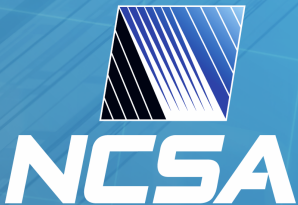


# NCSA Faculty Fellows 2017 Kick off Presentation

Gabrielle Allen, NCSA Senior Research Scientist  
Associate Dean for Research and Research  
Education, College of Education

Amanda Lombardo, NCSA Research Coordinator



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

# National Center for Supercomputing Applications



- Interdisciplinary institute at Illinois reporting to VCR
  - 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 200 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 30 partners

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EXECUTIVE ASSOCIATE VICE CHANCELLOR  
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Nohra Mateus-Pinilla



OFFICE OF THE VICE CHANCELLOR FOR RESEARCH ORGANIZATIONAL STRUCTURE  
January 2016

Research Institutes

VCR Administration

Compliance and Research Support Units



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



- **Blue Waters**
  - Funds 50 staff!!
  - 13PF, 1500TB, 300PB
  - >1PF On real apps
  - NAMD, MILC, WRF, PPM, NWChem, etc

- **Modern Data Center**
  - 90,000+ ft<sup>2</sup> total
  - 30,000 ft<sup>2</sup> raised floor
  - 20,000 ft<sup>2</sup> machine room gallery

- **Networking**
  - 400 Gbits to outside world

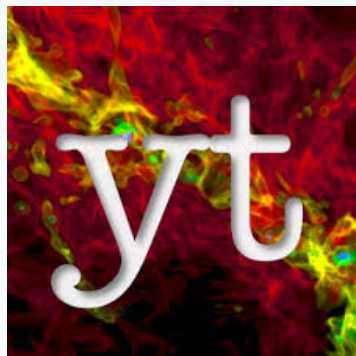
# Example Projects, Centers, Facilities



XSEDE, national cyberinfrastructure



Browndog: Curation for "long tail" unstructured data



Data analysis for large scale simulation data



LSST Data pipeline

- CyberGIS Center for Advanced Digital and Spatial Studies
- I-CHASS Institute for Computing in Humanities, Arts and Social Sciences
- eDream Emerging Digital Research & Education in Arts Media Institute

- ISL Innovative Systems Laboratory
- AVL Advanced Visualization Laboratory

# NCSA New Strategic Plan

A much deeper and integrative connection to the Illinois campus with faculty, postdocs and students embedded as part of NCSA working with staff and facilities and bridging to departments and units.



# NCSA Vision 2020:

<http://www.ncsa.illinois.edu/about/ncsa2020>



*“NCSA will be a home for addressing complex research problems in science and society, powered by the development and application of advanced and comprehensive digital environments.”*

# NCSA Vision 2020:

<http://www.ncsa.illinois.edu/about/ncsa2020>



*Goal 1: Transform NCSA into world-class center for transdisciplinary research, education and innovation*

*Goal 2: Create the world's most advanced digital environment that integrates large-scale computing, instrumentation, and data services.*

*Goal 3: Drive innovation, and economic, and societal impact for Illinois and the nation.*



# NCSA Organization

<http://www.ncsa.illinois.edu/about/directory>



**H. Edward Seidel**  
NCSA Director



**Bill Gropp**  
Acting Director

## DIRECTORATES



**Scott Wilkin**  
Associate Director for  
Economic and Societal Impact



**Randy Butler**  
Senior Associate Director for  
Integrated Cyberinfrastructure



**Donna Cox**  
Associate Director for  
Research & Education

# NCSA Thematic Areas

- Faculty-led research at NCSA organized through a set of thematic areas (faculty, research groups, postdocs, students).
- Address major challenges or opportunities that are complex, multifaceted, and interdisciplinary, going beyond traditional individual/departmental efforts, requiring deep connection to NCSA technologies and expertise.
- Theme characteristics include:
  - Broadly defined with a portfolio of component research projects spanning multiple inter-related activities
  - Contribute to the nation's advanced cyberinfrastructure programs
  - Involve faculty from multiple home departments and colleges.
  - Align with and advance the Illinois Strategic Plan.

# Thematic Areas at NCSA



## *Astronomy and Physics*

**Led by Athol Kemball**  
NCSA, Astronomy



## *Culture and Society*

**Led by Donna Cox**  
NCSA, Art and Design



## *Bioinformatics and Health Science*

**Matt Hudson**  
NCSA, Crop Sciences



## *Earth and Environment*

**Led by Shaowen Wang**  
NCSA, Geography and GIS



## *Computational and Data-enabled Science*

**Led by Gabrielle Allen**  
NCSA, Astronomy



## *Materials and Manufacturing*

**Led by Narayana Aluru**  
NCSA, Mechanical Science  
and Engineering

# At NCSA



- 89 affiliate faculty, with office or shared desks
- 32 postdoctoral scholars with a postdoc program
- Graduate and undergraduate students in interdisciplinary, theme based offices

# NCSA Faculty Fellows Program

- With different names, has been running since 1999
- Around 8 fellows a year, modest funds (~\$25K per award) for faculty to collaborate with NCSA, aim to lead to future externally funded activities
- Current aim:
  - Research fellows integrated with NCSA, projects more aligned to build on existing investments, and contribute to our strategic plans to build up thematic areas – want long lasting partnerships, deep connections to campus units
  - Fellows are made affiliate members of NCSA, access to programs and resources

# Current Fellows

- **Ange-Therese Akono**, Civil and Environmental Engineering
  - *Multi-scale and Multi-physics Modeling of Na-PS Geopolymer Cement Composites*
  - NCSA Staff: Erman Guleryuz (NCSA Industry)
- **Les Gasser**, Information Sciences
  - *Simulating Social Systems at Scale*
  - NCSA Staff: Scott Poole (ICHASS), Mark Van Moer, Matt Turk, and Alex Yahja
- **Nam Sung Kim**, Electrical and Computer Engineering
  - *Development of Runtime Page Placement and Migration Algorithms for Merging Heterogeneous Main Memory System for Big-Data Analytic Applications*
  - NCSA Staff: Vlad Kindratenko (Innovative Systems Lab)
- **Ting Lu**, Bioengineering
  - *A Multiscale Computational Framework for Studying Bacterial Communities*
  - NCSA Staff: Vlad Kindratenko (Innovative Systems Lab)

# Current Fellows

- **Jian Peng**, Computer Science
  - *Protein Structure Prediction using Deep Neural Networks*
  - NCSA Staff: Matt Turk
- **Nicole Riemer**, Atmospheric Sciences, and **Matthew West**, Mechanical Science and Engineering
  - *Learning Next-Generation Aerosol Models for Global Climate Simulations*
  - NCSA Staff: Greg Bauer (Blue Waters Science Applications)
- **Rebecca Smith**, Pathobiology
  - *Optimization of Agent-Based Models to Improve Infectious Disease Management*
  - NCSA Staff: Scott Poole (ICHASS), Shaowen Wang (CyberGIS), Alex Yahja
- **Ryan Sriver**, Atmospheric Sciences
  - *Visualizing Hurricane-Ocean Interactions using CESM*
  - NCSA Staff: Donna Cox, Rob Sisneros

# NCSA Fellow Program

- An opportunity for faculty and researchers at the UIUC to catalyze and develop long-term research collaborations between Illinois departments, research units, and the NCSA.
- Competitive program provides seed funding for demonstration, start-up projects, workshops, and/or other activities with the potential to lead to longer-term collaborations around research, development & education.
- **Jan. 20, 2017:** NCSA Faculty Fellows kickoff: solicitation goals and focus, help potential applicants understand its scope, answer questions
- **Jan. 27, 2017: NCSA Fellowships Ideas Accelerator Workshop.**  
**10 am-12 pm, NCSA Lobby. Speed match-making event between potential applicants and NCSA staff and researchers.**
- **Feb. 19, 2017:** Deadline to submit to the NCSA Fellowships Program
- **April 2017:** Target date for decisions



# Alignment with NCSA

- Projects are encouraged that build on existing NCSA activities, including the center's six thematic areas:
  - Bioinformatics and Health Sciences (Contact: Matt Hudson)
  - Computing and Data Sciences (Contact: Gabrielle Allen)
  - Culture and Society (Contact: Donna Cox)
  - Earth and Environment (Contact: Shaowen Wang)
  - Materials and Manufacturing (Contact: Narayana Aluru)
  - Physics and Astronomy (Contact: Athol Kemball)
- and major projects and programs, including:
  - Blue Waters (Contact: Greg Bauer)
  - XSEDE (Contact: Jay Alameda)
  - Innovative Systems Laboratory (Contact: Volodymyr Kindratenko)
  - Advanced Visualization Laboratory (Contact: Donna Cox)
  - Cybersecurity (Contact: Adam Slagell)
  - National Data Service (Contact: Kenton McHenry)
  - Midwest Big Data Hub (Contact: Melissa Cragin)
  - Innovative Software and Data Analysis (Contact: Kenton McHenry)
  - NCSA Industry (Contact: Seid Koric)



**Blue Waters**

Greg Bauer

**NCSA Industry**

Seid Koric



**Cybersecurity**

Adam Slagell



**Advanced  
Visualization Lab**

Donna Cox



**Midwest Big Data  
Hub**

Melissa Cragin



**Sci. Software  
Applications**

Dan Katz



**Innovative  
Systems Lab**

Volodymyr  
Kindratenko



**XSEDE**

Jay Alameda



**Education  
Coordinator**

Olena  
Kindratenko



**National Data  
Service;  
Innovative  
Software and  
Data Analysis**



Kenton McHenry



# Fellows at NCSA

- Fellows are provided a 0% NCSA appointment and are responsible for contributing to the center's academic core, play a significant role in advising on center strategy, contribute to and take part in large collaborative funding efforts, and act as liaisons with their home departments.
- Fellows are provided with office space at NCSA as appropriate and 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.

# Applying

- Easychair used for proposal submission, beginning January 27<sup>th</sup> (see “How to Apply” on Fellow Program website: <http://www.ncsa.illinois.edu/about/org/fellowships/apply>)
- Competitive proposals: individual or multiple faculty, well defined activity, need for close collaboration with NCSA, new collaborations with clear outcomes that contribute to our strategic plan and lead to new funding
- Particular interest in proposals that can lead to stimulating demonstrations of extreme-scale cyberinfrastructure
- Successful proposals will:
  - Advance the development of existing or new thematic areas at NCSA
  - Leverage and build on major NCSA projects and investments
  - Demonstrate a compelling need for NCSA funding and involvement
  - Outline a clear plan for activities to contribute to the NCSA environment (e.g. students working at NCSA)
  - Include NCSA staff as integral contributors to the project (strongly encouraged)

# Collaboration with NCSA Staff

- Fellows are strongly encouraged to have an active, close collaboration with NCSA staff for the duration of the fellowship, and **applicants should discuss these collaborations in detail with the NCSA staff involved before submitting proposals.**
- Proposals should describe the nature of the collaboration, anticipated staff time commitment staff, 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 one month effort or less are the most likely to be supported, should discuss their plans with their supervisor

# Proposal Format

- Proposals should be *no more than six pages*, consisting of:
  - Project summary (suggested length: 1/2 page)
  - Problem statement and potential impact (suggested length: 1 page)
  - Approach (suggested length: 1 page)
  - Need for collaboration and advanced cyberinfrastructure (suggested length: 1 page)
  - Plans for continuation of activity (e.g., submit proposals, other funding) (suggested length: 1/2 page)
  - Description of project team, location of activities, mechanisms of collaboration, and required compute/data (or other) infrastructure (suggested length: 1 page)
  - Milestones and/or assessment (suggested length: 1/2 page)
- Proposals should also include a budget and budget justification, short (2- or 3-page NSF/DOE or NIH style) resumes for all project participants, and may include references; these materials are not included in the six-page limit.

# Letters of Commitment

- Because we have had some issues in past with people not realizing they were part of proposals.
- Short letters of commitment should be included for all co-PI's and NCSA staff collaborating in fellowship proposals
- Template on web page: confirm involvement, NCSA staff includes confirmation they have discussed with supervisor and source of funding.

# Budgets

Not meant to limit projects, discuss with Amanda Lombardo if you have questions.

- Up to \$25,000 over 12 months (starting July 1, 2017). Follow-on funding for previously funded fellowships will be considered only in cases where additional funding is required to complete or develop a proposal for an active or imminent RFP.
- Fellowship funds can be used for the following purposes:
  - Adjustment of teaching responsibilities, to be negotiated with department heads
  - Research assistant support (GRA, postdoc, etc.)
  - Travel support—maximum of \$1,500 for conference travel or travel to other sites
  - Faculty summer salary
- **Project activities are strongly encouraged to take place in the NCSA Building where they will contribute to a collaborative, interdisciplinary research environment.**
- Project budgets do not need to include benefits, tuition remission, or overheads.



# Review Process

- NSF-style: 3-4 reviews for each proposal, reviewers from campus and NCSA. Panel to make recommendations on highly competitive, competitive, non-competitive.
- Awards made based on panel recommendation, match to strategic goals, leveraging of NCSA resources

# Next Week: Idea Acceleration Workshop – Jan. 27, 10am-12pm, NCSA Atrium

- Potential applicants encouraged to present 1 slide on:
  - project ideas or skills/resources needed from NCSA
  - Picture of yourself
  - Contact information (e.g. email address)
  - Submit slide to Amanda Lombardo by 4pm on January 26th
- NCSA staff will be on hand to share information on major NCSA program areas

# Questions/Comments??