# NCSA Faculty Fellows 2019 Kick off Presentation

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

# NCSA

- Interdisciplinary institute at Illinois reporting to OVCR
  - One of original five NSF supercomputing centers: Provide state-of-the-art computing capabilities (hardware, software, HPC expertise) to nation's scientists and engineers
- In total, > $1 Billion brought to U. Illinois since 1985
  - Approximately 220 staff (160+ technical/professional staff), two facilities
  - Operating NSF's most powerful computing system: Blue Waters ($345M)

- Managing NSF's national cyberinfrastructure: XSEDE ($145M)
- NCSA Industry:  over 40 partners

# NCSA

- 114 affiliate faculty
- 20 postdoctoral scholars with a postdoc program
- Graduate and undergraduate students

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October 2017

Research Institutes | VCR Administration | Compliance and Research Support Units

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# Petascale Computing Facility: Home to Blue Waters, Research Platform for Nation

- **Blue Waters**
  - 13PF, 1500TB, 300PB
  - >1PF On real apps
  - NAMD, MILC, WRF, PPM, NWChem, etc
  - Projected $1.08B direct economic impact on Illinois' economy

- **Modern Data Center**
  - 90,000+ $ft^2$ total
  - 30,000 $ft^2$ raised floor
    20,000 $ft^2$ machine room gallery

- **Networking**
  - 440 Gbits to outside world

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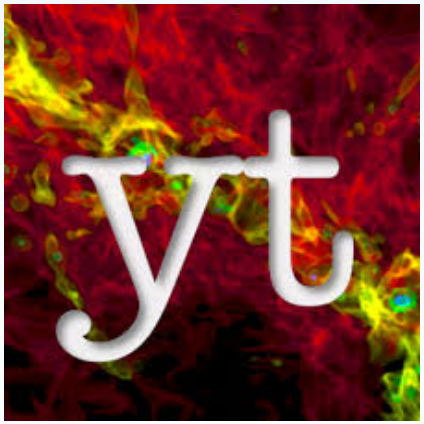
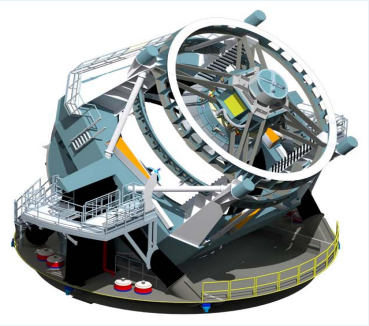
# Example Projects, Centers, Facilities


XSEDE, national cyberinfrastructure




Data analysis for large scale simulation data

- Innovative Systems Laboratory
- Advanced Visualization Laboratory
- eDream - Emerging Digital Research & Education in Arts Media Institute
- Visual Intelligence for Bio
- NCSA Industry program
- Data Analysis and Visualization



LSST Data pipeline

Clowder: Open source data management for long-tail data

NCSA

# NCSA Strategic Plan

A deeper and integrative connection to the Illinois campus with faculty, postdocs and students.

# NCSA Organization

## http://www.ncsa.illinois.edu/about/directory

Bill Gropp
NCSA Director

Scott Wilkin
Deputy Director

Randy Butler
Senior Associate Director,
Integrated Cyberinfrastructure

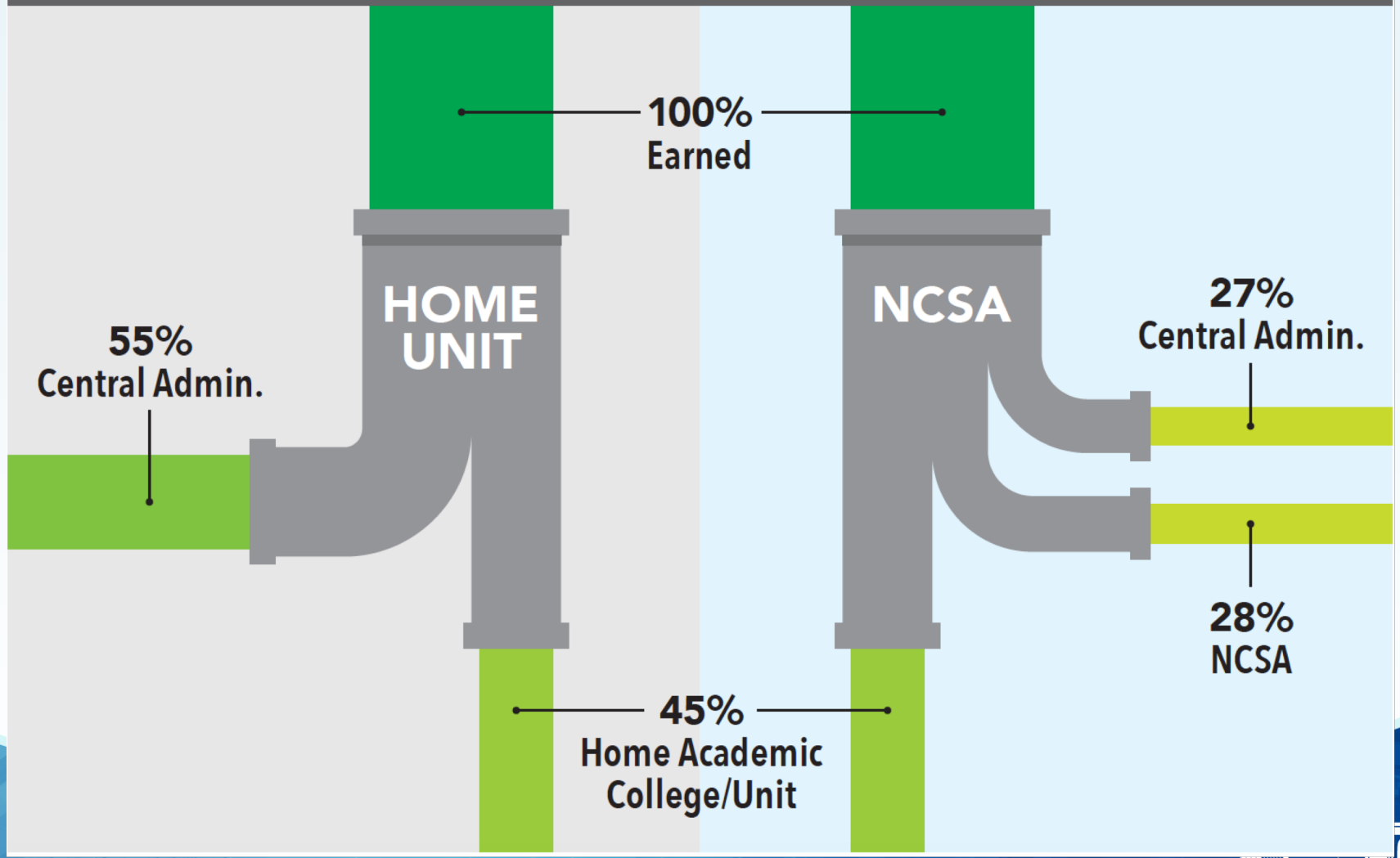
Donna Cox
Associate Director,
Research & Education

# NCSA Mission

- Address challenges or opportunities that are complex, multifaceted, and interdisciplinary aligned with with potential to advance the Illinois Strategic Plan

- Pursue external funding opportunities through NCSA's Research Focus Areas
  - Astronomy and Astrophysics
  - Computational Biology and Health
  - Culture and Society
  - Food, Energy, and Water
  - Computational Engineering

# Grants run through NCSA do not impact the F&A returned to your home unit.



# NCSA Faculty Fellows Program (est. 1999)

- Competitive program provides seed funding (up to $25K/award) for demonstration, start-up projects, workshops, and/or other activities with the potential to lead to longer-term collaborations and externally funded activities around research and development.
- Anticipate funding for 6 fellows for the 2019-2020 cohort

## Important Dates

- **Jan.25, 2019:** NCSA Faculty Fellows kickoff: solicitation goals and focus, help potential applicants understand its scope, answer questions
- **Feb. 1, 2019: NCSA Fellowships Ideas Accelerator Workshop.**

  **10 am-12 pm, NCSA Lobby. Speed match-making event between potential applicants and NCSA staff and researchers.**
- **Feb. 22, 2019:** Deadline to submit to the NCSA Fellowships Program – Link to submit will be posted on our website following the Idea Accelerator Workshop
- **April 2019:** Target date for decisions

# Current Fellows

- **Nora El-Gohary**, Civil and Environmental Engineering
  - *Heterogeneous Data Analytics Framework for Predicting the Deterioration of Civil Infrastructure Systems*
  - NCSA Staff: Chris Navarro (Innovative Software and Data Analysis)

- **Niao He**, Industrial and Enterprise Systems Engineering
  - *Learning Huge-Scale Diffusion Networks in Real-Time*
  - NCSA Staff: Dora Cai (Industrial Application Domains)

- **Hannah Holscher**, Food Science and Human Nutrition; **Ruoqing Zhu**, Statistics
  - *OmiX Development: A Visual Analytics Platform for Multi-Omic Microbiome Data*
  - NCSA Staff: Colleen Bushell, Michael Welge, Peter Groves, and Xiaoxia Liao (Visual Intelligence for Biology)

# Current Fellows (cont'd)

- **Zeynep Madak-Erdogan**, Food Sciences and Human Nutrition
  - *Development of Machine Learning-Based Analytics and Visualization Approaches for Predictive Toxicology*
  - NCSA Staff: Colleen Bushell, Michael Welge, Loretta Auvil, and Xiaoxia Liao (Visual Intelligence for Biology)
- **Rini Mehta**, Comparative and World Literature
  - *Indian Cinema in Context: Interactive Film History Archive and Tools*
  - NCSA Staff: Jay Alameda (Advanced Application Support), Kalina Borkiewicz (Advanced Visualization Lab), and Sandeep Puthanveetil Satheesan (Innovative Software and Data Analysis)
- **Mao Ye,** Finance
  - *A Workshop to Jumpstart High-Performance Computing in Finance*
  - NCSA Staff: John Towns (XSEDE)

# Projects are encouraged that build on:

- NCSA focus research areas:
  - Astronomy and Astrophysics
  - Computational Biology and Health
  - Culture and Society
  - Food, Energy, and Water
  - Computational Engineering
- and NCSA major projects and programs:
  - Blue Waters (Contact: Greg Bauer)
  - XSEDE (Contact: Jay Alameda)
  - Innovative Systems Laboratory (Contact: Volodymyr Kindratenko)
  - Advanced Visualization Laboratory (Contact: Donna Cox)
  - Cybersecurity (Contact: Alex Withers)
  - Midwest Big Data Hub (Contact: Melissa Cragin)
  - Innovative Software and Data Analysis (Contact: Kenton McHenry)
  - NCSA Industry Application Domains (Contact: Seid Koric)
  - Visual Intelligence for Biology Group (Contact: Colleen Bushell)
  - Data Analysis and Visualization (Contact: Rob Sisneros)

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# Fellows Responsibilities to NCSA

- Responsible for contributing to the NCSA academic core;
- Contribute to and take part in large collaborative funding efforts;
- Act as liaisons with their home departments.

# NCSA Responsibilities to Fellows

- Provide a 0% NCSA appointment;
- Fellows are provided drop-in office space at NCSA;
- Have direct access to NCSA research scientists, staff, and services;
- Where possible, NCSA will provide access to compute, data, and other cyberinfrastructure, including software licenses, needed for fellowship projects.

# Collaboration with NCSA Staff

- Strongly encouraged to maintain an active, close collaboration with NCSA staff for the duration of the fellowship, **discuss these collaborations in detail with the NCSA staff involved before submitting proposals**.
- Describe the nature of the collaboration, anticipated staff time commitment, source of support for staff involvement.
- Support for NCSA staff can come from existing project or grant funds or can be requested as part of the proposal from the NCSA Director's Office*.

***Requests of up to one month effort are the most likely to be supported. Staff should discuss their plans with their supervisor.**

# Proposal Preparation and Submission

- Competitive proposals will include:
  - Individual or multiple Illinois faculty
  - A well-defined activity that requires close collaboration with NCSA application and technical staff and possible use of NCSA computational resources or facilities.
  - A plan that will lead to new external funding

- Easychair used for proposal submission, beginning February 1st (see “Proposal Preparation and Submission” on Fellow Program website)

# Review Criteria

- Significance
  - Does the project address an important problem or a critical barrier to progress in the field?
  - Is the project interdisciplinary and relevant to the Illinois campus and to NCSA strategic plan?
  - Is there a strong scientific promise for the project?
  - If the aims of the project are achieved, how will scientific knowledge, technical capability, and or clinical practice be improved?
- Investigators
- Innovation
- Approach
- Environment

# Review Criteria (cont'd)

- Significance
- Investigators
  - Does the project include NCSA staff as integral contributor to the project?
  - Are the PI(s), collaborators, and other researchers well suited to the project?
  - Does the project include plan(s) to leverage NCSA scientific, technical, and management expertise, and/or leverage NCSA facilities and other major ongoing activities and programs?
  - Does the project include plan(s) for continued collaboration and pursue of external funding from Federal agencies, Foundations, or Industry?
- Innovation
- Approach
- Environment

# Review Criteria (cont'd)

- Significance
- Investigators
- Innovation
  - Does the project challenge to seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions?
  - Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense?
- Approach
- Environment

# Review Criteria (cont'd)

- Significance
- Investigators
- Innovation
- Approach
  - Are the overall strategy, methodology, and analysis well-reasoned and appropriate to accomplish the scientific aims of the project?
  - Are potential problems, alternative strategies, and benchmarks for success presented?
  - If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed?
- Environment

# Review Criteria (cont'd)

- Significance
- Investigators
- Innovation
- Approach
- Environment
  - Will NCSA in which the work will be done contribute to the probability of success?
  - Does the project demonstrate a compelling need for the NCSA funding and involvement?
  - Are NCSA support, equipment and other physical resources available to the investigators adequate for the project proposed?

# Proposal Preparation- Required Documents

Proposals should consist of:

A. Abstract ……(1/2 page)

B. Project Description ……..(4 pages)

- B.1 Project Significance
- B.2 Investigators
- B.3 Innovation
- B.4 Approach
- B.5 Environment

C. References (avoid using et. al)

D. Bios – each PI/co-PI ……..(2 pages)

E. Budget and Budget Justification

F. *Letter(s) of Commitment ……(1 page)

*Template may be found on the “Proposal Preparation and Submission” web page

# Budgets

- Up to $25,000 over 12 months (appointments begin July 1, 2019).

- Fellowship funds can be used for the following purposes:
  - Research assistant support (GRA, postdoc, etc.)
  - Workshop support (to be held at NCSA)
  - Travel support—maximum of $1,500 for conference travel or travel to other sites
  - Faculty summer salary

- Project budgets do not need to include benefits, tuition remission, or overheads.

- Awards made are subject to the availability of funds, and review panel's recommendations.

# Next Week: Idea Acceleration Workshop – February 1, 10am-12pm, NCSA Lobby

- Potential applicants encouraged to present 1 slide on:
  - project ideas and/or skills/resources needed from NCSA
  - Picture of yourself
  - Contact information (e.g. email address)
  - Submit slide to Amanda Lombardo (alombar@illinois.edu) by 4pm on January 31st

- NCSA staff will be on hand to share information on major NCSA program areas

# Questions/Comments??