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NEWS

Exciting Development: 25 Years of Archive and Back System

At night, the work of the robots begins with a whirring sound in the data and archive room of the Leibniz Supercomputing Centre (LRZ): with their gripper arms, they pull tapes out of the compartments of the libraries, store on them the 40 million backup copies that around 5,000 computer systems in the Munich Scientific Network (MWN) send to Garching every day, and put them back

again. 25 years ago, the LRZ centralised data storage - Werner Baur accompanied the change, saw the archive and backup system (ABS) grow above all: "Data is becoming more and more important in our society, it must not be lost," he says in the interview, which you can find on the [LRZ website](#). "That was true 25 years ago and is even more true today. Today, the security measures are correspondingly multi-level, at the end of which, as the 'last line of defense' so to speak, is our archive and backup system." Baur is wonderful at telling stories about technical change, about the special needs of the scientific data that the LRZ usually collect, about the Sisyphean and detective work of his team in recopying tapes and tape libraries. And he can back up his knowledge with impressive figures. This is definitely [worth reading](#).

By the way, if you are interested in developing and maintaining the LRZ's archive and backup system, Werner Bauer and his team are currently looking for new staff and

student assistants. Read more in the LRZ [job advertisements](#).

Tips and Tricks for more Security

The numbers make you think: every [39 seconds, there is a cyber attack](#) on a company's systems in Germany, that's around 2244 per day. The attackers mainly target relevant customer or offer data. In 48 per cent of the cases, they succeed in accessing the systems via contaminated mail attachments; in 80 per cent with the help of phishing, i.e. directly addressing employees through fraudulent websites, mails or messages. In Corona times, [67 percent of attacks](#) take place while employees are working from home: Google registered 18 million fraudulent mails alone, in which data thieves try to obtain mail addresses and other information with Corona themes. "Cyberattacks put our businesses, our critical infrastructures, our data and the functioning of our democracies at risk. Even the slightest vulnerability in our digital environment is exploited by cybercriminals," warns the European Commission. Since 2013, it has



been organising October as [EU Cybersecurity Month](#), with many actions to encourage users to think and protect their systems. After all, 95 percent of data attacks are based on human error - credulity with attachments, passwords that are far too simple, inadequate security of data traffic.

As a scientific computing centre, the Leibniz Supercomputing Centre (LRZ) supports #CyberSecMonth 2021. On the social media channels on [LinkedIn](#) and [Twitter](#), we present simple and easy-to-implement measures that followers and users of LRZ services can take to secure themselves. "Unencrypted emails are unprotected like postcards, anyone can read them," says Miran Mizani, IT architect in the LRZ security team. "That's why you should either not send sensitive information in them or encrypt them. In addition, you should check the sender's address when receiving emails - mistakes in the spelling indicate fake addresses and fraud." For those who want to dive even deeper into security topics - the technical university Braunschweig is offering a [series of lectures on cyber security](#) until 4 November 2021.

By the way, the LRZ security team is currently looking for [\(business\) computer scientists and student assistants](#) who want to promote security in the Bavarian research landscape.

E-Mails verschicken

Unverschlüsselte E-Mails sind so sicher wie Postkarten...



Deshalb:

- ✓ keine sensiblen Informationen versenden
- ✓ E-Mail-Verschlüsselung nutzen
- ✓ Dateien nicht als Anhang senden, sondern (passwortgeschützte) Download-Links nutzen (z.B. über LRZ Sync&Share)

#CybersecurityCheck 

Practical HPC Technology and Excellent Research

HPC in the cloud, preparation for exascale systems, the future mix of super and quantum computing and many simulations from a wide range of research areas: From November, 14 until 18, 2021, specialists in High Performance Computing (HPC) will meet at [Supercomputing 2021](#) - partly in person, partly digitally. This year, the motto of the world's most important HPC conference and trade fair is "Science and Beyond". „This means HPC can power a range of use cases to tackle the world's toughest challenges, unlock discoveries, and open up new frontiers – on land, in the depths of the sea, and in outer space“, [Bronis de Supinski](#) says. As

General Chair the Chief Technology Officer at Lawrence Livermore National Laboratory (LLNL) is responsible for SC21 science programme. „Each year at the SC conference, we demonstrate the power of highperformance computing (hpc) by showcasing breakthrough discoveries and innovation. We also offer a glimpse of the ways that hpc is expanding beyond scientific and academic communities to inform other industries, improving research and business outcomes.“ Insights into [new hpc technologies](#), as well as exciting research results, can therefore be expected from SC21. The keynote address at the event will be given by internet pioneer Vint Cerf, who, among other things, helped develop the structure of the internet as well as the TCP/IP protocols. The multi-award-winning computer scientist will ask himself and the audience whether supercomputing has a similar groundbreaking effect on thought and action as studies into language, literature and art.

Staff and users of Leibniz Supercomputing Centre (LRZ) will also present research work and useful software or new methods for supercomputing at SC21. Since SC21 is hybrid and takes place in St. Louis/USA as well as digitally. So it is easier to participate in lectures, discussions or workshops. The programme items with the participation of LRZ:

- Energy efficiency in supercomputing is also becoming relevant with regard to the growing power of new systems: Hopes are also pinned on [data analysis and smart control](#). Dr. Michael Ott and Alessio Netti from the LRZ will discuss with colleagues from all over the world how the analysis of operating data from HPC systems can be unified and standardised in order to be able to compare and research the effect of technical interventions.
- Openly accessible HPC resources for researchers are the topic of a panel discussion in which David Brayford presents the LRZ's cloud and container concepts, including tools and technology. Together with colleagues from the Irish Centre for High-End Computing (ICHEC), the HPC specialist at the LRZ will present the paper "Deploying Containerized QuantEX Quantum Simulation Software on HPC Systems" in a workshop, as well as concepts on how tensor networks, i.e. variational wave functions for new quantum systems, can be simulated on the exascale HPC systems.
- The European research project [CHEESE](#) deals with the research of tsunamis and earthquakes and develops algorithms and software for this purpose also with the help of the LRZ and its supercomputer SuperMUC-NG. The team demonstrates the first petascale production runs and scaling studies for a pilot demonstrator to calculate the interaction of tsunamis and earthquakes. <https://cheese-coe.eu/media/news/cheese-pilot-physics-based-tsunami-earthquake-interaction-paper-3d-acoustic-elastic>
- Elisabeth Mayer, expert for Virtual Reality at the LRZ, will present a [visualisation of the blood flow in the human forearm](#) and how this was created with the algorithm HemeLB as well as with the graphics software OSPRay. This work will be shown as part of the "SC's Scientific Visualization & Data Analytics Showcase" where five of best scientific visualisations are selected and at the SC the best is chosen. We wish good luck for the competition.



SC21
St. Louis, MO | science & beyond.

- Fingers are also crossed for the working group led by Professor Wolfgang Wall from the Institute of Computational Mechanics at the Technical University Munich (TUM): Their highly complex [digital model of the human lung](#) is competing for the renowned Gordon Bell Award, which honours excellent research work on supercomputers. With the support of the ComputationalX team, not only was a simulation code developed, but also a highly scaling solver for calculating respiratory functions. The group will present the paper about the work.



An Open Navigation through Internet

About 77 million people in Germany search for information on the Internet every day at Google. The search engine has a market share of more than 90 percent in Germany. This is similar in Europe and worldwide. Its closest competitor, Microsoft's Bing, reaches at least under 10 percent of internet users in Germany and just under 3 percent worldwide. Consequently, a single company provides orientation on the net and decides with its secret algorithms which information offers are listed where in the ranking of results. The [Open Search Foundation \(OSF\)](#) wants to change this - also with the support of the Leibniz Supercomputing Centre (LRZ): "An important partner for the Open Search Foundation," says Christine Plote, founding member of the OSF. "The computer resources of LRZ are already working on an open index for the internet. The best solution against the dominance of existing search engines is diversity." On the [LRZ website](#) you can learn more about the fascinating vision of open search and how the LRZ supports the OSF. If you want to see for yourself or contribute your experiences and ideas to the important grassroots movement, then you have the opportunity to do so from 11 to 13 October 2021: [The Open Search Symposium \(#ossym\)](#) brings together online activists, assigns tasks, discusses new search technologies and the need for rules and transparency in internet search. The programme offers interesting topics and speakers.

Quantum Computing in Earth Observation

Bavarian Quantum Computing eXchange (BQCX.de) is starting off again with a new concept after summer break: the Leibniz Supercomputing Centre (LRZ) will host its monthly meetings in future together with fellow institutions, in September with the German Aerospace Center (DLR) and with Airbus. "In this way, we strengthen the network effect and specifically bring participating projects and specialists together," explains Luigi Iapichino, head of the quantum computing team at LRZ.

Recognising Images and Controlling Satellites

At [DLR](#) and [Airbus](#), they are exploring quantum computing in two fields: satellite control and image recognition of Earth observation data. In four presentations, Prof. Dr Mihai Datcu, Soronzonbold Otgonbaatar, Dr Yilei Shi and Fan Fan from DLR Earth Observation, Dr Nikolas Pomplun from the German Space Operations Centre and Mathieu Picard from Airbus presented practical experiences. In image recognition and satellite control, they are experimenting with [quantum annealers](#), the first analogue quantum computers. "If you want to evaluate images automatically or calculate the best paths for vehicles or aircraft, you are inevitably confronted with mathematical optimisation problems," explains Dr Stefan Huber from the LRZ Quantum Integration Centre (QIC). "That's what quantum annealers are made for." These computers are not (yet) as precisely programmable as universal quantum processors, but they could be able to model certain probability distributions and combinatorial questions faster. Characteristics of such tasks: Few alternatives open up too many variants, and these are difficult to model even with supercomputers.



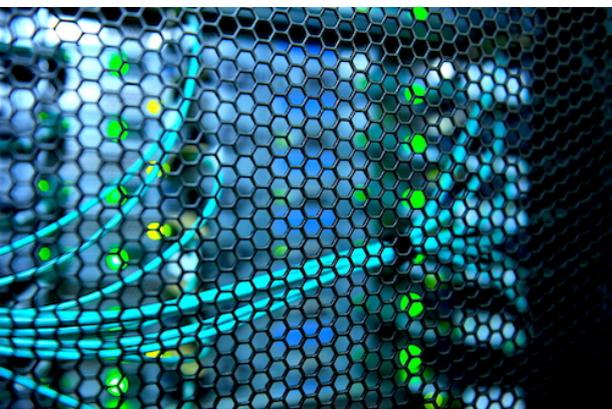
Theoretically, more than a tredecillion combinations would be possible for planning a flight path over 58 regions of the earth; annealers sort out the best solutions heuristically and calculate several variants simultaneously. [Tests by Airbus and DLR](#) confirm that the method can work: according to data and quantum specialists Picard and Pomplun, the paths and positions for satellites [annealers calculated](#) from test data could be compared with those of conventional computers, results came sometimes much faster. If the existing precision problems of annealers are solved, they could be developed and expanded into a control instrument for satellites. Annealers could also be used to control the position of missiles: Based on mathematical control theory, engineers Shi and Fan built a system for this with the help of grade and Hamiltonian algorithms, which is now to go into testing: "DLR or

Airbus are not yet using annealers in everyday life, but it is interesting that they are already working on quantum computing," Huber reports. "I was surprised in the lectures that the quantum systems calculated useful results from real data, but also that many satellites control their position themselves. I didn't know that before."

A more precise view is called for

When it comes to image recognition, however, quantum annealers don't quite play up their computational advantages, according to the [experience of Datcu and Otgonbaatar](#). The two experts in Earth observation adapted artificial neural networks for the evaluation of hyperspectral satellite images for quantum annealers. While the human eye composes the world multispectrally in the wavelengths of red, green and blue, the sensors of satellites take images line by line and via optical filters of very many frequencies that are close to each other. This makes many more details of the Earth's surface visible. Satellites send several Terabytes of such images to Earth every day, they are analysed on a computer and usually sorted by artificial intelligence. In experiments, Datcu and Otgonbaatar found that quantum annealers also manage these tasks - but not quite as precisely as conventional computers.

The next BQCX meeting will take place on 13 October 2021, with a focus on optimization and error correction in quantum computing, on 10 November from 4 p.m. onwards it will be about initial experiences at the LRZ in using the Atos Quantum Learning Machine, and on 8 December students will present research projects before Bavaria's quantum community celebrates Christmas. You can register to our mailing list to receive the meeting announcements and connect to our community: bqcx@lrz.de



Round about 150 New Concepts for MPI

Innovations for supercomputers at software and hardware level are changing programming languages and standards. In summer, the fourth major release of the Message Passing Interface (MPI) was published, and in mid-September these were discussed by researchers and users during [EuroMPI21](#). "The EuroMPI was planned to be shorter this year," reports Prof. Dr. Martin Schulz, Director of the Leibniz Supercomputing Centre (LRZ) and co-organiser of the conference. "The conference day was spread over two afternoons and the content was more focused on MPI standardisation. This was obviously very well received." In about [150 new functions](#), MPI 4 now includes fundamentally new concepts for the exchange of messages between computing nodes and thus for increasing the performance of high-performance computers (HPC). The first

practical experiences with the MPI 4 standard were a topic during EuroMPI21, but also the preparation of the programming scheme for the next performance level of supercomputers. You can find out more about EuroMPI21 and its new functionalities on the [LRZ website](#).

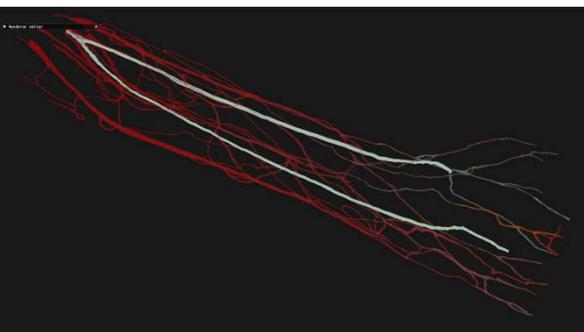
Supercomputing for Medicine and Drug Research

What happens in the human body during a heartbeat? We don't really know actually. Even if the functioning of the heart, brain and organs is known, we can - if at all - only take snapshots of their work. Computer technology helps to track down the human being: It was the focus of the [CompBioMed Conference](#) in mid-September, in which the Leibniz Supercomputing Centre (LRZ) was also involved. Prof Dr Dieter Kranzlmüller, head of the LRZ, and Dr David Wifling from the ComputationalX team moderate the [conference panel](#) "Towards Exascale – Validation, Verification and Quantification of Uncertainties", Elisabeth Mayer from the Centre for Visualisation and Virtual Reality (V2C) showed the [visualization of blood flow](#) in the forearm.

"Visualizations, models and simulations not only illustrate body functions such as blood flow, they now also give a better insight into molecular processes," Wifling summarises impressions from the conference. "That's why more and more computing power and computer performance is needed, hopes rest on exascale systems, but also on quantum computing." On the one hand, modelling down to the molecular level is going into more and more detail; on the other hand, researchers want to simulate body events for longer. The exciting simulation and visualisation of blood flow in the forearm illustrates this: it shows what happens during a heartbeat in the forearm. For the short sequence, more than 220 million data points were elaborately calculated, modelled and visualised. More than 7 gigabytes of data were collected per output step. Only supercomputers can handle such quantities, but they have their limits: Doctors and researchers could learn more from it if they could watch the blood flow for longer. At [CompBioMed](#), they are working also on advancing simulations from the micro to the millisecond range and are also looking at the next performance levels of high-performance computing (hpc): "That's really a difficult challenge, Exascale therefore is becoming more and more important for CompBioMed. The first systems that the centre of excellence wants to use will soon be set up in Europe," reports Wifling.



Researchers discussed during the Virtual Human Conference how existing CompBioMed software such as [HemelB](#) (blood flow) or [TIES](#) (molecular compounds) can be adapted to new Graphic Processing Units (GPU) and to the new systems, thereby compensating for uncertainties in computing. Another topic: pattern recognition and machine learning as methods for diagnosis



and the search for active agents against diseases. The centre of excellence has participated in the research around COVID-19, searching for substances against SARS-Cov-2 viruses and exposing its techniques to a practical test. In addition to active substances, ideas were collected for optimising smart systems that help improve drug research. SuperMUC-NG also searched through libraries of chemical substances for CompBioMed. Such tasks can be better organised with the [QCG Pilotjob software](#). This is being tried out in practice at SuperMUC-NG: "With QCG Pilotjobs, several simulations on molecular dynamics can be distributed and processed simultaneously on the nodes of an HPC system," explains Wifling. Whether and how this helps to accelerate the search for effective substances will possibly be the topic of the next CompBioMed conference.

Figures of the Month

Service in numbers: **4** employees at the Leibniz Supercomputing Centre (LRZ) developed the Configuration Management Data Base, or CMDB for short. Recently introduced, CMDB already lists **148,000** items, including, for example, more than **5500** installed access points, **256** firewalls, **1,486** servers, the equipment of almost **500** workstations in the LRZ and at Munich universities, as well as **2,853** virtual machines. CMDB was developed for the certification of IT service management according to ISO/IEC standard **20,000** and continues to grow almost daily.

WORKSHOPS & EVENTS

Research, Understand, Act

[Forscha](#) invites schoolchildren and science enthusiasts to the Deutsches Museum from **October 8 to 10, 2021**. At the Munich Science Days, visitors can take a look at current research projects and be inspired themselves. [BAYSICS](#), the app and database that provides readings from Bavaria on climate change and plant development for school assignments, civic engagement or curiosity.

Building an Open Search

Experience new search technologies, discuss strategies on how to break the dominance of Google, Bing, Yandex or Alibaba: The Open Search Foundation (OSF) invites you to the third Open Search Symposium #ossym from **October 11 to 13, 2021**, hosted this year by CERN in Geneva. During the digital conference, new tasks will certainly be distributed - the OSF is, after all, working on an open search index, harnessing data centers such as the LRZ or the CERN and many, many enthusiasts who are committed to openness and transparency on the Internet. If you want to get involved, network or learn more about innovative search technologies, this is the place to be. [Information & Registration](#).

Learning to Deal with Data

Analyzing data and building smart systems or artificial intelligence for evaluation is one of the tasks of researchers and scientists today. From **October 11 to 15, 2021**, you can learn this intensively at the LRZ. Specialists from LRZ, Intel and SigOpt will introduce the basics of data analytics. Participants can get to know the HPC resources of the LRZ, the cloud and container technology, but also the first tools and construction kits for their own smart systems. As usual with the LRZ workshops, theory and practice are mixed in the courses - bet that you will enjoy working with Big Data even more afterwards. [Information & Registration](#)

Awakening Interest in MINT

[TUM-Junior](#) is the name of a new series of events with which the Technical University of Munich aims to awaken the interest of 5th, 6th and 7th grade students in the natural sciences, mathematics, computer science and technology, the so-called MINT subjects (see a report on [Deutschlandfunk](#)). Lectures, research projects with school classes and guided tours are on the program: The Leibniz Supercomputing Center (LRZ) is one of the exciting destinations and teaches students about the possibilities of supercomputing and what is possible in research today with visualizations. The first tours will take place on **October 11, 2021**, with more to follow **until mid-December**. Registration only via the participating schools.

Detecting Errors in Quantum Computing

In October, the Bavarian Quantum Computing eXchange network (BQCX) will focus on debugging and optimizing error and uncertainty. Bavaria's quantum community is organizing its monthly meeting on **October 13, 2021**, starting at 4 p.m., together with the University of the Federal Armed Forces in Munich and Dr. Sabine Tornow, who is advancing research on quantum computing at the Institute for Cyber Defense CODE. Security issues will also be addressed - quantum computing is suspected of making it easier to crack existing security measures. Register at bqcx@lrz.de

Combining Supercomputing with Quantum Computing

Quantum processors are now moving out of the labs and into the real world - and they need supercomputers to be guided and controlled. This integration is the topic of a workshop from **October 18 to 22, 2021**, organized by the Leibniz Supercomputing Center (LRZ) together with the Technical University of Munich as well as the Technical University of Denmark (DTU) as part of Quantum Week. Participants can also look forward to first experiences and many practical recommendations. The workshop is embedded in the Quantum Week trade fair and conference of the Institute of Electrical and Electronics Engineers (IEEE), which will also take place online from October 17 to 22, 2021, and will showcase the latest technologies, discuss possible applications, and provide an introduction to future technology in tutorials. [Information & Registration](#) Workshop. Information about the [conference programme](#).

Introduction to ANSYS CFX

10 lectures and about 5 practical exercises to get familiar with the ANSYS programs: This online course from **October 18 to 22, 2021** is intended for students and researchers with a good knowledge of fluid mechanics and the numerical methods to compute it. Initial experience in computational fluid dynamics (CFD) is welcome. Participants will get to know the ANSYS software package CFX and its functionalities and will learn the most important steps for its use on the LRZ Linux cluster and other high performance computers. Last but not least, possibilities for workflow automation with Python in combination with the CCL/CEL scripting language of ANSYS will be covered. [Information & Registration](#)

Classifying Texts with Speech Applications

We've been doing it in everyday life for a long time: using speech assistants, corresponding programs for processing speech (Natural Language Processing or NLP) are now spreading into research with AI assistants. The online course on **October 19, 2021** introduces NLP techniques for processing, analyzing, and generating text-based data. Researchers can use these techniques to create their own NLP applications and enable human-computer communication using chatbots, voice agents, and other speech applications. Deep-learning models are gaining importance because they generalize language, and transformer-based models, such as Bidirectional Encoder Representations from Transformers (BERT), are driving NLP further because their features provide high accuracy in text evaluation. In this course, you will learn how to use BERT and other language applications for text classification. [Information & Registration](#)

Cybersecurity for Europe

At the end of Cybersecurity Month, CONCORDIA; the community for cybersecurity in Europe, will open its platform on **October 20 and 21, 2021**, offering insights into tools, technology and research projects as well as qualification offers developed to protect data and systems. In addition to talks and presentations, the [CONCORDIA website](#) alone is worth a visit, as interested parties will find plenty of networking there. [Information & Registration](#)

Modeling with ANSYS Fluid

Calculating and modeling flows - this is where the ANSYS Fluid software package comes in. Over six days starting on **October 28 and ending on December 2, 2021**, this online course provides insights into the functionalities and possibilities that ANSYS Fluent offers researchers. Included are practical exercises with the program package, as well as an introduction of the Linux cluster of the Leibniz Computing Center. Last but not least, possibilities are shown to automate and individualize work steps of ANSYS Fluent with Python and the ANSYS script languages Fluent TUI and Fluent Expression. Participants should have previous knowledge of fluid mechanics as well as numerical methods for the calculation of flows. [Information & Registration](#)

Optimizing HPC Codes

Researchers should be able to optimize their algorithms to get more performance out of supercomputers and make the computing nodes work faster. In the PRACE workshop on **November 2, until November 4, 2021**, they will learn strategies and methods for this and lots of tricks from HPC specialists. New processors and innovative parallel computing systems will also be touched upon - optimization in the age of the first exascale computers. [Information & Registration](#)

Working with the QLM from Atos

The Quantum Learning Machine (QLM) from Atos is a system to which the Leibniz Supercomputing Center (LRZ) provides access and with which researchers can develop initial applications for quantum computing. At the Bavarian Quantum Computing eXchange (BQCX) meeting on **November 10, 2021, starting at 4 p.m.**, practical experiences in using the machine will be exchanged, and participants can expect many tips and tricks from the LRZ and Atos. Registration bqcx@lrz.de

Trends in Supercomputing

The next [Supercomputing \(SC21\)](#) has already been scheduled. The US counterpart to ISC will start on **November 14, 2021**. For this conference and exhibition, the Leibniz Supercomputing Center is sending HPC and visualization projects into the race, research partners are presenting papers and have already been nominated for the prestigious Gordon Bell Prize. For the anticipation: The SC has opened a [Youtube channel](#), where you can already find some interesting insights into supercomputing

Telling stories with immersive techniques

Virtual, augmented and mixed reality are ideal for explaining research and science or for telling stories: From **November 15 to 19, 2021**, the European Creator's Lab will deal with these topics, present works and give game developers, designers, programmers, authors, journalists, students and researchers the opportunity to network and develop projects together. The Creator's Lab is organized by the XR Hub in Bavaria and takes place online. [Information & Registration](#)

HPC and Computational Fluid Dynamics at LRZ

On **November 17, 2021**, young scientists will be introduced to the use of the Linux cluster at the Leibniz Supercomputing Center (LRZ) and in particular to the possibilities of Computational Fluid Dynamics, i.e. the numerical representation of fluid dynamics. Introduced. Prior knowledge of HPC is not expected, but is certainly welcome. [Information & Registration](#)

Software Design with C++

Object-oriented (OO) software design with the C++ programming language is the focus of this three-day workshop **from November 17 until 19, 2021**. Experts will discuss with participants the development principles, concepts, idioms and best practices for coding professional algorithms and applications. The course does not cover specialties of C++, but provides guidelines for developing mature, robust, and maintainable C++ code. [Information & Registration](#).

The challenge of Quantum Computing

Quantum technologies are still young and in the experimental stage. But the community is already networking and discussing innovations, challenges and opportunities: from **29 November to 2 December 2021**, for example, at the European Quantum Technology Conference, which will take place virtually. [Information & Registration](#)

Addressing the new GPU with CUDA C++

Compute-intensive CUDA C++ applications in high-performance computing (HPC), data science, bioinformatics, and deep learning can be accelerated by using multiple graphic processing units (GPU), which can increase throughput and reduce overall runtime. Combined with concurrent computation and memory transfer overlap, computations can be scaled across multiple GPUs without increasing memory transfer costs. In this course on **November 30, 2021**, participants will learn how to write CUDA C++ applications and improve application performance. [Information & Registration](#)

Stimulate compute nodes properly

Even application developers familiar with OpenMP and MPI often don't know exactly how much performance their code could achieve in the best case. This online course from PRACE on **December 1, 2021**, therefore covers performance engineering approaches at the compute node level and provides an understanding of the interactions between software and hardware. If you want to properly utilize compute nodes you must start at the core, socket, and node level, where the code that does the actual compute work is executed. We will introduce the basic architectural features and bottlenecks of modern processors and compute nodes. [Information & Registration](#)

Research around Quantum Computing

Shortly before Christmas, the Bavarian Quantum Computing eXchange (BQCX) will meet again: On **December 8, 2021**, young scientists will present their research questions and projects in the network. These will also be of interest to older users. Afterwards, they can celebrate and network at the virtual Christmas party. Registration: bqcx@LRZ.de

HPC and Computational Fluid Dynamics at LRZ

On **January 19, 2022** young scientists will be introduced to the use of the Linux cluster at the Leibniz Supercomputing Center (LRZ) and in particular to the possibilities of Computational Fluid Dynamics, i.e. the numerical representation of fluid dynamics. Introduced. Prior knowledge of HPC is not expected, but is certainly welcome. [Information & 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 [here online](#). Employees of universities and authorities can register their interest under the mail addresses [<althardware@lrz.de>](mailto:althardware@lrz.de) or for furniture under [<GM@lrz.de>](mailto:GM@lrz.de). The equipment and furniture are free of charge.

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!

[IT Systemadministrator](#) for the development and organisation of security concepts for Windows client systems
[Site Reliability Engineers](#) for the development of the Data Science Archiv und storage solutions
[System-Engineer](#) for the development of cloud storage solutions
[IT-Specialist](#) for security and penetration testing
[IT-Specialist](#) for IT security, analysis and protection against cyberattacks

[Student Assistant](#) for Media Design
[Student Assistant](#) for development of ITSM software
[Student Assistant](#) for web Backend and the BAYSICS portal
[Student Assistant](#) for service desk

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](#).
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- 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](#).

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