



## Message from the Director



As I take the lead at the San Diego Supercomputer Center in the interim, I also take the long view—from a multitude of opportunities to mindful optimizations. This brings to mind our former director Michael Norman, whose large shoes I stepped in to fill July 1. With 12 years of stewarding SDSC’s national reputation through leadership and innovation as the model to follow, I have my work cut out for me. The good news is that I look forward to the challenge!

It all begins with our greatest resource—our SDSC and campus communities. As we approach the fall and the start of a new academic year, we are preparing for returning to learning and to working on campus. This pandemic has taught us

both the value and the viability of remote work, as well as some of its drawbacks—namely, missing interacting with each other in person. Because we hold these human connections dear, we are taking care to transition back with flexibility and as informed by science and technology.

Since technology is our domain, I want to acknowledge our latest “wins” amidst the challenges of virtual work. First there’s *Voyager*, our experimental artificial intelligence resource with our partner Habana, by Intel, which will be in operation this fall. Then there is *Expanse*, our latest HPC resource that enables a computing-without-boundaries approach to research support. In fact, we added one rack for use by industrial partners and, in late fall, we anticipate an expansion of *Expanse* to include the latest high-performance NVIDIA GPUs and more CPUs for High Throughput Computing and the long tail of science. Other big wins include new NSF support for our Prototype National Research Platform (NRP), for which I am honored to be the principal investigator, and ICICLE, the new artificial intelligence institute, for which Amit Majumdar leads the affiliated SDSC subaward for the development of cyberinfrastructure and the integration with research facilities.

While *Voyager*, *Expanse* and NRP serve as portals to our future as a center, the recently SDSC-retired *Comet* is now lending its service to water cycle science with research led by CW3E at the Scripps

Institution of Oceanography. This work will result in practical impacts such as managing water reservoirs in California and improved weather and hydrological forecasts.

Fire science is another area where we excel. For example, Ilkay Altintas, chief data science officer, leads the [FIRIS](#) program, which provides real-time intelligence data and analysis on disaster events in California. The program is implemented through the WIFIRE Lab, which is getting national media attention for its efforts to assist firefighters and fire managers on the ground. FIRIS, an important tool in this data implementation effort, now enters its third year as a public/private partnership serving data fusion and predictive modeling services to California's emergency responders.

Our impact was also present at the ACM Practice and Experience in Advanced Research Computing (PEARC) Conference in July. SDSC award winners included Subhashini Sivagnanam, Manu Shantharam, Scott Sakai and Igor Sfiligoi, as well as other campus colleagues.

One of our priorities at SDSC is student engagement. Our outreach extends far and wide, resulting in the participation of hundreds of students—from K-12 to graduate-level and professional participants. I especially want to call attention to our [ENLACE](#) students and faculty, who have done a great job this summer making WIFIRE products available to Spanish speaking communities. You can watch a video about [WIFIRE in Spanish](#) (special thanks to Melissa Floca, part of the WIFIRE Lab team, for the Spanish translation). SDSC's Peter Rose is also active with ENLACE through a research project titled, "Spatial, temporal, and phylogenetic analysis of COVID-19 spread." Additionally, we invite students to participate in our SDSC Summer Institute and our Cyberinfrastructure-Enabled Machine Learning (CIML) Summer Institute, both of which draw dozens of participants each year.

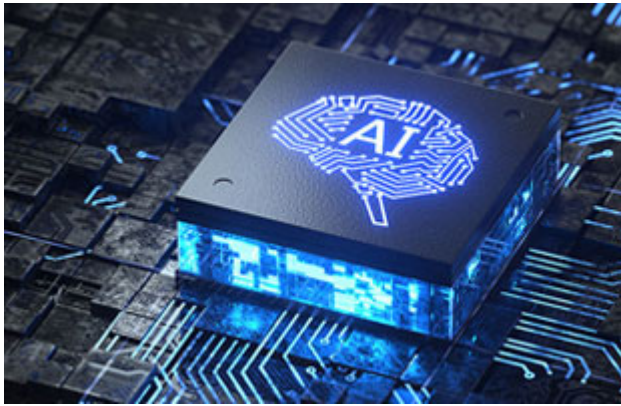
I could go on, but I will reserve my enthusiasm and regard for SDSC, and the role I now play, until next time. Until then, have a safe and enjoyable remainder of the summer. I look forward to seeing you, as pandemic conditions allow, in the fall.

My best,

Frank Würthwein  
SDSC Director

**SDSC NEWS HIGHLIGHTS**





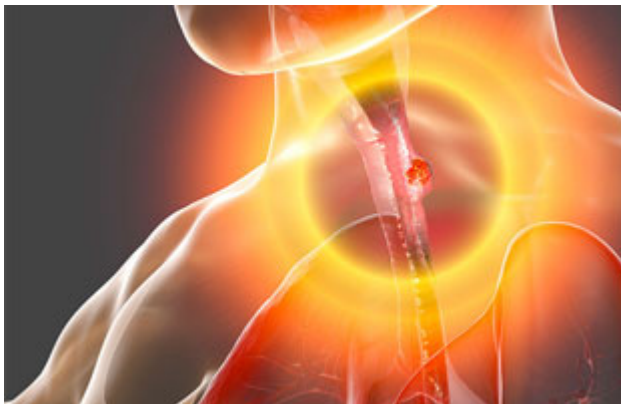
### **San Diego Supercomputer Center Plays a Role in NSF's New ICICLE Institute**

The AI Institute for Intelligent Cyberinfrastructure with Computational Learning in the Environment, or ICICLE, will focus on next-generation intelligent cyberinfrastructure that makes using AI as easy as plugging an appliance into an electrical outlet.



### **Accelerating Science from Idea to Publication with Bold National Research Platform**

NSF Awarded \$5M to SDSC for its Prototype National Research Platform, a first-of-its-kind cyberinfrastructure ecosystem intended to help science drivers expedite science and enable transformative discoveries.



### **Supercomputers Improve Understanding of Esophageal Disorders**

Gastroesophageal reflux disease (GERD) can lead to serious medical issues and sometimes esophageal cancer. *Comet* at SDSC and *Bridges-2* at the Pittsburgh Supercomputing Center were used to advance image modelling of the swallowing process of GERD patients.



### **Computational Modeling Results in New Findings for Preeclampsia Patients**

To better understand preeclampsia, or pregnancy-related hypertension, researchers used SDSC's *Comet* supercomputer to detail the differences between normal and preeclampsia placental tissue.

**RESEARCHER SPOTLIGHT**





### **SDSC's Open Science Chain Awarded \$500,000 NSF Grant**

The Open Science Chain (OSC) program at the San Diego Supercomputer Center at UC San Diego has received support from the National Science Foundation to provide a secure method for sharing and verifying data and metadata while maintaining privacy restrictions. The funding allows Principal Investigator **Subhashini Sivagnanam** and the OSC team to expand their already successful project.



### **SDSC Awarded Funding for GO FAIR Symposium**

**Christine Kirkpatrick** and **Melissa Cragin** (pictured left to right) lead UC San Diego's Findable, Accessible, Interoperable and Reusable (FAIR) data efforts via the U.S. GO FAIR Office from SDSC. Recently they received a National Science Foundation award in support of a GO FAIR symposium that will gather input from the broader scientific community to build U.S. capacity for understanding and implementing the FAIR principles for research digital objects.

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### **PEARC21 Awards**

The Association for Computing Machinery (ACM) Practice and Experience in Advanced Research Computing (PEARC) Conference Series is a community-driven effort with the aim to grow and be more inclusive by involving additional local, regional, national and international cyberinfrastructure and research computing partners spanning academia, government and industry. ACM PEARC21 brought together community thought leaders, CI professionals and students to learn, share ideas and craft the infrastructure of the future during the July event. This year's conference theme was Evolution Across All Dimensions. SDSC was well represented this year with several papers, posters, birds-of-a-feather and tutorials. A special acknowledgement is due for the following individuals:

- **Manu Shantharam, Subhashini Sivagnanam, Kai Lin and Scott Sakai**, who won in the Best Short Paper category, Applications and Software Track, with their publication titled, "Integrity Protection for Research Artifacts using Open Science Chain's Command Line Utility."
- **Igor Sfiligoi, Rob Knight, Daniel McDonald, Tom DeFanti, Frank Würthwein, John Graham and Dima Mishin**, who won in the Best Poster category for their collective effort on "Comparing GPU Effectiveness for Unifrac Distance Compute."

Congratulations to all the winners!

## INDUSTRY PARTNER HIGHLIGHTS



*Visualization from benchmark test on SDSC's Expanse supercomputer with OpenFOAM. The animation shows an incompressible flow analysis passing a rotating ship propeller. Credit: DJ Choi, SDSC*

### **Accelerate Your Product R&D Using HPC Infrastructure from Core Scientific and the San Diego Supercomputer Center**

Infrastructure-as-a-Service (IaaS) providers can offer a solution for temporary scale-out computing to meet delivery deadlines. To this end, SDSC and Core Scientific partnered to make high-performance computing capacity on SDSC's new *Expanse* supercomputer available to industry. Core Scientific's Plexus interface facilitates onboarding, provisioning, job control/monitoring and payment. Various CAE software packages are available via the Plexus platform. One such software capability is the OpenFOAM Computational Fluid Dynamics package.

## AROUND SDSC

### **Real-Time Work Aboard the Icelandic Voyage of Joides Resolution**



*SDSC's EarthCube-funded IODP staff members photograph and archive freshly split sedimentary cores. Credit: Leah Levay*

The SDSC-based [EarthCube Office](#) announced the conclusion of Joides Resolution's latest Icelandic voyage on August 6. The research staff of Joides Resolution—a research vessel exploring the waters surrounding Iceland— included EarthCube-funded Scientist Leah Levay, who shared [daily updates](#) during the mission.

"The science objectives of this cruise were amazing because we were linking processes of the Earth's mantle, ocean circulation and even climate," said Levay. "From my perspective, what is unique about this cruise is that we did not have a science party on the ship due to COVID-19 restrictions, so the International Ocean Discovery Program (IODP) staff conducted their normal job duties, along with running all of the lab equipment, so that science continued even in a pandemic. My responsibility on board was to provide a link to co-chief scientists and the rest of the international science party ashore, to ensure they were getting the information they needed to best analyze collected data."

## Revving-Up for Fall

The Sustainable Scientific Software Division is excited to announce the Rev-Up Program. The program will “rev-up” this fall to offer SDSC projects the opportunity to create sustainability plans by exploring revenue generation strategies. Projects will have the opportunity to apply sustainability strategies with the support of training, coaching and software development and operations services. SDSC software projects with an interest in non-commercialization-based revenue are strongly encouraged to consider this opportunity. For more information about the program and how to apply, please contact [Claire Stirm](#).

## Taking on Transboundary Aquifer Resiliency

To better understand the issues around [transboundary aquifers](#)—deep subsurface water sources shared by multiple countries—and assist with solutions, SDSC’s **Christine Kirkpatrick**, **Ilya Zaslavsky** and Sam Fernald (New Mexico State University) will be working together with support from the National Science Foundation’s Accelerating Research through International Network-to-Network Collaborations (AccelNet) program. Their project will include virtual activities such as workshops, peer mentoring programs, a transboundary water modeling course and a user-friendly forum for interested researchers and citizen scientists to share information about issues surrounding transboundary aquifers.

“Of the hundreds of aquifers on our planet, only a few reside within the boundaries of a single sovereign nation. This poses challenges for applying traditional models of resource management because one country’s successes could be completely negated by the actions of bordering countries,” said Kirkpatrick. “Fortunately, those who are involved in water research and management, at least on the U.S.-Mexico border, tend toward cooperation no matter the politics above them. We are excited to bring focus on this much needed area of research that can only be furthered through collaboration and cooperation.”

**PROGRAMS & EVENTS**





SDSC hosts speaker events, workshops and hands-on training in computational thinking, high-performance computing and big data exploration for students and researchers at nearly every level of sophistication. We also include program and event information hosted by colleagues outside of SDSC. Following is a list of upcoming programs and events. Please click the links for details and for registration information.

September 15 – November 18, 2021

**CyVerse Foundational Open Science Skills**

September 23, 2021

**Technology Forum: SDSC Voyager - An Innovative Resource for AI & Machine Learning**

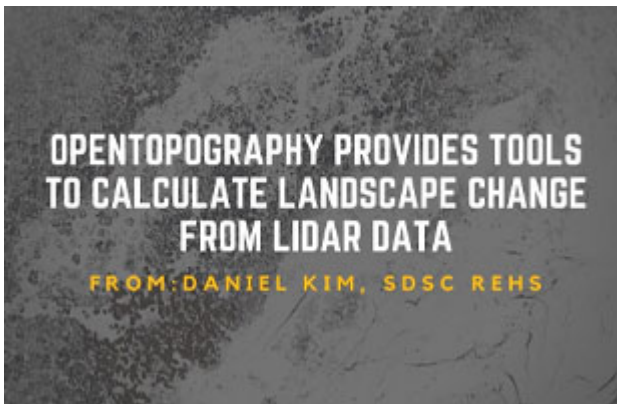
October 6, 2021

**Technology Forum with Janssen: Leveraging High-Performance Computing and Cloud Environments for the Analysis of Biobank-Scale Datasets**

November 14 - 19, 2021

**SC21 – Science & Beyond**

## SOCIAL MEDIA HIGHLIGHTS



**OpenTopography builds topographic differencing tools that reveal changes from earthquakes, volcanic eruptions, landslides, climate change & urban development**

Article and social media graphics by Daniel Kim of the Research Experience for High Students (REHS) Program at SDSC.



**BurnPro<sup>3D</sup>: Using Artificial Intelligence to Prevent Wildfires**

BurnPro<sup>3D</sup>, powered by WIFIRE Commons, is a platform for proactive wildfire management that gives public sector partners next-generation fire science to ramp up prescribed burns to an unprecedented scale.

## **NSF Awards \$20M for AI Optimization Institute**

The Halicioğlu Data Science Institute (HDSI) was awarded \$20M by the National Science Foundation to lead an integrated AI Optimization Institute to be headquartered at UC San Diego. The innovative project includes HDSI, Jacobs School of Engineering and Computer Science and Engineering, and other institutions including Massachusetts Institute of Technology, National University, University of Pennsylvania, University of Texas at Austin and Yale University. Several HDSI faculty members support the project.

## **Q&A: Realism on Achieving Herd Immunity with Dr. Chip Schooley**

Dr. Robert “Chip” Schooley, professor in the Department of Medicine at UC San Diego’s School of Medicine and co-lead of the Return to Learn program, answers questions about the Delta variant—from our chances of achieving herd immunity to how safe fully vaccinated individuals are from it.



SDSC’s Innovators Newsletter is published six times a year, every two months. To submit information to be included in the next edition, please send details to: [cdillon@ucsd.edu](mailto:cdillon@ucsd.edu).

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