



LRZ summer newsletter, June 2022: Enjoy festivals, birthdays, supercomputing. Stay curios

NEWS

The Exascale era starts in Germany and Bavaria

Congratulations, LRZ

Model case lungs

Science intelligently secured

Figures of the Month

WORKSHOPS & EVENTS

Invitation to the birthday of LRZ

Programming GPU with Open ACC

Artificial Intelligence in Research

Festival of Future 2022

Deep learning in one week

Introduction to LRZ systems and flow simulations

The Olympic Games of 1972 in photos

Energie efficiency und climate neutrality

Researching and computing with Trilinos codes

Programming with C++

Improving and transforming Websearch

Téchné Summerschool at LRZ

Introduction to LRZ systems and flow simulations

ANSYS Fluent for Computational Fluid Dynamics

Improving and accelerating supercomputing

Introduction to LRZ systems and flow simulations

USED THINGS FOR FURTHER SERVICE

JOB OFFERS

MORE TO READ

INFORMATIONS & IMPRINT

NEWS

The Exascale era starts in Germany and Bavaria

Exascale is the highest computing power currently achievable: it produces a trillion floating point calculations or FLOPS per second and thus the prerequisite for analysing research data in even greater detail and dealing with urgent questions, for example on climate, the environment or health. Europe and Germany are now entering the exascale era. Forschungszentrum Jülich was recently awarded the contract for the [next-generation European supercomputer](#). "JUPITER" will be [installed in Jülich from 2023](#). The Federal Government also continues to support the Gauss Centre for Supercomputing (GCS) and is funding the procurement of exascale systems in Munich/Garching, Stuttgart and Jülich. For example, the Federal Ministry of Education and Research,

together with the Bavarian State Ministry of Arts and Science, are each investing 125 million euros in the [LRZ's next supercomputer](#). This exascale system - also a first - will be the first supercomputer in Europe to be planned and procured within the [framework of an innovation partnership](#) and in cooperation with various manufacturers. "Together with manufacturers, we will put innovative computing approaches through their paces," says Prof. Dr. Dieter Kranzlmüller, head of the LRZ. "Implementation will follow with the aim of tailoring the system as precisely as possible to the applications of our users." Innovation partnerships have been possible in Germany since 2016; they divide procurement into several, financed development rounds. In the technical competition of ideas according to the LRZ's specifications, the best possible exascale system and many new or optimised components are to be created. In a loose series, we report on the state of affairs. [Episode one](#) deals with the opportunities and risks of the innovation partnership.



Congratulations, LRZ

The Leibniz Supercomputing Centre (LRZ) [turns 60 years old](#) – the perfect opportunity to take a look back on the LRZ's success story but even more so discuss where computer science and the LRZ are headed in future. Celebrate with us on **July 14, 2022**. In the morning, the LRZ Directorate, together with partners, researchers and users, will address the history and future of the LRZ in front of invited guests from politics, science and the public. The [LRZ started in 1962 as the computing centre](#) of the two Munich universities, established itself as an IT service provider also for institutions beyond Munich's city limits, grew to become a supercomputing centre of international standing and today accompanies research, science and institutions in the digitalisation: "The LRZ started operating large computing facilities 60 years ago and has steadily expanded its services. In the meantime, we operate the [Münchner Wissenschaftsnetz](#), the data storage for the Bayerische Staatsbibliothek, we offer IT services and work with international research groups. Such growth requires adaptability," says Prof. Dieter Kranzlmüller, director of the LRZ. "We help build IT infrastructures for science. The LRZ will continue to be operational. But we need to stay humble and we need to keep working: What we have achieved today, we should do even better tomorrow."

In the afternoon, starting at **1.30 p.m.**, the birthday celebration will be personal and hybrid: various lectures will focus on fascinating research projects that would be possible without the LRZ's high-performance infrastructure. The LRZ will have scientists report on what they use high-performance computing (HPC) for and what trends they expect. In addition, young researchers will present their computer science projects and theses on the future of computers, networks and software: another leap into the future of the LRZ, which will certainly be shaped by this knowledge and future technologies such as quantum computing or the methods of artificial intelligence (AI) in the coming years. From **5 p.m. onwards**, the LRZ will be the place to celebrate, to make contacts with scientists and LRZ specialists and to deepen the research content of the lectures. The detailed birthday programme including all speakers can be found at <https://lrz60.de/> You can follow the live stream via this website. You want to join the afternoon programme on-site? Please send an email to events@lrz.de



Model case lungs

Those who associate mechanics only with technical problems are unaware of the diversity and breadth of this subject: "All physical, biological, chemical phenomena can be described by mathematical equations," explains [Professor Dr. Wolfgang Wall](#), head of the [Chair of Computational Mechanics \(LNM\)](#) at the Technical University of Munich (TUM). "And mechanics plays a very essential, albeit long underestimated, role in living systems." With years of intensive research and the support of the supercomputers of the Leibniz Computing Centre, Wall's chair created a multi-award-winning, highly regarded and, above all, useful [digital model of the human lung](#): this breaks with traditional ideas about the organ and about the performance of mechanics, helps medicine to better understand the processes involved in ventilation and, in particular, saves lives. The risk of death from ventilation is still as high as 50 per cent, but with the digital model, doctors can practice ventilation processes and tailor them to individual patients. Read more about this groundbreaking work on [the LRZ website](#).



Science intelligently secured

Artificial intelligence supports security: The Leibniz Supercomputing Centre (LRZ) has its computer systems and networks monitored by smart programmes. They permanently and automatically search for patterns in the technical data on access to the Munich Science Network (MWN). They recognise whether a person only needs an IT service or whether a botnet is attacking systems. In this case, the smart programmes sound the alarm - and the [Computer Security Incident Response Team \(CSIRT\)](#) has its hands full: "In just a few minutes, a security incident can disrupt the operation of our computers and systems," explains Stefan Metzger, computer scientist and head of the team. "We analyse the [incident](#), immediately protect our resources, inform the institutions involved and our customers and make sure that the services work reliably again." IT security is becoming increasingly important, and Bavarian science, universities and research institutes are also arming themselves against attacks and data loss with the help of the LRZ - it's time we introduced you to the CSIR team and its work on [the LRZ website](#).



Figures of the Month

It is and remains hardworking, the SuperMUC-NG: this year alone, its **311,040** computing cores have computed **962.2 million** hours for science and research, processing **277,375 jobs**. Since its launch in 2019, this has added up to **1.7 million** jobs for **430 projects** and around **6.2 billion** computing hours. **1,200** researchers work with the SuperMUC-NG: in addition to physics and fluid mechanics, it computes for chemistry, biology, medicine, geosciences, materials sciences, mechanics and engineering, and informatics specialists also work with it: **10** disciplines on one supercomputer - that is also an achievement of this system. In Europe, SuperMUC-NG is currently the **10th** fastest supercomputer: no longer under the fastest, but certainly one of the most versatile.



WORKSHOPS & EVENTS

Invitation to the birthday of LRZ

60 years and not a bit old-fashioned: The LRZ turns 60 and celebrates its birthday with researchers, teachers, interested people and politicians on **July 14, 2022**. In the morning, invited guests will discuss the past and future of the LRZ, in the afternoon, young scientists will present their work for computer science in many rounds of lectures, and researchers will give practical insights into their work with SuperMUC-NG and the high-performance computing resources of the academic computing center in Garching. Those who come to Boltzmannstr. 1 in the afternoon can take a look at the SuperMUC-NG in person. [Information](#) registration for afternoon: events@lrz.de

Programming GPU with Open ACC

Big Data in research can be efficiently analysed with the help of artificial intelligence: In this three-day classroom course at the High Performance Computing Centre Stuttgart (HLRS) from **12 to 14 July 2022**, researchers will learn on-site how to accelerate applications using the open source programming scheme Open ACC, how to use and train neural networks with data. Another topic on the agenda: how multilayer networks can be parallelised. Participants can expect a mix of lectures and practical exercises - good if they already have their own ideas for data evaluation with artificial intelligence. [Information & registration](#)

Artificial Intelligence in Research

Artificial Intelligence methods in research will be debated at the symposium "Artificial Intelligence: Machine Learning and Pattern Recognition" of the Bavarian Academy of Sciences and Humanities (BADW) on July 22, 2022, starting at 1:30 pm. Scientists conducting research in Bavaria will show what is possible with AI today and how it will influence our lives in the future. They will also talk about the risks, such as the prejudices or misconceptions transported from data. [Informations](#), registration at post@technologieforum.badw.de

Festival of Future 2022

Climate crisis, pandemics, growing energy demand: From **July 22 to 24, 2022** the Festival of the Future in Munich will present ideas and innovative technologies for a future worth living and debate ways in which we can quickly achieve climate neutrality. The topics include sustainability, biotech, mobility, quantum, the Internet and outer space. In addition to the exhibition and conference, there will be debates, talks and workshops throughout the city. The LRZ will be there with its partner IQM and will show the latest developments in quantum computing. [Information and registration](#)

Deep learning in one week

Learn about and practise smart data analysis in one week: The Leibniz Supercomputing Centre (LRZ) is hosting the Deep Learning Week online from **25 to 29 July 2022**. Experienced instructors will introduce participants to smart methods of data analysis and show them how to build and programme neural networks and train them efficiently with data. The use of the LRZ Artificial Intelligence Systems (LAI) and the pitfalls of image and speech recognition are also covered. [Information & registration](#)

Introduction to LRZ systems and flow simulations

Simulating gases, liquids, flows: These are tasks that are carried out particularly frequently on SuperMUC-NG and the LRZ's High Performance Computers (HPC). On **10 August 2022**, Master's students and doctoral candidates can get an idea of the possibilities, get to know the Linux cluster, the LRZ supercomputer and software and algorithms for computational fluid mechanics or computational fluid dynamics. And of course it's also about the workflows - how to access and use the resources and plan or organise your own work. [Information and registration](#)

The Olympic Games of 1972 in photos

The photo exhibition "The Olympic Games 72 in Images" will be continue **until 4 September 2022** at the Bavarian State Library. On display are 140 photographs, among others from the Stern Archive and other photo collections of the State Library, from the period between 1965 and 1972. They show how Munich changed with the first underground lines and the modern, architecturally still interesting Olympic Centre, the joyful atmosphere of the Games, but also the shock caused by the assassination attempt on Israel's team in the Olympic village. Worth seeing. [Information](#).

Energie efficiency und climate neutrality

According to the European Union, data centers should be climate-neutral by 2030. Will this be achieved? And how? That's the topic of the Data Center Dialog in Berlin on **September 8, 2022**. Data center specialists from all over Germany will present their strategies for reducing energy requirements, utilizing waste heat and energy-efficient cooling of IT and computer resources. For the LRZ, Laura Schulz, responsible for strategies and partnerships as well as for the quantum computing department, will talk about hot water cooling, but also about innovative methods to accelerate supercomputing for research. [Information and registration](#)

Researching and computing with Trilinos codes

The European Trilinos User Group (EuroTUG) is a workshop from **12 to 14 September 2022** for scientists and researchers who use software and libraries of the [Trilinos Project](#). The workshop will focus on applications in linear algebra, linear equation solvers, non-linear solution methods, discretisation techniques for partial differential equations and optimisation methods. This year, Dr. Alexander Heinlein from TU Delft, developer of the Trilinos package "FROSch" and Dr. Matthias Mayr from the University of the Federal Armed Forces Munich, developer of the package "MueLu" are organising the workshop. The workshop will probably take place hybrid, i.e. in presence and online. On 12 September, a preliminary course will introduce the basics of Trilinos (especially sparse linear algebra using Tpetra). On the other days, there will be talks on the Trilinos project, for example by Mike Heroux, Sandia National Laboratories. [Information & registration](#)

Programming with C++

Programming languages like C++ are tools that help to plan work processes systematically, logically and consistently. In a three-day workshop from **21 to 23 September 2022**, participants will learn the tricks and tips for handling and programming with C++. As with many other modern programming languages, the difficulty in writing C++ code lies in making decisions, such as which functions to use and how. The workshop will therefore focus on programming, functions, but also project management and debugging. If you are already planning a research project with C++, please bring your concept, ideas or preliminary work with you. Otherwise, you will learn with application examples from the natural sciences and mathematics. [Information and registration](#)

Improving and transforming Websearch

Open, transparent Internet search without tracking will be the focus of the fourth, international Open Search Symposium #OSSYM2022, **October 10-12, 2022**, at the CERN supercomputing center in Switzerland. The event will be broadcast online and will bring together specialists from around the world who want to improve the way information is searched for online. In addition to presentations on search algorithms, the program will address ethical issues surrounding search and the business done with the data collected from it, as well as educating students and citizens about the Internet and search. This is currently being compiled.. [Information und registration](#)

Téchné Summerschool at LRZ

Data scientists will meet for the Téchné Summer School from **October 10 to 14, 2022** at the LRZ and will focus on language data. Workshops and lectures will show how to filter out sentiments or other important topics, and there will also be lots of advice on describing and storing research results using language data. Lectures will discuss issues related to copyright and open licenses. And of course, participants can visit the LRZ's supercomputers and virtual reality and visualization center and learn about other (data) projects. The Summerschool is organized by the Campus Network for Digital Social Sciences and Humanities of the Ludwig-Maximilians-University Munich, the University of Regensburg and the Friedrich-Alexander-University Erlangen, [Information und Anmeldung](#)

Introduction to LRZ systems and flow simulations

Simulating gases, liquids, flows: These are tasks that are carried out particularly frequently on SuperMUC-NG and the LRZ's High Performance Computers (HPC). On **October 12, 2022**, Master's students and doctoral candidates can get an idea of the possibilities, get to know the Linux cluster, the LRZ supercomputer and software and algorithms for computational fluid mechanics or computational fluid dynamics. And of course it's also about the workflows - how to access and use the resources and plan or organise your own work. [Information and registration](#)

ANSYS Fluent for Computational Fluid Dynamics

Consisting of 13 lectures and about 6 practical exercises, this seminar, which runs from **October 27 to December 8, 2022**, introduces the use of the fluid dynamics software package ANSYS Fluent. This supports computations and simulations of computational fluid dynamics in particular. Participants will learn about typical CFD workflows for ANSYS and application examples. In addition, they learn how ANSYS works and is integrated on the LRZ Linux cluster. For this they will receive the Linux Primer. Participants should know the basics and numerical methods of fluid mechanics and have completed first calculations. [Information & Registration](#)

Improving and accelerating supercomputing

Arrived in the exascale era: The latest supercomputers from the U.S. and Japan can already perform a trillion calculations or FLOP per second, and their performance and new exascale systems are the focus of SC2022 from **November 13 to 18, 2022**, the international conference on high-performance computing (HPC), networks, storage and data analysis, which is being held this year in Dallas. Of course, it's all about innovative supercomputing technology, but above all it's about how supercomputers can compute and work even faster with the help of quantum computing and artificial intelligence (AI) methods. Speed is also a form of energy efficiency in computing, and ways to achieve more economical cooling will also be discussed at SC2022. [Information und registration](#)

Introduction to LRZ systems and flow simulations

Simulating gases, liquids, flows: These are tasks that are carried out particularly frequently on SuperMUC-NG and the LRZ's High Performance Computers (HPC). On **December 14, 2022**, Master's students and doctoral candidates can get an idea of the possibilities, get to know the Linux cluster, the LRZ supercomputer and software and algorithms for computational fluid mechanics or computational fluid dynamics. And of course it's also about the workflows - how to access and use the resources and plan or organise your own work. [Information and registration](#)

USED THINGS FOR FURTHER SERVICE

The LRZ is always getting rid of used hardware and furniture - a constantly updated list of things we want to give away can be found [online](#). Here you can also read where to direct your interest. The equipment and furniture are free of charge for institutes, chairs and other research institutions.

JOB OFFERS

You will find an international and diverse team in Garching, which is constantly growing. If you don't find a suitable job profile below, please visit the [career page](#) of the Leibniz Supercomputing Centre or send an [unsolicited application](#). We are LRZ - and curious about you!

- [System engineer](#) Kubernetes / Linux
 - [High-Performance Computing \(HPC\) engineer](#) for the management of codesign and for construction of the next supercomputer
 - [HPC software engineer](#) for the planned Munich Quantum Software Stack and quantum projects
 - [Expert for High Performance and Parallel Computing](#) with focus in life science, medicine, chemistry
 - [Programmer](#) for GPU accelerated HPC Applications
 - [Computational scientist](#) for methods and application of artificial intelligence and data analytics
 - [Software developer](#) for research data management
 - [IT specialist](#) for Life Science, medicin, digital und e health
 -
 - [DevOp](#) for IT service management tools
 - [IT specialist or system consultant](#) for the multi factor authentication
 - [Researcher](#) for Managed Security Services
 - [IT specialist or system consultant](#) für IT Security
 - [IT engineer](#) for support of Windows Server and for new Microsoft services

 - [Apprentice](#) for IT specialist
 - [Apprentice](#) for technician in IT system electronics

 - [Administration stuff](#) for the reception and office work
 - [Assistant](#) for the LRZ-Directors and main office
 - [CRM-Manager](#) in part time (20 Hrs) for operations of CRM system

 - [Student Assistant](#) for the development of ITSM software
 - [Student Assistants](#) for new services for research data management
 - [Student Assistants](#) for the ServiceDesk
-

MORE TO READ

Here you will find links to latest information from the german-european supercomputing community and our cooperation partners

- The [newsletter](#) of the Bavarian Academy for Science and Humanities
 - [Publications](#) of the Gauss Centre for Supercomputing (GCS): GCS-News und Inside
 - [Infoletters](#) of the Gauß-Alliance
 - Publications of PRACE: [PRACE Digest, Jahresbericht](#)
-

INFORMATIONS & IMPRINT

- The LRZ Newsletter is published in German and English. You can find the latest and former editions on the [LRZ-Website](#).
- You have problems displaying the newsletter? Please send a [description](#) of your problem to <pr-team_AT_Irz.de>. Thank You!
- You can subscribe or unsubscribe the LRZ-Newsletter via our [website](#).
- Current information about the LRZ and about courses and events can also be found on [Twitter](#) and [LinkedIn](#).

Editor:

Leibniz-Supercomputing Centre (LRZ) of the Bavarian Academy of Science and Humanities

Boltzmannstraße 1

D-85748 Garching

Phone: +49-89-35831-8000

Telefax: +49-89-35831-9700

E-Mail: pr-Team_AT_lrz.de; newsletter_AT_lrz.de

Twitter: [LRZ_DE](#)

LinkedIn: [Leibniz-Rechenzentrum](#)

Editorial Office: PR-Team

E-Mail: pr-team_AT_lrz.de; newsletter_AT_lrz.de

Photos: Fly d'Art/Unsplash, V. Hohenegger/LRZ, Chair Computational Mechanics/TUM, Nejc Soklic/Unsplash