VISUAL SUPERCOMPUTING TO BE DEMONSTRATED AT SC97

November 14, 1997

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Champaign, IL -- If all goes well, attendees to the SC97 conference in San Jose, CA, will witness the culmination of months of international collaboration and the first sustained usage of the STAR TAP global interconnection point in Chicago as they view a demonstration of interactive visual supercomputing across an 8,000 mile distance.

The demo --- a 3D physics simulation --- will be computed on a CRAY T3E-600 system at Rechenzentrum Garching (RZG) der Max-Planck-Gesellschaft Garching in Garching, Germany and displayed on ImmersaDesk systems in the National Computational Science Alliance (Alliance) and Argonne National Laboratory (ANL) booths on the conference floor. It will be a feat remarkable not only for the scientific achievement it represents, but also for the struggle required to negotiate the complex labyrinth of international collaboration that has made it possible.

"Many, many people have had to agree to give priority, time, and cooperation; but, in the end, all our efforts have paid off -- the response has been great," said Ed Seidel, a physicist at the Max-Planck-Institut-für-Gravitationsphysik and the key researcher behind the demonstration. "Our testing over the last month shows that the application works, and that the necessary bandwidth can be acheived. If all goes well with the complex networking on the days of the show, we will prove that high-speed networking makes the distance between remote locations irrelevant." In an international community of computational researchers unlimited by physical distance from the resources needed to advance individual disciplines, a significant global acceleration in scientific achievements becomes possible.

"By organizing a special connection that enables us to do something exceptional," Seidel said, "we also draw attention to the need for high-speed international networking and to the acheivements such networks can support." At present, researchers wishing to use high-performance networks to take advantage of remote resources often have to devote months of time and money negotiating for the required connections. "This project has helped the various groups involved to develop a spirit of cooperation that I hope will make it easier for researchers to access such connections in the future," he added.

For Seidel and the international team of scientists from the four research centers, making arrangements was a complex problem from the start. Simply identifying possible paths between Munich and San Jose, and determining whom to contact at intermediate sites, required much time and investigation. Once alternatives were identified, the resource owners had to be convinced of the benefits of cooperation. In the end, Seidel and his team were able to attract support by generating excitement about doing something new and newsworthy.

Instrumental in providing the network connections to enable this demonstration were the Rechenzentrum Universitaet Stuttgart, Deutsche Telekom AG, Teleglobe, CANARIE INC/NTN, and the National Science Foundation. "The STAR TAP connection," Seidel noted, "enabled us to connect to the National Science Foundation's vBNS (very high-performance Backbone Network Service), which is an essential link in our network. Without STAR TAP, it would have been difficult or impossible to make the connections in time for SC97." STAR TAP is an interconnection point established by the University of Illinois at Chicago (UIC) and its partners, the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign, ANL, and Ameritech Advanced Data Services (AADS) to offer a persistent switch for international connections that will enable the exchange of high-speed network traffic among research institutions worldwide.

With all the necessary pieces in place, Seidel expects to have excellent connectivity all the way to San Jose. These pieces were assembled and tested by an international team of researchers from RZG, ANL, NCSA, and the Max-Planck-Institut-für-Gravitationsphysik. The visualization will travel across Germany from Garching to Stuttgart via the Deutsches Forschungsnetz's (Germany's high-performance networking testbed, the DFN)

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34Mbit ATM connection. Deutsche Telekom has arranged for a line going from Stuttgart to Sylt, an island in the North Sea, from whence a transatlantic connection will be established via Teleglobe's ATM link to CANARIE, an experimental Canadian high-performance networking testbed. The connection will then move to CANARIE's link to STAR TAP and, from there, across North America via the vBNS to San Jose. Special TCP/IP tuning for efficient long distance transfers are being implemented in the communicating applications that will be in place in Garching and San Jose.

The effort will result in an opportunity for attendees to SC97 to witness the real-time solution of Einstein's three dimensional equations, some of the most complex in all of physics, which describe the simulation of interactions between black holes and gravitational waves. "Five years ago," Seidel pointed out, "such simulations were virtually impossible in 3D, and now we can run one interactively, in almost real time, remotely across this 8,000 mile distance." For the conference, as in previous tests, Seidel hopes that a data stream of 1 Mbyte-per-second can be produced that is suited for direct visualization on the ImmersaDesk and will enable gravitational wave iso-surfaces to be selected and displayed in near to real time.

"We have already demonstrated that it can work in tests between Germany and the U.S." says Seidel. "We just hope that we can demonstrate the application in action at SC97, where there will be a few more complications due to the temporary setup in San Jose." NCSA's SGI/CRAY Origin2000 system will be standing by as a backup in case any of the myriad of vital links should fail during the demonstrations.

SC97 is the annual conference for leaders in high-performance networking and computing. It will be held November 17 to 21, 1997. The demonstration will take place at 4:00 p.m. on both Tuesday, November 18, and Wednesday, November 19.

STAR TAP, http://www.startap.net (http://www.startap.net/) --- the Science Technology And Research Transit Access Point --- is a persistent infrastructure, funded by the NSF CISE Networking and Communications Research and Infrastructure, to facilitate the long-term interconnection and interoperability of advanced international networking. The STAR TAP anchors the international vBNS connections program.

The Albert-Einstein-Institut (AEI), part of the Max-Planck-Gesellschaft, is located in Potsdam, Germany. The institute was established in 1995 to pursue the study of gravitational physics, especially general relativity and quantum gravity. In pursuing its research the institute supports large-scale computer calculations, both in house and in collaboration with other groups, and it participates in a number of international projects.

The Rechenzentrum Garching, a joint computing center of the Max Planck Society and the Institute for Plasmaphysics, is located close to Munich, Germany. On its large CRAY T3E system, research is carried out in the fields of material sciences, polymer research, plasma physics, biochemistry, laser physics, astrophysics, and gravitational physics.

The National Computational Science Alliance is an initiative to prototype an advanced computational infrastructure for the twenty-first century and includes more than 50 academic research partners from across the United States. It is funded by the National Science Foundation. The National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign is the leading-edge site for the Alliance. It is funded by the the NSF, the State of Illinois, the University of Illinois, industrial partners, and other federal agencies.

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- SEEQC to Install First-of-its-kind Cross-Qubit Scaling Platform (https://www.hpcwire.com/off-the-wire/seeqc-to-install-first-of-its-kind-cross-qubit-scaling-platform/)
- Intel Appoints Lip-Bu Tan as Chief Executive Officer (https://www.hpcwire.com/off-the-wire/intel-appoints-lip-bu-tan-as-chief-executive-officer/)
- Infleqtion Secures $6.2M ARPA-E Award to Advance Quantum-Powered Energy Grid Optimization (https://www.hpcwire.com/off-the-wire/infleqtion-secures-6-2m-arpa-e-award-to-advance-quantum-powered-energy-grid-optimization/)

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Intel Announces Lip-Bu Tan as New Chief Executive Officer

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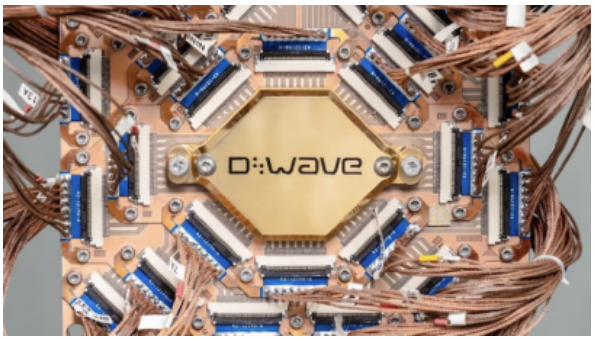
March 13, 2025

Intel announced that its board of directors has appointed Lip-Bu Tan, a technology veteran with deep semiconductor industry experience, as chief executive officer, effective March 18. He succeeds Interim Co-CEOs David Zi Read more… (https://www.hpcwire.com/2025/03/13/intel-announces-lip-bu-tan-as-new-chief-executive-officer/)



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D-Wave Reports Quantum Supremacy; Stirs Immediate Challenge (and Rebuttal)

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Quantum computing pioneer D-Wave yesterday reported achieving Quantum Supremacy with a simulation of magnetic material performed on its Advantage2 system. For years D-Wave has championed its quantum annealing approach as Read more… (https://www.hpcwire.com/2025/03/13/d-wave-reports-quantum-supremacy-stirs-immediate-challenge-and-rebuttal/)

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Anders Jensen Discusses AI Factories, Quantum Progress Before the EuroHPC Summit

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March 12, 2025

The HPC community in Europe and beyond looks forward each year to the EuroHPC Summit, which will happen next week, March 18-20, in Krakow. Ahead of the conference, we asked Steve Conway, senior analyst at Intersect360 Re Read more… (https://www.hpcwire.com/2025/03/12/anders-jensen-discusses-ai-factories-quantum-progress-before-the-eurohpc-summit/)

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NIST Selects HQC as Fifth Algorithm for Post-Quantum Encryption

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March 12, 2025

Last year, NIST standardized a set of encryption algorithms that can keep data secure from a cyberattack by a future quantum computer. Now, NIST has selected a backup algorithm that can provide a second line of defen Read more… (https://www.hpcwire.com/2025/03/12/nist-selects-hqc-as-fifth-algorithm-for-post-quantum-encryption/)

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Correcting an AI Overreaction On DeepSeek, and Emphasizing the Importance of Quality

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March 11, 2025

A few weeks back, DeepSeek, China's new high profile generative AI platform, hit the news with a substantial alleged reduction in training and hardware cost. This announcement had a major adverse impact on Nvidia's v Read more… (https://www.hpcwire.com/2025/03/11/correcting-an-ai-overreaction-on-deepseek-and-emphasizing-the-importance-of-quality/)

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An Italy that can't grow its own wheat for pasta? It's a race against time. Using a shared database in a Microsoft super-computer, scientists from Italy and other countries are working together to develop new strains of durum wheat that can better withstand heat and drought caused by climate change. Read more… (https://www.hpcwire.com/solution_content/microsoft-amd/the-pasta-puzzle-decoding-durum-wheats-dna-for-a-sustainable-future/)

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Singapore Launches Hybrid Quantum-HPC Push at SCA2025

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March 10, 2025

Singapore is expanding its efforts in high-performance computing (HPC) and quantum computing through new national initiatives and strategic partnerships, announced at this year's SupercomputingAsia 2025 (SCA2025). The Read more… (https://www.hpcwire.com/2025/03/10/singapore-launches-hybrid-quantum-hpc-push-at-sca2025/)

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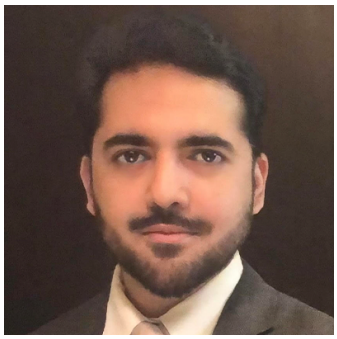

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IQM: Leading the Charge in European Quantum Computing

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March 10, 2025

Editor's Note: As part of the ISC 40th Anniversary Interview series, Nages Sieslack from ISC High Performance had an insightful discussion with Jan Goetz, a leading quantum physicist and co-founding co-CEO of IQM Q Read more… (https://www.hpcwire.com/2025/03/10/iqm-leading-the-charge-in-european-quantum-computing/)

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2025 Winter Classic: Crash Course Exam Results

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March 10, 2025

Our student teams get a lot of real-world HPC experience in the course of the three-month Winter Classic cluster competition. They get to run on five different supercomputers, are trained by HPC experts, and run/optimize Read more… (https://www.hpcwire.com/2025/03/10/2025-winter-classic-crash-course-exam-results/)

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Molly Presley, SVP Global Marketing at Hammerspace, Shares Her Thoughts on International Women's Day 2025

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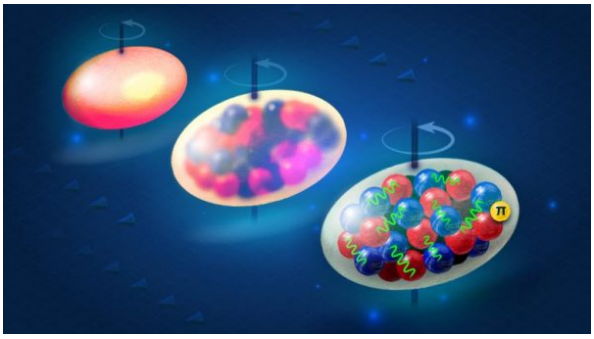
March 7, 2025

On Saturday, March 8th, the world celebrates International Women's Day 2025. This day recognizes the accomplishments of women in different industries, particularly in tech, while acknowledging the continuing inequalities Read more… (https://www.hpcwire.com/2025/03/07/molly-presley-svp-global-marketing-at-hammerspace-shares-her-thoughts-on-international-womens-day-2025/)



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Using a novel computational modeling technique to test theoretical quantum physics, a team of researchers at the Department of Energy's Oak Ridge National Laboratory have discovered properties of the atomic nucleus at Read more… (https://www.hpcwire.com/2025/03/07/deep-dive-exascale-computing-illuminates-detailed-structure-of-atomic-nuclei/)

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Frontier Computes Details of Nucleus Deformation

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March 6, 2025

Using the Frontier supercomputer at the Department of Energy's Oak Ridge National Laboratory, researchers have developed a new technique that predicts nuclear properties in record detail. The study revealed how the struc Read more… (https://www.hpcwire.com/2025/03/06/frontier-computes-details-of-nuclear-deformation/)

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AI Today and Tomorrow Series: Artificial General Intelligence

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March 5, 2025

In response to readers' questions about AI, HPCwire sister site BigDATAwire asked me to write a series of columns on AI, a topic that is generating excitement and concern in the worldwide HPC community and beyond. The Read more… (https://www.hpcwire.com/2025/03/05/ai-today-and-tomorrow-series-artificial-general-intelligence/)

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China Quantum Chip — Zuchongzhi 3.0 — Claims Google's QA Benchmark Title

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March 4, 2025

A team of researchers led by Jian-Wei Pan at the University of Science and Technology of China has reported their 105-qubit superconducting quantum processor — Zuchongzhi 3.0 — posted the fastest benchmark so far i Read more… (https://www.hpcwire.com/2025/03/04/china-quantum-chip-zuchongzhi-3-0-claims-googles-qa-benchmark-title/)

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Quantum Career Fair Celebrates 100 years of Quantum Mechanics

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March 4, 2025

The U.S. Department of Energy's (DOE) National Quantum Information Science (QIS) Research Centers hosted the fourth annual Accept Reject on Jan. 22, 2025. The virtual event, led by the Co-design Center for Quantu Read more… (https://www.hpcwire.com/2025/03/04/quantum-career-fair-celebrates-100-years-of-quantum-mechanics/)

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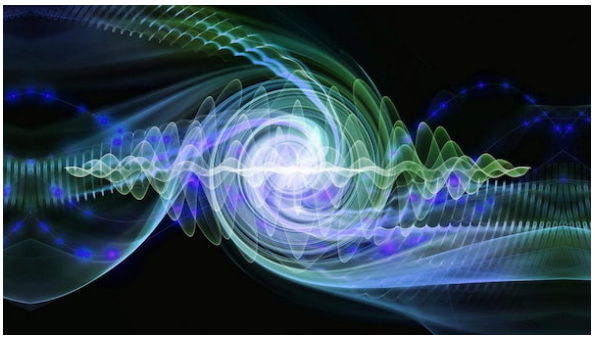

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NTT, RIKEN Debut New Load-Store Architecture for Quantum Computing

(https://www.hpcwire.com/2025/03/03/ntt-riken-debut-new-load-store-architecture-for-quantum-computing/)

March 3, 2025

Taking a page from conventional computing architecture, a team of researchers from RIKEN, the University of Tokyo, Kyushu University, and Japanese technology giant NTT will present a new architecture — Load/Store Quant Read more… (https://www.hpcwire.com/2025/03/03/ntt-riken-debut-new-load-store-architecture-for-quantum-computing/)

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OpenAI Expands Access to Deep Research

(https://www.hpcwire.com/2025/03/02/openai-expands-access-to-deep-research/)

March 2, 2025

OpenAI announced it has expanded access to its Deep Research, its new AI agent designed to conduct complex research. Deep Research debuted earlier this month to users of ChatGPT Pro, the company's $200/month subscripti Read more… (https://www.hpcwire.com/2025/03/02/openai-expands-access-to-deep-research/)

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