



LRZ-Newsletter August 2020

NEWS

- Europe's IT security offensive**
- Certification renewed: Further milestone achieved**
- Bavarian Minister for Science and the Arts Sibler at the LRZ**
- Smartphones - the mirror of personality**
- The LRZ in the media**
- Figures of the month**

WORKSHOPS & EVENTS

- Iterative linear Solver and parallelization**
- Deep Learning und programming**
- Fortran for Advance**
- Introduction to the supercomputer of LRZ**
- Introduction in ANSYS Fluid Dynamics**
- C++ for software-engineering**
- Handling the supercomputers of LRZ**

JOB OFFERS

MORE TO READ

INFORMATIONS & IMPRINT

NEWS

Europe's IT security offensive

Hackers took over Twitter accounts of well-known entrepreneurs and politicians in mid-July for fraudulent transactions. In May, supercomputers throughout Europe were compromised. And the German IT industry association Bitkom estimates the damages



caused by attacks on companies' IT systems in 2019 at more than 100 billion euros in Germany alone - twice as much as in the previous year. "Cybersecurity is becoming increasingly important, CONCORDIA is therefore building up a competence network for the topic in Europe and wants to create awareness in all areas of society," explains Reinhard Gloger, who is coordinating the work for the EU research project at the Leibniz Supercomputing Centre (LRZ).

Bundling experience and know-how

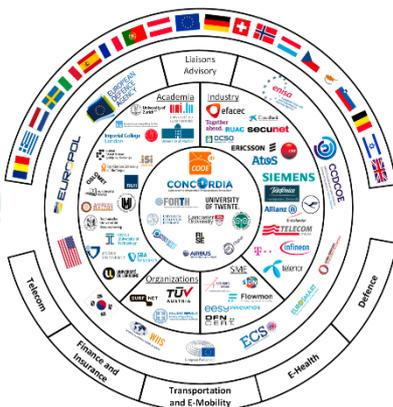
CONCORDIA stands for "Cybersecurity Competence for Research and Innovation". Since 2019 it has built an ecosystem for cybersecurity experts made up of universities, scientific compute centres such as the LRZ and companies from diverse industries. By now a total of 60 partners and more than 220 participants has joined. They are all already working on technical solutions, cryptography

and documentation methods, standards for data protection, data security and the control of IT and Internet services. CODE, the Research Centre for Cyber Defence at the Universität der Bundeswehr München (UniBW) is leading the efforts and continues to build and extend the ecosystem. The goal is to develop next-gen cybersecurity tools to improve IT products and services – all guided by the experience and the know-how existing in the project. "CONCORDIA is not a classic EU or Horizon2020 project," says Dr. Nils Gentschen Felde, Head of Cyber Defence at CODE. "Instead of basic research, it is primarily about building the ecosystem and bundling existing experience and knowledge."

Almost 25 million Euros are being invested by the EU, individual nations and companies in the project, which is intended to further strengthen Europe's position in digital technology. In particular, the e-health, electromobility, autonomous driving and flying, finance and telecommunications sectors are at the centre of efforts to achieve security and standards, to create secure spaces for IoT and for human computer interaction.

Combining knowledge on platforms

After an mid-term project review in June 2020 CONCORDIA is making good progress: The website already links to a catalogue of [various services](#) ranging from job offers for [security experts](#) and information to research results and beneficial [open source tools for small and medium-sized businesses](#). An interactive map of Europe shows qualification offers, specialists from various disciplines from forensics to risk management, from malware analysis to artificial security intelligence, monitoring or privacy issues are also listed. Founders and politicians can also find advice at CONCORDIA and contacts for the promotion of initiatives and business. Last but not least, the reporting procedures for cyber-attacks are currently being standardized in Europe, so that a clearing house can be formed from these reports to evaluate attack tactics.



The LRZ supports CONCORDIA as a service provider, organises communication services as well as platforms such as GitLab for the open source security tools. Above all, however, the LRZ is involved in training and research: "As task leader in this area, we are currently planning a so-called Cyber Range with various services in the Compute Cloud", reports Gloger. "This will allow attack scenarios to be simulated and strategic training to be improved." The software for setting up these virtual simulation environments is provided by partners such as the Czech Masaryk University in Brno. Together with KYPO, it has developed a platform for researching security risks and training defence mechanisms. In order to be able to use it online throughout Europe, interfaces are needed, also for the exchange of scenarios of other cyber ranges, which have been developed by UniBW, the University of Lorraine and other partners. The LRZ is developing a platform through which all these exercise scenarios can be accessed once centrally via the CONCORDIA website.

In addition, the LRZ cooperates with the Ludwig-Maximilians-Universität München (LMU) in Software Defined Networks, SDN: If even networks built from different technical components can be uniformly controlled online, this not only simplifies communication between the technology, but also increases security, because conflicts between different control modules are detected. CONCORDIA's SDN concepts could also help to better network different security solutions made in Europe and to intervene protectively in case of network manipulation. (vs)

Certification renewed: Further milestone achieved

The Leibniz Supercomputing Centre (LRZ) is getting better and better: The auditing company DEKRA recently reviewed the further development of the management systems for IT service and information security according to the ISO/IEC standards 20000 and 27001 - and found it to be good: "The interim audit went very well", reports Eda Seval, Head of the Service Desk and jointly



responsible for the audit preparations: "The auditors were extremely satisfied with the implementation of their recommendations and were surprised that we have already expanded and standardized considerably more processes than was required last year".

In 2019 the [LRZ had certified its management systems for IT services](#) and information security for the first time. Audits evaluate the effectiveness, development and continuous improvement of internal processes. The results are documented in a report of minor deviations, which must be processed for optimization, as well as recommendations. The implementation and compliance with standards is monitored annually by external auditors. Compared to the 2019 certification audit, the LRZ now scored significantly better: DEKRA only criticized two minor deviations and made around 20 recommendations: "This is a very

good result," says Natalie Vogel, who's responsible for service management. "We will be able to implement most of the recommended changes quickly, but we will have to deal with some of them more intensively." For example, the auditors criticized the partially unclear communication processes in the investigation of the causes of technical problems. The final test report from DEKRA will be available by mid-August. "The aim of certification is to improve together", says Stefan Metzger, CISO at the LRZ, "The external view of our processes helps us to evaluate and optimize them more critically." The certification team has already tackled some of the improvements with the relevant experts in-house. (vs)

Bavarian Minister for Science and the Arts Sibler at the LRZ



In mid-July, the Bavarian Minister for Science and the Arts, Bernd Sibler, visited the Leibniz Supercomputing Centre (LRZ) together with representatives of his ministry. They discussed with scientists from Ludwig-Maximilians-Universität (LMU), the Technical University of Munich (TUM) and the Walter-Meißner-Institute about future technology and quantum computing: "Visit to the Leibniz Supercomputing Center, our IT cathedral," Sibler then noted in his online diary on Facebook. "Great debate on the quantum strategy of the Free State of Bavaria. Great perspectives for the location Bavaria." The photo taken in front of the LRZ shows (from left to right): Dieter Kranzlmüller, Director of the LRZ and Professor of Computer Science at the LMU, Bernd Sibler, Bavarian Minister of Science and Arts, Professor Immanuel Bloch,

Quantum Optics LMU and Max Planck Institute for Quantum Physics (MPQ), Professor Ignacio Cirac, Theoretical Quantum Optics TUM and MPQ (bottom from left). Ministerialdirigent Michael Greiner, Professor Rudolf Gross, TUM and Walter Meißner Institute, Ministerialdirigent Dr. Johannes Eberle (top from left). (vs)

Smartphones - the mirror of personality

What critical users have long feared has now been scientifically proven with the help of high-performance computing: Data on the use of smartphones, apps or mobile music selection reveal a lot about our personality. A team led by Professor Markus Bühner of the [Ludwig-Maximilians-Universität \(LMU\)](#) used a specially developed app to analyze the smartphone use of 624 students. "The automated analysis of this data allows us to draw conclusions about the personality of the users, at least for most of the important personality dimensions," explains Clemens Stachl, former employee at the Department of Psychological Methods and Diagnostics and now at Stanford University in California. The usage data collected by the research app, which was similar to that

of the US corporations Google, Amazon, Facebook, Apple and other companies, was evaluated using algorithms and machine learning at the CoolMUC-2 - an indication that supercomputing is now also being used in the social sciences and psychology.

30 days of Usage Data from 624 People

"Predicting personality from behavioral patterns collected with smartphones" is the title of the [LMU PhoneStudy](#), which has just been published in the renowned US-American journal [PNAS](#) and describes the project: 624 volunteers were initially interviewed extensively about their personality. They then downloaded the app, which collected passive data on usage times or app and music preferences as well as mobility and communication behavior for 30 days. "By far the most difficult part of the project was preprocessing the huge amount of data and training the predictive algorithms," says Stachl, "For the necessary calculations, we had to rely on the cluster of high-performance computers at the Leibniz Supercomputing

Centre. Here, algorithms were trained to detect patterns in the data chaos and to derive combinations with these personality traits. To be on the safe side, the automatically produced results were confronted with the answers from the interviews and thus validated.

Smartphones could support research

There are two findings in particular that are exciting: Users reveal a lot of personality just by using a smartphone and apps. This is rightly unsettling when companies collect the data. However, smartphones also open up new opportunities for science. Until now, psychological studies have mostly been based on the self-assessment of test persons. "Thanks to their widespread distribution, intensive use and very high performance, smartphones are an ideal tool for researching the relationships between self-assessment and real behavior," says Bühner. However, the findings of psychologists also point to the personal disadvantages of data-driven marketing. Stachl therefore argues in favour of regulating data collection and strengthening the right to privacy, but also advocates caution in science when it is helped by artificial intelligence and machine learning: "The user, not the machine, must be the main focus of research in this area," says Stachl, adding that "it would be a serious mistake to adopt machine-supported learning methods without seriously considering their wider implications". (vs)

The LRZ in the media

A lot of interest in the Leibniz Supercomputing Centre (LRZ): In the past few weeks, it has attracted attention on radio and television and has been visited by politicians. The contributions and interviews dealt with energy efficiency and cooling with hot water, with the activities around open search and quantum computing. Finally, the possibilities of visualisation and virtual reality were discussed.

- At the end of June Dieter Kranzlmüller, Director of the LRZ and Professor of Computer Science at the Ludwig-Maximilians-Universität (LMU) Munich, was a panelist at the online edition of ["Reclaim the Future"](#). There he discussed the next generation of computers with Jan Goetz, founder of IQM Quantum Computers, as well as Thomas Hubregtsen, Head of Quantum Computing at BMW, and Oliver Wick, Technology Scout at BMW Research. The article is interesting because, firstly, the technology and mode of operation of the new computer technology are described in an understandable way and, secondly, good reasons are given for why quantum technology in Europe is largely a subject for science and universities and thus stands for independent solutions.

- Google collects 97 percent of all search queries on the Internet, with Bing and other, smaller providers accounting for the rest. This must change - says the Open Search Foundation (OSF), in which the LRZ is involved. The non-profit organisation is currently in the process of indexing the .de domains in order to enable an open search and lay the foundation for a European search engine. [Deutschlandfunk interviews Professor Alexander Decker](#) from the Technical University in Ingolstadt about this. It's worth listening to, because Decker talks about how computer centres help to build the search engine without large server systems:

- Once again [Deutschlandfunk, on July 4](#) – this podcast deals with digitization and the increasing power consumption due to Internet use. The central thesis of the piece: Commercial computer centres can learn from supercomputing and significantly improve their energy efficiency. And this is very clearly illustrated by the hot water cooling system of the LRZ.
 - The [children's channel of ARD and ZDF, KI.KA](#), visited SuperMUC-NG and explains briefly and concisely how supercomputers make it possible to look into the future. This is illustrated by the simulation of Professor Hans-Peter Bunge, geophysicist at the Ludwig-Maximilians-Universität München, and his team, which shows the formation of continents. Also worth seeing for adults.
 - Finally, the [Bavarian Academy of Sciences \(BAW\)](#) interviews Professors Wolfgang Wall and Dieter Kranzlmüller on the subject of supercomputing and research for medicine for its podcast. Wall is a specialist in mechanical numerics and has calculated a model of the lung that now helps doctors to better adjust ventilation for patients. This is a wonderful example of how computer science is becoming a partner of science for almost all research areas in times of digitalisation. Exciting (also worth hearing the other podcast-stories).
 - Supercomputing is all about data. This data is turned into models, simulations and finally fascinating images: During a visit to the LRZ, Bela Bach, SPD politician and member of the Bundestag from Garching, informed herself about the possibilities of virtual or augmented reality and the visualisation of research data. She posted her impression on [Facebook](#). (vs)
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Figures of the month

Power, energy consumption, temperature, but also the performance of the processors, their access to memory, data and networks: in the SuperMUC-NG, around [15 million sensors](#) permanently collect data on the work and utilization of the system. A total of 7,685,568 are public, i.e. they are stored regularly so that the values can be used and interpreted. In the CoolMUC-3 in turn, around 600,000 sensors collect data. These provide information on the functioning of the two computer systems and help to optimize the design of SuperMUC-NG Phase II and the planning of its successor. A team led by Professor Martin Schulz (TUM) and Alessio Netti, a research associate at the LRZ, has presented [Wintermute](#), a [program](#) for evaluating and controlling these data, thus creating a basis for automated control of supercomputer performance. (vs)

WORKSHOPS & EVENTS

Iterative linear Solver and parallelization

The focus of this five-day online compact course from **August 31 to September 4** is on iterative and parallel solvers, the parallel programming models MPI and OpenMP as well as the parallel middleware PETSc. Using real applications, various modern Krylov Subspace methods (CG, GMRES, BiCGSTAB ...) and highly efficient preconditioning techniques are presented. Participants can test and understand solutions in exercises. Knowledge of the programming languages C and Fortran is required. The online course is organized by the University of Kassel, the High Performance Computing Centre Stuttgart (HLRS), the LRZ and the IAG. [Informations and registration](#)

Deep Learning und programming

The online workshop from **7 to 10 September** will focus on the basics of deep learning, computer vision and programming of multi-GPU. Lectures and practical exercises with the programs Open ACC and the programming languages CUDA C / C ++ will deepen the theory. All exercises are performed on a fully configured GPU-accelerated workstation and on Jupyter notebooks in the cloud. For the workshop PRACE, CSC (Finland), IT4Innovations and LRZ cooperate with Nvidia. [Informations and registration](#)

Fortran for Advance

Scientists who want to expand their knowledge of Fortran will learn about objects, interfaces and object-based programming in this four-day online course from **22 to 25 September**. Lectures and exercises will also cover IEEE functions and floating point exceptions, interoperability with C and Fortran 2003 E, and the advantages of OO design patterns or co-arrays. [Informations and registration](#)

Introduction to the supercomputer of LRZ

An introduction to high-performance computing and a crash course in computational fluid dynamics, the representation of flows on the computer, will be given in this half-day online workshop **on October 14**. It is intended for beginners and shows the work on the Linux cluster of the LRZ. [Informations and registration](#)

Introduction in ANSYS Fluid Dynamics

This is what future engineers and scientists need: ANSYS Fluid Dynamics is a bundle of programs for the calculation and visualization of different flows. The introductory course to the most frequently used program on the supercomputers of the LRZ will take place online every Monday from **October 19 and December 14** from 10 a.m. to noon and from 2 p.m. to 4 p.m. [Informations and registration](#)

C++ for software-engineering

Object-oriented software design with the programming language C++ is the focus of this online course **from November 18 to 20**. Participants will learn the most important programming concepts and procedures. The goal is to produce robust, reliable code that can be maintained and further developed. [Informations and registration](#)

Handling the supercomputers of LRZ

Those who could not participate in October will get another chance to get to know the Linux cluster of the LRZ **on 9 December**. The half-day online course explains the handling of the cluster and the most important applications to calculate and display flows in the cluster. [Informations und registration](#)

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!

[Researcher with focus on data bases](#) for our Web-Team (m,f,d)

[Client-Manager for MAC- and Mobile Devices](#) (m,f,d)

[Client-Manager for Windows](#) (m,f,d)

[Data- und Storage-Manager](#) (m,f,d)

[Working student for the simulation portal Magneticum](#) (m,f,d)

[Working student for HPC-User-Administration](#) (m,f,d)

[Working student for web backend and app development](#) (m,f,d)

[Working student Web, Java und Type Script](#) (m,f,d)

[Working student for the Service-Desk](#) (m,f,d)

MORE TO READ

Here you will find links to latest information from the german-european supercomputing community and our cooperation partners [Publikations](#) of the Gauss Centre for Supercomputing (GCS): GCS-News und Inside

[Infoletters](#) of the Gauß-Alliance

Publikations of PRACE: [PRACE Digest, Jahresbericht](#)

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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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