (2xXeon Gold 6136 3 GHz 192 GB RAM) узлов: 2 (2xXeon Gold 6136 3 GHz 256 GB RAM) узлов: 2 (2xXeon Gold 6134 3.2 GHz 384 GB RAM) узлов: 4 (4xXeon Gold 6134 3.2 GHz 192 GB RAM) сети: Infiniband EDR/10 Gigabit Ethernet/Gigabit Ethernet	495.90	1,011.60	DELL

#6 – installed at Skoltech, 1 Pflops

#45 – JIHT RAS, Angara Interconnect (NICEVT), AMD accelerators

# Summer Supercomputing Academy

September, 22<sup>nd</sup> – September, 29<sup>th</sup> , 2018

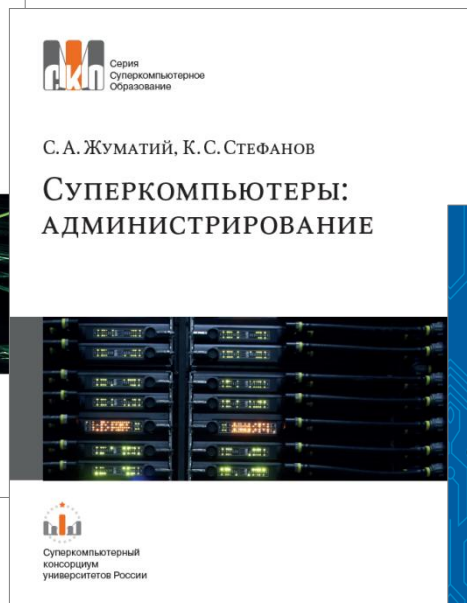


## *Educational tracks:*

- *MPI / OpenMP programming technologies*
- *NVIDIA GPU programming technologies*
- *Quantum Informatics*
- *OpenFOAM/Salome/Paraview open software*
- *Python for HPC*



# Supercomputing Education: New Books



# Warm Welcome Words from Colleagues



I would like to welcome you to the Russian Supercomputing Days Conference. I'm sorry that I'm not able to join you in person as I had hoped; a minor medical issue is prevented me from traveling at this time. The program appears to offer an exciting look at the state of the art in supercomputing and horizons for the future. I'm sure the conference will provide for stimulating discussions and open new avenues for future research and collaboration. With my best wishes for a successful conference.

Jack Dongarra



It is with great pleasure that I add my 'welcome' to all attending this year's Russian Supercomputing Days even as I am forced to convey my regret for not being there with you. Issues related to VISA control precluded my trip to Moscow in spite of the valiant efforts by respective staffs at Moscow State University and Indiana State University. This conference is one of few I would consider as an important bridge spanning the ideas and accomplishments of the international HPC Community. I congratulate organizing committee and the contributing sponsors for the assured success of this year's conference and extend to all of you my warmest regards.

Thomas Sterling

# Warm Welcome Words from Colleagues



Prof. Victor Gergel, NNSU  
from China





# International Conference Russian Supercomputing Days



**JUNE 16-20,  
FRANKFURT,  
GERMANY**

**5 DAYS | 450 SPEAKERS | 3,500 ATTENDEES | 160 EXHIBITORS**

## **ISC 2019 TOPICS**

Next-Generation High Performance Components | Exascale Systems | Extreme-Scale Applications | HPC and Advanced Environmental Engineering Projects | Parallel Ray Tracing -- Visualization at its Best | Blockchain Technology and Cryptocurrency | Parallel Processing in Life Science | Quantum Computers/Computing | What's New with Cloud Computing for HPC | Parallel Programming Models for Extreme-Scale Computing | Workflow Management | Machine Learning and Big Data Analytics | Deep Learning and HPC -- State of the Art |

## **PROGRAM ELEMENTS**

Research Papers  
Research Posters  
Project Posters  
PhD Forum  
Tutorials

Industrial Day  
Machine Learning Day  
BoFs  
Workshops  
Exhibition

HPC in Asia  
Exhibitor Forum  
Student Cluster Competition  
Student Volunteer Program  
ISC STEM Student Day

[isc-hpc.com](http://isc-hpc.com)





# Russian Supercomputing Days: Awards

- Best Research Paper,
- Best Research Report – Industrial Session,
- Best Research Paper – Young Scientists Session,
- Best Research Poster,
- Winners of the GraphHPC contest,
- Winner of the contest of Educational Materials.

Winners will be announced at the Closing Session:  
September, 25<sup>th</sup>, 18:25

# International Conference Russian Supercomputing Days



September 24-25, 2018, Moscow