

## Virtual Guest Student Programme in 2021

JSC will once again host a guest student programme in summer 2021, supported by the Centre Européen de Calcul Atomique et Moléculaire (CECAM). In light of the restrictions due to the coronavirus pandemic, the programme will run remotely for the second time. Within the programme, students with a major in natural sciences, engineering, computer science, or mathematics will get the opportunity to familiarize themselves with different aspects of scientific computing. Together with local scientists, they will work on a variety of current topics in research and development. Depending on the participants' previous knowledge and interests, their assignment can be chosen from different areas, including mathematics, physics, chemistry, neuroscience, software development tools, visualization, distributed computing, operating systems, and communication. Special emphasis is placed on the use of supercomputers.

Participants are expected to have knowledge and experience in the computer-oriented branches of their subjects. They should have already completed their bachelor's degree but not yet finished a master's course. Additionally, a letter of recommendation from a university lecturer or professor is required to apply.

The programme will last ten weeks and take place remotely from 2 August to 8 October 2021. Students are encouraged to apply for the programme online. The closing date is 16 May 2021. Further information can be found at <https://fz-juelich.de/ias/jsc/gsp/>.

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## Study on Global Health Risk from Ozone Air Pollution Based on JSC's TOAR Database

A new publication in the journal *Environmental Science & Technology* (DOI: [10.1021/acs.est.0c07742](https://doi.org/10.1021/acs.est.0c07742)) led by the University of North Carolina, USA, developed a novel data fusion approach to combine the global observations from the Tropospheric Ozone Assessment Report database hosted by JSC with output from several numerical chemistry-transport models. The new method allows for

the production of annual high-resolution maps of ground-level ozone burden, which can be combined with population density to assess the regional health risk from ozone air pollution. The findings from this study were used by the Global Burden of Disease 2019 (GBD2019) study, which estimated that about 365,000 people around the world died in 2019 from exposure to ozone pollution. The research, published online on 8 March, used the largest compilation of ozone observations ever produced as well as estimates from nine global atmospheric models. By carrying out a data fusion, the research team was able to combine these different sources of information, making use of the advantages of each.

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## New DFG Project on Parallel Simulation of Multi-Modal Energy Systems

The complexity of modern energy systems poses significant challenges concerning how these systems are planned, designed, and operated. These systems are expected to be multi-modal and to include storage capacities. The distributed nature of new resources and the participation of loads in energy management require fast, reactive control and protection. In this context, the use of highly efficient and fast numerical simulation tools becomes a critical need.

The goal of the newly started DFG project "Space-time parallel simulation of multi-modal energy systems" (PinTSimE, funded by DFG within the priority programme 1984 "Hybrid and multimodal energy systems") is to define methodologies for the use of parallel-in-space-and-time techniques for the simulation of multi-modal energy systems in order to achieve faster than real-time performance. The two parallelization techniques combined will ensure an effective use of simulations for the design, analysis, control, and optimization of multi-modal power grids.

The project is led by Prof. Andrea Benigni of the Institute of Energy and Climate Research – Energy Systems Engineering at Forschungszentrum Jülich (IEK-10). Together with the University of Wuppertal, researchers at

JSC will primarily work on parallel-in-time techniques for energy systems, in particular with respect to discrete events and their impact on convergence and efficiency. The group at IEK-10 will focus on the implementation and application of parallel-in-space solvers on Field-Programmable Gate Arrays (FPGAs). The project started on 1 February 2021 and will run for three years, supporting PhD and master's students during this time.

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## Dirk Pleiter Appointed PDC Director and Professor at KTH

Dirk Pleiter, a long-time employee at JSC, became professor of high-performance computing at the Division of Computational Science and Technology at the KTH Royal Institute of Technology in Stockholm in January 2021. He joined JSC in April 2011 and was appointed professor at the University of Regensburg in parallel. At JSC, he has built up a research team on "Application oriented technology development" and in this role he was involved in various European projects, which mostly focussed on co-design of future HPC architectures and technologies, but also closely worked with different computational science communities. He pursued collaborations with HPC solutions providers, e.g. through the NVIDIA Application Lab at Jülich, which helped to prepare applications for systems like the recently installed JUWELS Booster.

In recent years, his focus was on Arm-based technologies through work with different companies including Arm and Huawei. He also played a leading role in projects working on future HPC-based infrastructures, like PPI4HPC, the first joint procurement of HPC systems in Europe, and Fenix, an effort of various European supercomputing centres to create a federated collection of e-infrastructure services. With his appointment at KTH, Dirk Pleiter also became director of the PDC Center for High Performance Computing.

JSC is sorry to see Dirk go, but wishes him all the best in his new position.

## Stefan Krieg Appointed Professor at University of Bonn

Stefan Krieg joined JSC in 2010 to work on exascale computing within JSC's Exascale Laboratories. In 2011, he took charge of the newly founded Simulation Laboratory Nuclear and Particle Physics, to help prepare the lattice field theory community for the upcoming developments in computing hardware. Together with colleagues at JSC and the Universities of Wuppertal and Regensburg, this work continued within the special research field "SFB Hadron Physics from Lattice QCD", which ran until 2020.

Stefan now works to expand the utility of the methods developed within the Lattice QCD framework to other areas where quantum field theories are applied. The broader scope of this approach is reflected in the new

name of the Simulation and Data Laboratory Numerical Quantum Field Theory, which he continues to lead. In 2021, Stefan Krieg was appointed professor at University of Bonn's Helmholtz Institute for Radiation and Nuclear Physics within the Faculty of Mathematics and Natural Sciences, while retaining his position at JSC according to the Jülich Model. The joint position will strengthen the existing collaborations with the University of Bonn, help to develop new cooperation opportunities, and attract students to work and perform computational research at JSC.

Congratulations, Stefan, and good luck with your new tasks.

## Events

### ESM user forum (online)

Instructors: JSC employees, external partners  
Date: 25–26 March 2021, starting on 25 March at 14:00  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/esm-user-forum>

### Interactive High-Performance Computing with Jupyter (online)

Instructors: Jens Henrik Göbber, Alice Grosch, JSC  
Date: 20–22 April 2021, 09:00–13:00  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/interactive-hpc>

### GPU Programming with CUDA (online)

Instructors: Dr. Jan Meinke, Jochen Kreutz, Dr. Andreas Herten, JSC; Jiri Kraus, Markus Hrywniak, NVIDIA  
Date: 26–30 April 2021, 09:00–13:00  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/cuda>

### Introduction to Scalable Deep Learning (online)

Instructors: Dr. Stefan Kesselheim, Dr. Jenia Jitsev, Roshni Kamath, Dr. Mehdi Cherti, Dr. Alexandre Strube, Jan Ebert, JSC  
Date: 3–7 May 2021, 09:00–13:15  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/scalable-dl-2>

### Introduction to the usage and programming of supercomputer resources in Jülich (online)

Instructors: Representatives of Atos, Intel and ParTec, JSC employees  
Date: 17–20 May 2021, 13:00–17:00  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/sc-1>

### Using the supercomputers at JSC – a hands-on tutorial (online)

Instructors: Andreas Smolenko, Benedikt Steinbusch, JSC  
Date: 21 May 2021, 09:00–17:00  
Venue: online  
<https://fz-juelich.de/ias/jsc/2021/sc-hands-on-1>

For further events, talks, and training courses see <http://www.fz-juelich.de/ias/jsc/events>