

# National Center for Supercomputing Applications

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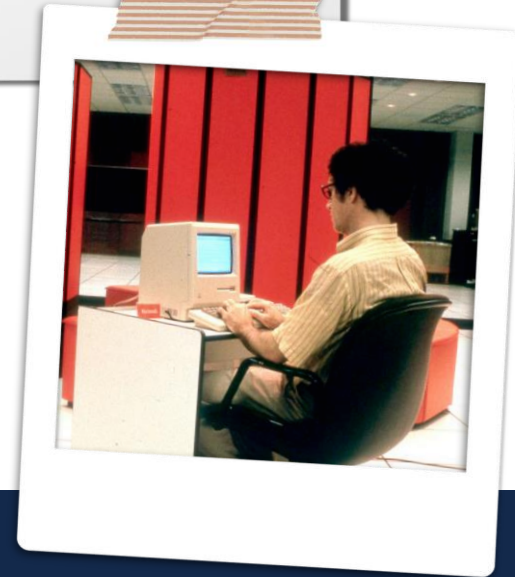
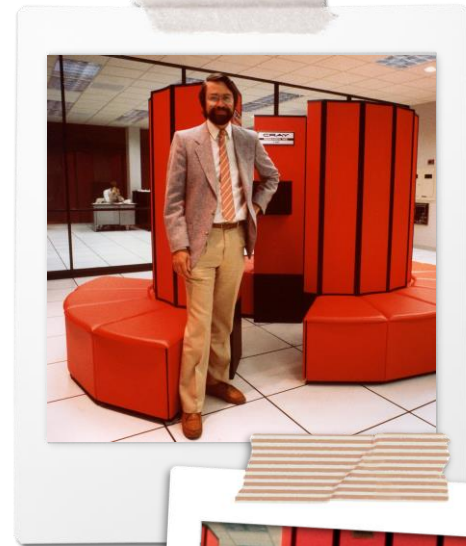
# NCSA Background

- The National Center for Supercomputing Applications partners with faculty, staff, and students, and collaborators from around the globe to use advanced computing and data to create solutions to the most challenging problems.
- Created nearly 40 years ago as one of the first US NSF Supercomputing Centers
- NCSA Industry Partner Program began in 1986
  - Original focus: modeling and simulation
  - One large, shared machine



# NCSA Short History

- Larry Smarr convinces NSF to invest in Supercomputing Centers to meet the needs of computational science. NCSA opens January 1986.
- NCSA Mosaic Released January 1993
- NCSA Creates Sony PlayStation2 Cluster May 2003
- XSEDE launched January 2011
- National Petascale Computing Facility completed 2012
- Blue Waters begins production January 2013
- Delta begins production October 2022
- DeltaAI begins acceptance tests August 2024
- See more at <https://www.ncsa.illinois.edu/about/history/>



# NCSA Today — The Numbers



## PEOPLE

240 FTE, 100+ faculty affiliates, 100+ students



## FACILITIES

Main office building and state-of-the-art data center



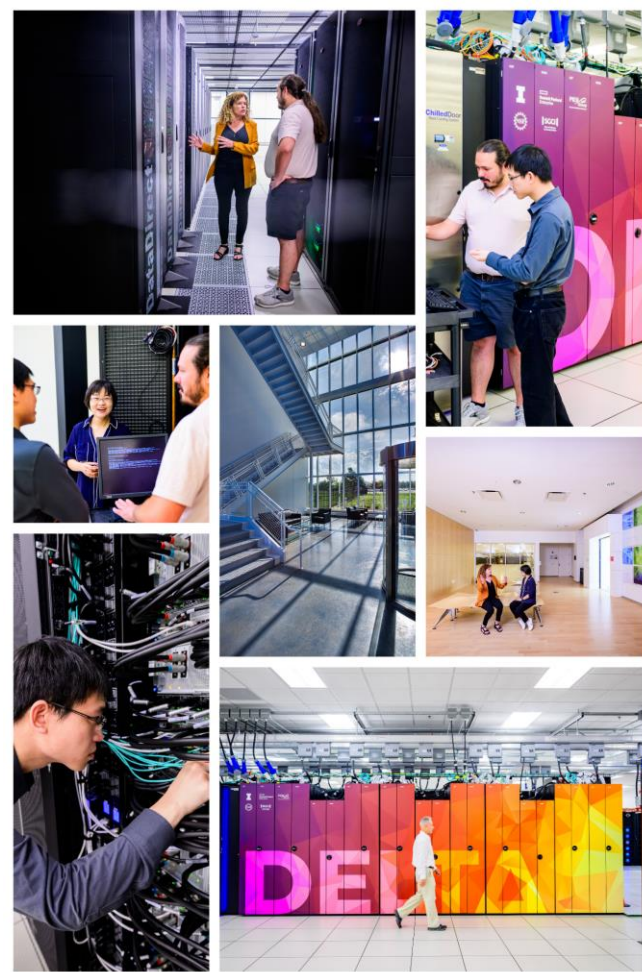
## BUDGET

US\$70M/year

- Largest share from NSF, but funding from DOE, NIH, Industry

# NCSA Industry Partner Program

- Confluence of Data-Driven AI/ML and Classical Numerical Methods – optimization+
- AI-Driven Equipment Configuration in Manufacturing
- Methane detection in Oil & Gas / Energy
- Hosting R & D while providing application expertise in Healthcare and Drug Discovery
- Providing cyber infrastructure expertise to global leader in Human and Animal Nutrition





# Centers and Collaborations



Center for  
Digital Ag (CDA)  
& AIFARMS

Office of Data  
Science  
Research

NSF Materials  
Science NRT  
(DIGI-MAT)

Delta and  
DeltaAI

Center for  
Astrophysical  
Surveys (CAPS)

Center for  
Artificial  
Intelligence  
Innovation  
(CAII)

Illinois  
Computes

Illinois Mayo  
Alliance

Center for  
Exascale-  
Enabled  
Scramjet Design  
(CEESD)

Healthcare  
Innovations  
Program Office  
(HIPO)

# Why NCSA?

- Extensive experience supporting the computational science community
- NSF leader in AI compute
- Long history of developing software for applications
- Computing systems designed for science applications
  - Blue Waters for sustained PetaFLOPS, not peak Linpack
  - Delta and DeltaAI for GPU apps and AI – embrace a subset of applications; note much higher memory bandwidth with GPUs, as long as your algorithm fits – but terabyte GPU nodes now available
- We can host large systems – NPCF is a modern data center with 24MW power, liquid cooling, and expansion space to double in size

