

November 17, 2016 | By Jan Zverina

SDSC to Improve the Performance of Life Science Applications

Spurred by the increasing reliance of life sciences researchers in the academic and private sectors on computational methods and data-enabled science, the San Diego Supercomputer Center (SDSC) at the University of California San Diego has inaugurated a new life sciences computing initiative focused on improving the performance of bioinformatics applications and associated analysis pipelines on current and future advanced computing systems.

Dramatic improvements in scientific instruments and techniques, such as Next Generation Sequencing (NGS) and Cryo-electron Microscopy (Cryo-EM), are enabling the rapid accumulation of vast amounts of data including DNA/RNA molecular sequences and high-resolution imaging of biological structures from all manner of animal and plant organisms. The research and biotech community faces daunting challenges to manage and analyze this trove of data.

“Our experience with both on-campus researchers and biotech companies is that refined bioinformatics techniques and new technologies can be leveraged to improve the breadth and throughput of analyses,” noted Wayne Pfeiffer, an SDSC Distinguished Scientist and the Center’s bioinformatics lead.

Researchers are employing computational methods and analytics to derive scientific insights and commercial innovations from these growing pools of data, while advances in high-performance computing, storage, and networking are required to keep pace and help enable new discoveries. SDSC’s initiative will focus on developing and applying rigorous approaches to assessing and characterizing computational methods and pipelines. It will then specify the architectures, platforms, and technologies for optimizing along dimensions such as performance and throughput.

“UC San Diego is a pillar in one of the most vibrant life science research ecosystems in the world, and life science computing has always been a major focus of SDSC,” said SDSC Director Michael Norman. “Over the past decade we have seen unprecedented growth in the use of

advanced computing by researchers in this area, and we view this partnership as a unique opportunity to bring the combined experience of SDSC, Dell EMC, and Intel to bear on one of the most important areas of data-intensive research today.”

The initial work, supported by Dell EMC and Intel, focuses on benchmarking and profiling selected genomic and Cryo-EM analysis pipelines and developing targeted recommendations for technical architectures to service those pipelines. Architectural recommendations will encompass integrated computing and storage platforms as well as networking fabrics.

“Dell EMC is dedicated to enabling and advancing the state-of-the-art for HPC solutions from the workgroup to the Top500,” said Jim Ganthier, senior vice president, Validated Solutions and HPC Organization, Dell EMC. “We are pleased to collaborate with both Intel and SDSC to help drive dramatic performance improvements and results in life sciences research.”

For more information about SDSC and opportunities for other organizations to get involved, please contact Ron Hawkins, Director of Industrial Relations, at rhawkins@sdsc.edu.

MEDIA CONTACT

Jan Zverina, 858-534-5111, jzverina@sdsc.edu

UC San Diego’s [Studio Ten 300](#) offers radio and television connections for media interviews with our faculty, which can be coordinated via studio@ucsd.edu. To connect with a UC San Diego faculty expert on relevant issues and trending news stories, visit <https://ucsdnews.ucsd.edu/media-resources/faculty-experts>.