



NCSA | National Center for
Supercomputing Applications

CAN YOU IMAGINE? WE CAN.

Solutions and Services

HEALTH

Science, especially health science, has been moving away from individual researchers working solo into multiple disciplines working together. NCSA Genomics is a student-centered team that participates in academic research, industry solutions work, and the education of campus faculty, students, and postdocs in the use of high-performance computing (HPC) for genomic biology. Since 2010 the Mayo Clinic & Illinois Alliance for Technology-Based Healthcare has launched numerous collaborations

that have grown and continued for years reference-based analysis of whole genome sequences; cancer research; and more. NCSA's Visual Analytics Group's mission is to apply and develop visualization design and machine learning approaches to address global challenges in human health and wellness, including making tools to aid in visualization.



MACHINE LEARNING

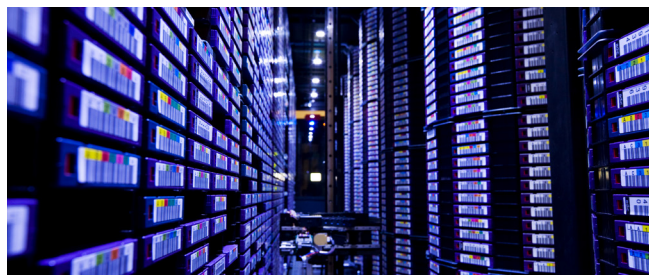
At NCSA, we're using machine learning to apply computing to a variety of disciplines in order to increase speed and accuracy, spanning many research domains. More than 50 groups from 25 different academic departments at the University of Illinois use machine learning. To further our ML efforts we've launched the Center for Artificial Intelligence Innovation to lead AI research and application.

DATA FACILITIES

The state-of-the-art 88,000-square-foot National Petascale Computing Facility (NPCF) houses Blue Waters, LSST data systems, NCSA Industry and other NCSA major infrastructure, and will soon be the home of Delta. NPCF combines top-flight physical and cyber protection with the open, collaborative research attitudes of a public institution. The HIPAA Data Center at NPCF is a physically isolated 1000-square-foot data center that is strictly managed to support electronic Protected Health Information.

BIG DATA

As research expands to more domains, so does the vast amount of data that is expanding right along with it. With these increasingly large datasets comes needs, both computational and administrative, to make sure that the data is handled efficiently, and in a way that is easily-interpretable by researchers seeking to draw conclusions. At NCSA, we're working with a variety of projects and collaborations to make big data seem more manageable than ever before.





GEOSPATIAL DATA

We're working with the National Geospatial-Intelligence Agency (NGA) to build off of our previous geospatial successes with ArticDEM and the Reference Elevation Model of Antarctica (REMA), which produced Digital Elevation Models of the Arctic and Antarctic, respectively.



Thanks to a the collaboration between NCSA, NGA, the University of Minnesota and The Ohio State University, these incredibly accurate elevation models are now being constructed for the entire Earth as part of a project called EarthDEM.

INDUSTRY

For over 30 years, NCSA Industry has helped innovative companies solve their biggest challenges. We have the largest high-performance computing (HPC) industry program in the world. Today, we work with many of the world's largest companies in more areas than ever before. NCSA Industry's recent development work includes artificial intelligence (AI), genome mapping, autonomous transportation, and so much more, delivered on our advanced computing resources or those of our trusted partners.

AGRICULTURE

On the surface, agriculture and high-performance computing are opposite industries. The former has been a staple of human society for thousands of years and pre-dates nearly all technology, while the latter is relatively



young, was created entirely by humans, and is constantly evolving. At NCSA, we're working to combine these seemingly disparate research areas to continue innovating in agriculture, aided by the tools of technology.

SOFTWARE

While NCSA is known worldwide for its powerful supercomputers, the center also has a long history of software development. NCSA research software engineers apply their expertise to the issues facing society as well as scientists, building and supporting software for modeling, simulation, analytics, genomics, phonemics, and artificial intelligence (AI). We build reusable and repurposable frameworks from the software activities in which we're involved, and then offer these frameworks to new efforts in order to accelerate research activities.

VISUALIZATION

Making sense of complex scientific data is the daily routine for the visualization groups at NCSA, who take this dense data and turn it into visual representations that are as digestible as they are breathtaking. While they're at it, they pioneer new visualization techniques.

NCSA's Advanced Visualization Lab bridges the gap between science and the arts. NCSA's Visual Analytics Group focuses on the visualization necessitated by human health and biological wellness.

NCSA's Data Analytics and Visualization Group works with scientists from a variety of domains to help them better understand their data and make new discoveries.

