

NCSA Programs

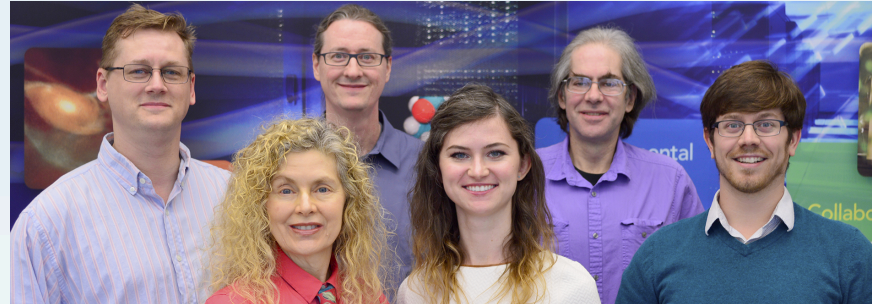
Faculty Fellows Idea Acceleration
Workshop

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Advanced Visualization Lab / Data Analysis and Visualization



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Physiological Computing

- Biosensors & biofeedback
- Adaptive technologies
- Data Visualization
- Quantified Self
- Mobile Health
- Human-Computer Interaction

Scientific Visualization

- Cinematic quality visualizations of computational and observational data
 - Expertise in astrophysics and geoscience
 - Branching out to many other science domains
- Interactive visualization
- Multimedia & video production

Arts & Humanities

- Visualization for live performances
 - KCPA, Ellnora Guitar Festival
- Virtual Reality
- Mobile apps

Information Visualization

- Networks
- Hierarchical data
- High-dimensional data
- Distributions

Blue Waters Advanced Application and Workflow Support



- Science and Engineering Application Support (SEAS) team provides user and advanced application support to projects on Blue Waters.
- Range of domain and technical expertise: chemistry, fluid dynamics, runtime systems, numerical methods, astrophysics, application performance, workflows.
- Able to work with faculty interested in enhancing their high-performance computing and data workflows and applications on Blue Waters.



- Gregory Bauer – SEAS lead

CyberGIS Center

cybergis.illinois.edu



Dr. Shaowen Wang
Founder and Director
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Researching, developing, and applying Geographic Information Science and Systems on advanced cyberinfrastructure.



ROGER
CyberGIS Supercomputer
go.illinois.edu/ROGER

Research Application Focus Areas:

- Agriculture and Food
- Disaster and Emergency
- Earth and Environment
- Energy and Water Resources
- Health and Wellness



Johnathan Rush,
Education, Outreach and Training Coordinator
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NCSA Industry

Ahmed Taha, Technical Program Manger

Domain Expertise

- Multi-physics/scale Modeling in Manufacturing and Material Processing
- Biomechanics
- Nuclear Engineering
- Combustion
- Molecular Dynamics
- Bioinformatics
- Data Analytics, Big Data, ...

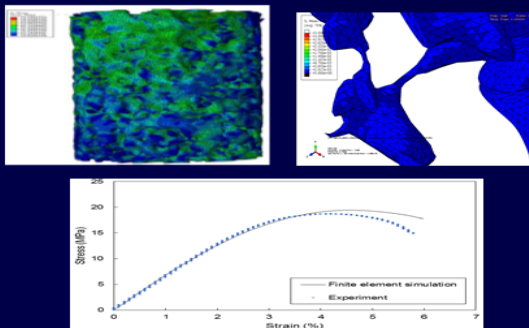
HPC Expertise

- Multiphysics Software (ISV and Open Source)
- Extreme Scalability
- Sparse Solvers
- Code Profiling , Parallelization and Optimization

Proposals and Beyond

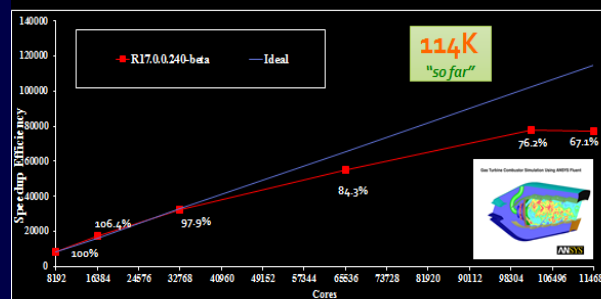
- NCSA Faculty Fellowships
- Industry
- NSF/NIH/NIST
- Mixed .gov/.com (NDEMC, DMDII, AFFOA)
- Project Management
- Business Development

Direct Numerical Simulation of Bone Plasticity and Strength
Seid Korić, Fereshteh Sabet, Iwona Jasiuk, 2015-2016



Ansys-Fluent ver. 16.0 "beta"

Dr. Ahmed Taha, Blue Waters (Cray CLE6) "Ansys Gas Turbine Combustor, 830M Cells, Aug. 2015



NCSA *Innovative Software & Data Analysis*

- Research & Development
- Reusable software tools & frameworks for data analysis
- Bridging and amplifying efforts across different projects
- New custom software tools & frameworks



The National DATA SERVICE

- National effort to bring together infrastructure supporting the publication, discovery, and reuse of data
- In collaboration with the RDA implementing standards and protocols
- From the Internet to the “DataneT”



Innovative Systems Laboratory

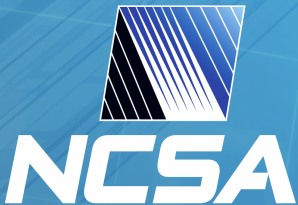


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Adjunct Associate Professor, ECE



National Center for Supercomputing Applications
University of Illinois at Urbana–Champaign

Innovative Systems Laboratory

- NCSA's place for special projects
 - Investing into future projects that will result in major developments (impact, funding, ...) 5+ years from now
 - Long-term support for 1-3 such projects
- NCSA's research and development vehicle
 - Primarily serve NCSA's mid-term needs in core technology areas
 - support for evaluating new technologies
 - support for developing new technologies
 - Annual R&D agenda setup by the NCSA technical leadership with input from faculty and staff
 - 2-5 projects/technologies
 - Looking forward 1-5 years
 - Focus on new systems or impact on existing systems
- NCSA R&D business development
 - Collaboration with faculty and industry to establish new programs
 - Support for preparing proposals

NCSA Idea Acceleration Workshop

Midwest Big Data Hub

What we do:

- *Cultivate cross-sector communities*
- *Reduce friction in Data-to-Decision systems*
- *Build capacity in data science and data literacy*

Application Domains

- Digital Agriculture
- Food-Energy-Water
- Transportation & Smart Cities
- Urban Sciences
- Network Sciences
- Health & Biomedicine
- Business Analytics
- Advanced Manufacturing
- Materials Science

Join our Midwest communities

Cross-cutting Activities

- Legal and Policy Issues
- Economic Development
- Cyberinfrastructure and Cloud Services
- Data Sharing
- Privacy, Security, and Ethics
- Entrepreneurship
- Data Literacy and Education
- Replicability and Reproducibility in Data Science

Looking for R+D partners in this space!



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Accelerating the Big Data Innovation Ecosystem



Scientific Software and Applications (SSA) Division

Dan Katz & Kenton McHenry

(dskatz@illinois.edu & mchenry@uiuc.edu)



- SSA Groups
 - Advanced Application Support (AAS) – Jay Alameda
 - Innovative Software & Data Analysis (ISDA) – Kenton McHenry & Jong Lee
 - Scientific and Engineering Applications Support (SEAS) – Greg Bauer
- SSA Expertise
 - Software Development
 - Build scientific software to satisfy current needs & create new opportunities
 - Use of external software development technologies
 - Applications Support
 - Provide consulting & advanced application support for Blue Waters, campus cluster, industry partners, e.g. porting, tuning, benchmarking, debugging, workflows, frameworks, performance tools integration, code refactoring, enabling new programming models, new algorithms
- Dan's research
 - Workflow systems (e.g. Swift) applied to parallel and distributed computing
 - Science of software: software as an academic product, software citation, software credit, software sustainability, software communities, etc.
 - Resilience: executing complex software on non-reliable systems

