

NCSA Fellows 2023 Kick off Presentation

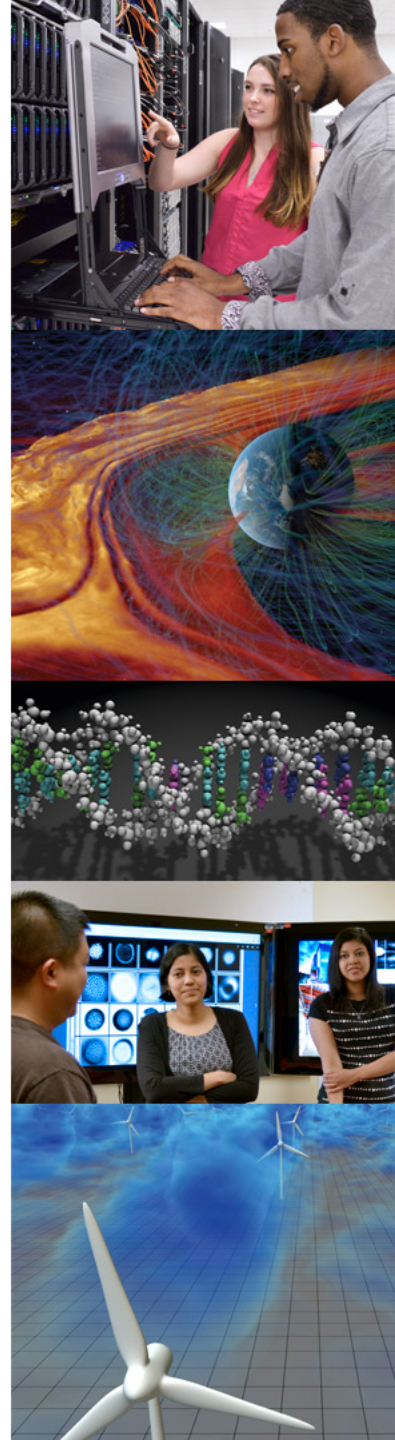
September 23, 2022

Presenters: John Towns, Amanda
Lombardo, Olena Kindratenko

I ILLINOIS

NCSA | National Center for
Supercomputing Applications

Introduction to NCSA



NCSA Strategic Plan

- NCSA Mission:

NCSA leads and supports partnerships around campus, the nation, and the world by developing our staff and leveraging their expertise, experience, and innovation in digitally-enabled scholarship to solve the most scientifically and societally important and challenging problems.

->Research focus areas: Artificial Intelligence, Arts and Humanities, Astrophysics, Digital Agriculture, Earth and Environment, Engineering, Health Sciences

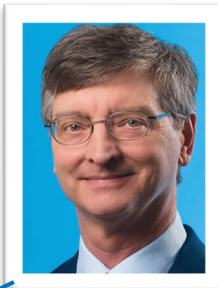


National Center for Supercomputing Applications

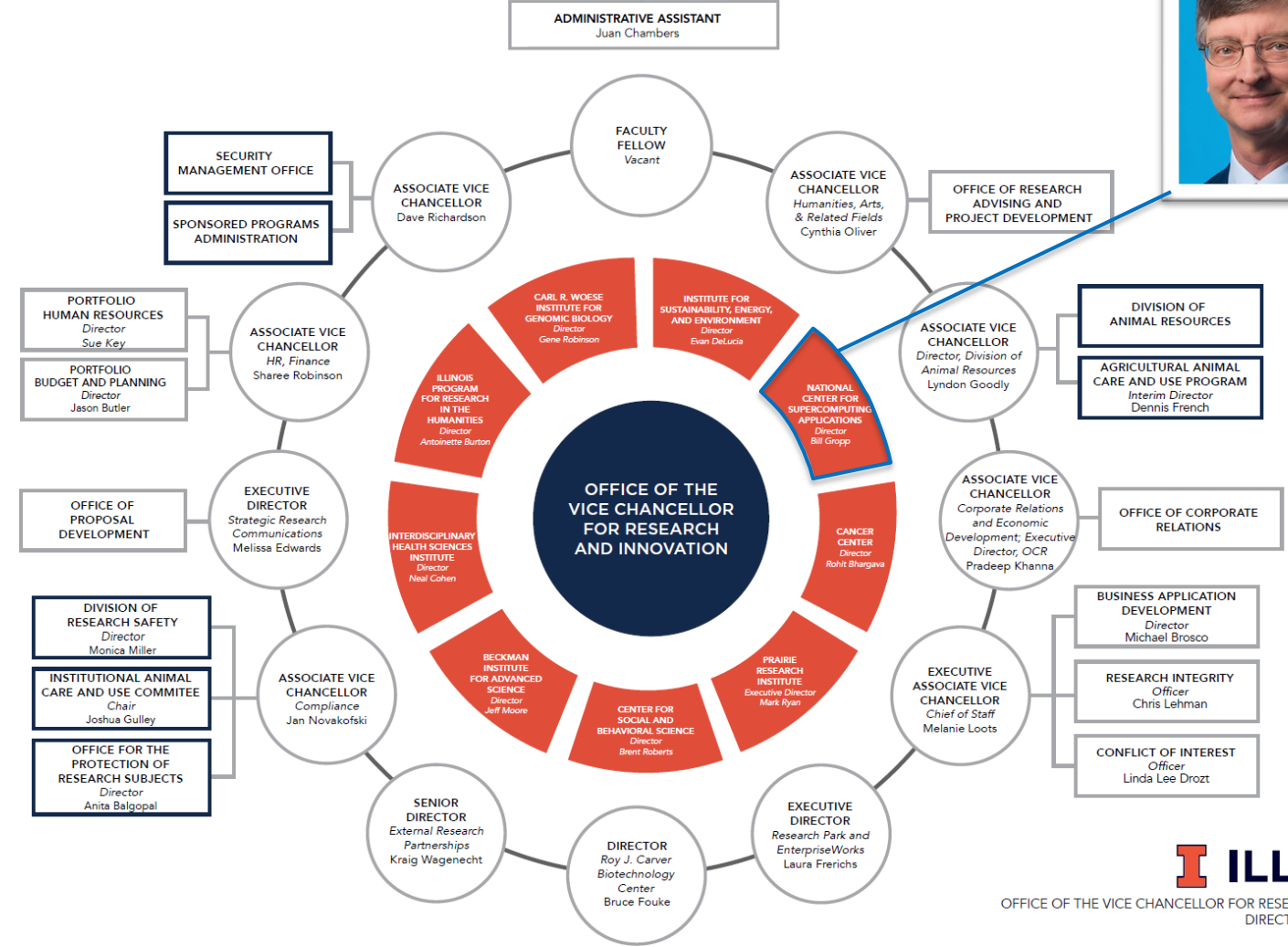


- Interdisciplinary institute at Illinois reporting to OVCRI
 - One of original five NSF supercomputing centers: Engage the nation's scientists and engineers on advanced research applications leveraging state-of-the-art computing capabilities (software, hardware, HPC expertise)
- In total, > \$1 Billion brought to U. Illinois since 1985
 - Approximately 240 staff (160+ technical/professional staff, academic professionals, and postdocs), two facilities
- Coordinating and providing key elements of NSF's national cyberinfrastructure: Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support (ACCESS)

**VICE CHANCELLOR FOR RESEARCH AND INNOVATION
SUSAN MARTINIS**



**Bill Gropp,
Director
of NCSA**



I ILLINOIS
OFFICE OF THE VICE CHANCELLOR FOR RESEARCH & INNOVATION
DIRECT REPORTS AND UNITS
DECEMBER 2019

Research Institutes
VCR Administration
Compliance and Research Support Units

NCSA Leadership



Bill Gropp
NCSA Director



Dan Katz
Chief Scientist

TBD
Chief Scholar



Jay Roloff,
*Interim Associate
Director,
Administration*



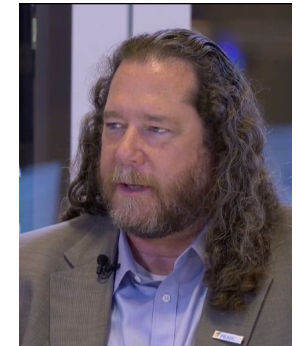
Laura Herriott
*Associate Director,
Research Consulting*



Kenton McHenry
*Associate Director,
Software*



Tim Boerner
*Interim Associate
Director, Integrated
Cyberinfrastructure*



John Towns
*Executive
Associate Director,
Engagement*

Director's Office
Bill Gropp



NCSA Executive Committee



Engagement

- Research & Education (R&E)
- Astrophysical Surveys Program Office (ASPO)
- Center for Digital Ag (CDA)
- Center for AI Innovation (CAI)
- Industry Program
- Healthcare Innovations Program Office (HIPO)
- Center for Exascale-Enabled Scramjet Design (CEESD)
- ACCESS
- Midwest Big Data Hub Project Office (MBDH)
- Delta Project Office
- Visualization Program Office

**Research Consulting
Science & Engineering
Applications Support (SEAS)**

- Technology Management Group (TMG)
- Business IT
- Data Analytics
- Genomics
- Research Facilitation Services

**Integrated
Cyberinfrastructure**

- Cybersecurity (CSD)
- Continuous Improvement & Innovation (CIID)
- Advanced Systems (ASD)
- Data Management & Deliver (DMDD)

Software

- Software Applications and Data Lab (SADL)
- Research Software Applications and Learning Technologies (ReSALT)
- Middleware Technology Group (MTG)
- Software Design Delivery and Deploy (SD3)
- Visual Analytics (VA)
- Tools for Research Institutions and Infrastructure (TRI)

Administration

- Facilities
- Business Office
- Human Resources (HR)
- Project Management Coordination Office (PCO)
- Communications (Comm)

Example Projects, Centers, Facilities



ACCESS

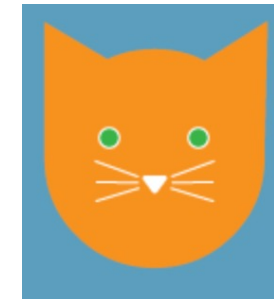


Community
Engagement
around Data

- Innovative Systems Laboratory
- Center for Artificial Intelligence Innovation
- Healthcare Innovation Program Office
- Visualization:
 - Advanced Visualization Laboratory
 - Data Analysis and Visualization
 - Visual Analytics
- NCSA Industry Program
- Partnerships with the Center for Digital Agriculture and the Center for Astrophysical Surveys
- Software Directorate
- Research Consulting



Center for AI
Innovation



Clowder: Open
source data
management for
long-tail data

NCSA offers access to a variety of computing resources from campus level to the Nation

- **Campus Cluster:** 4 nodes dedicated to NCSA Fellows + access to NCSA allocation queue
- **HAL Cluster** for Deep Learning research on campus
- **HOLL-I** for extreme scale machine learning
- **Radiant** private cloud computing service
- **Nightingale** high-performance compute cluster for sensitive data
- **Delta:** new advanced computing and data resource system to expand GPU-based computing.
- **ACCESS: Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support**
 - Access to various machines and services (storage, software, etc.) via separate application process
 - Trainings

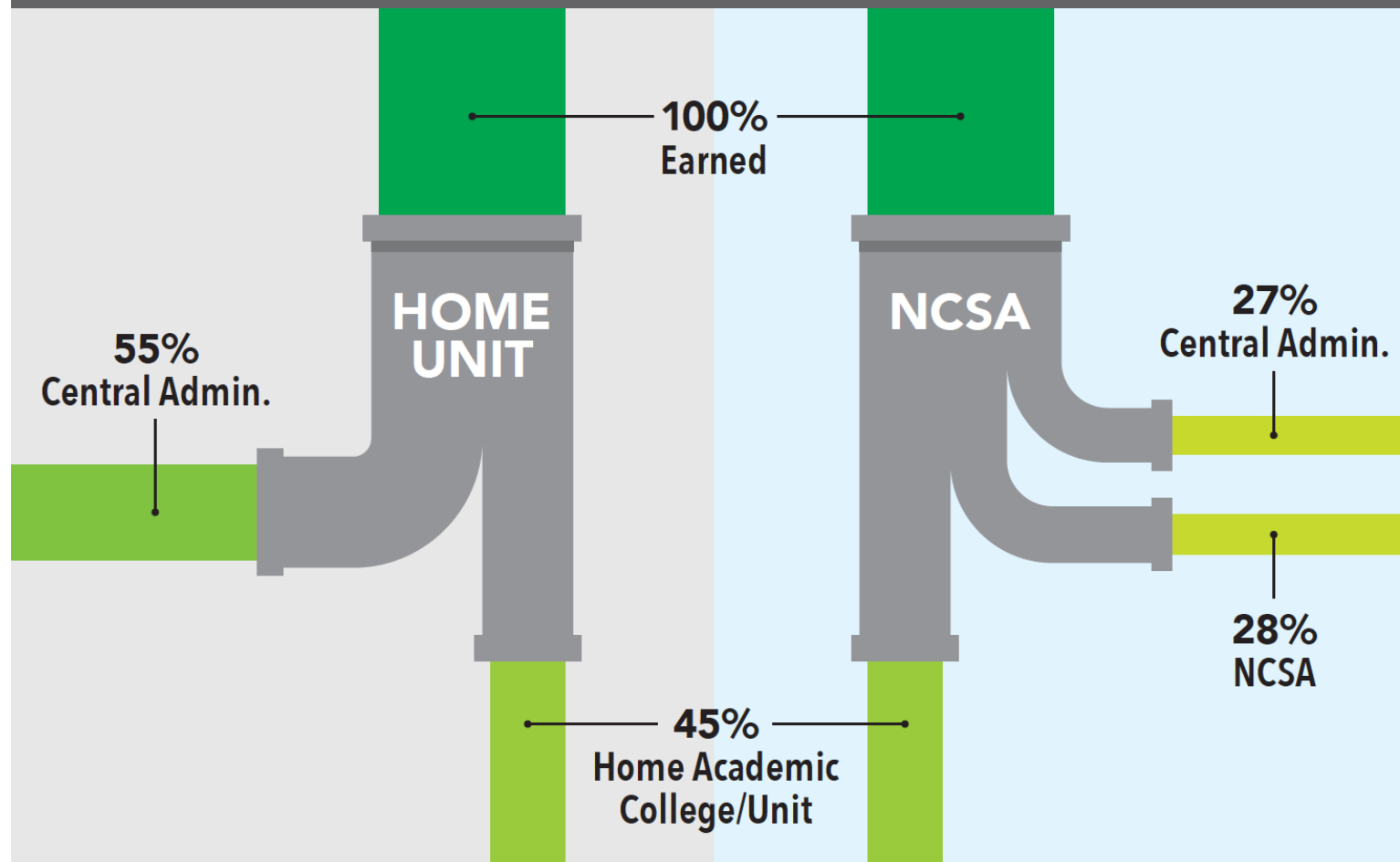


NCSA Research & Education (est. 2015)

- R&E Mission:
 - Develop deeper and integrative connections to the Illinois campus with faculty, researchers, postdocs, and students
- Research & Education is within the Engagement Directorate.
- R&E Major Functions:
 - Connect to the primary research and education mission of the university by driving innovation at NCSA and helping Illinois respond actively to the challenges of 21st century transdisciplinary research and education
 - Help to advance the technologies, labs and projects in NCSA
 - Pursue external funding opportunities through NCSA



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

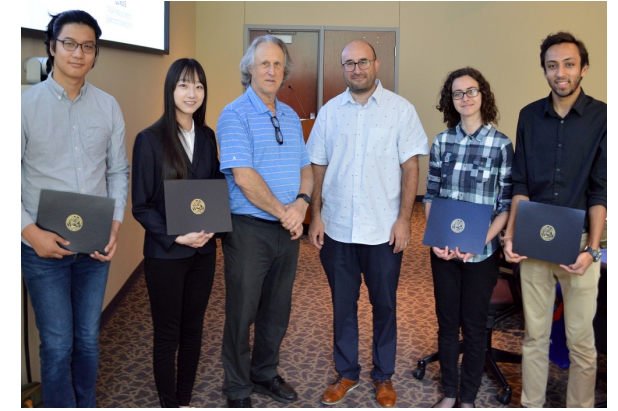
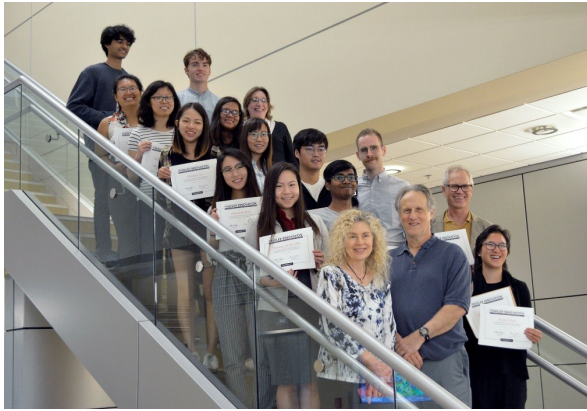


NCSA Education

- 179 faculty and center affiliates
- Post-Doctoral Research Program
- Undergraduate and graduate students
 - SPIN program: NCSA undergraduates internship program
 - SPIN students are eligible for Fiddler Fellowship Awards
 - NSF-funded REU FoDOMMaT (The Future of Discovery: Training Students to Build and Apply Open-Source Machine Learning Models and Tools)
 - NSF-funded Cyberinfrastructure Professional Intern Program (CIP)
 - NCSA International Research Internship Program



Fiddler Innovation Endowment Award



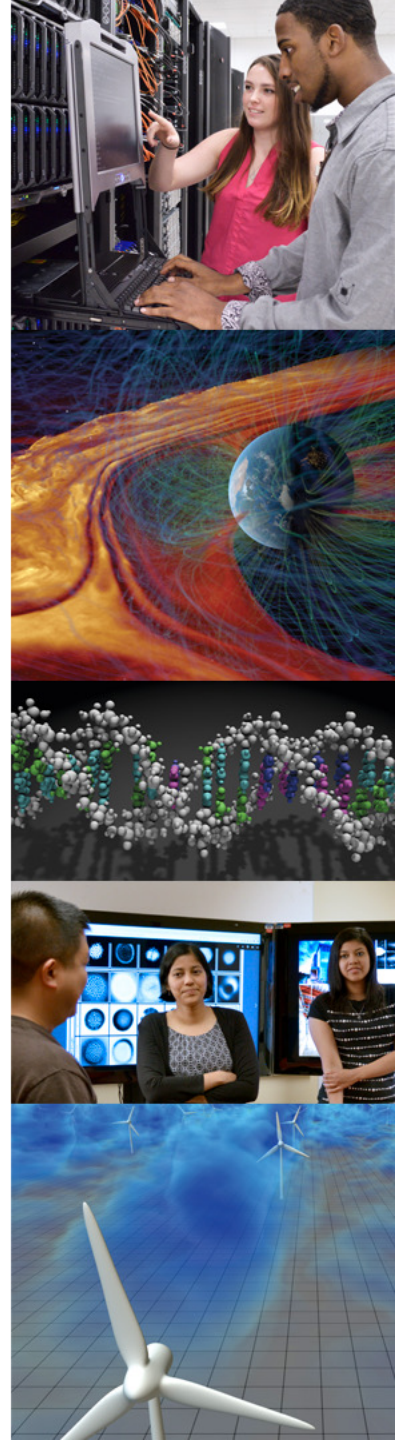
The Fiddler Innovation Fellowship Award is part of an endowment from Jerry Fiddler and Melissa Alden to the University of Illinois in support to the Emerging Digital Research and Education in Arts Media (eDream) Institute, which is based at the National Center for Supercomputing Applications.

68 undergraduate, graduate, and NCSA faculty affiliates awarded 2018-2021

FIDDLER INNOVATION ENDOWMENT

I ILLINOIS NCSA

NCSA Fellows program



NCSA 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 from the NCSA's Director's Office for 5-6 projects for the 2023-2024 cohort
 - Additional projects may be funded by other NCSA programs if they match the research interests

Important Dates

- **September 23, 2022:** NCSA Faculty Fellows kickoff: solicitation goals and focus, help potential applicants understand its scope, answer questions
- **October 7, 2022, 11 am-1pm: NCSA Fellows Ideas Accelerator Workshop: speed match-making event between potential applicants and NCSA staff and researchers**
- **October 31, 2022:** Deadline to submit to the NCSA Fellows Program - Link to submit will be posted on our NCSA wiki webpage following the Idea Accelerator Workshop
- **By February 1, 2023:** Target date for decisions

Current Fellows

- **Angela Lyons, Agricultural and Consumer Economics**
 - *A Machine Learning and Geospatial Approach to Targeting Humanitarian Assistance among Syrian Refugees in Lebanon*
 - NCSA Staff: Yifang Zhang and Aiman Soliman
- **Antonios Tsokaros, Physics**
 - *High Performance Computing for Magnetized Neutron Stars*
 - NCSA Staff: Roland Haas
- **Roman Makhnenko, Civil and Environmental Engineering**
 - *Physics-informed neural network modeling of fluid flow in microporous materials*
 - NCSA Staff: Volodymyr Kindratenko, Seid Koric, and Shirui Luo

Current Fellows (continued)

- **Mohamad Alipour**, Civil and Environmental Engineering
 - *Mixed Reality Platform for Immersive Physics-based Structural Digital Twins*
 - NCSA Staff: Robert Sisneros
- **Surangi Punyasena**, School of Integrative Biology
 - *PALYIM - An Automated Image Analysis Platform for Fossil Pollen Classification*
 - NCSA Staff: Sandeep Puthanveetil Satheesan
- **Zhiyu (Frank) Quan**, Mathematics
 - *Insurtech innovation and university-industry collaboration*
 - NCSA Staff: Volodymyr Kindratenko

Current Fellows (continued)

- **Zhi-Pei Liang and Brad Sutton, Electrical and Computer Engineering**
 - *Synergistic Integration of AI with MR Spectroscopic Imaging to Unravel Molecular Fingerprints of Brain Function and Neurodegenerative Diseases*
 - NCSA Staff: Volodymyr Kindratenko, Maria Jaromin and Colleen Bushell
- **Yuxiong Wang, Computer Science**
 - *Early Detection and Prediction of Parkinsonism Powered by Multi-Modal Few-Shot Learning*
 - NCSA Staff: Volodymyr Kindratenko
- **Andre Schleife, Materials Science and Engineering**
 - *First-principles and machine learning modeling of atomic disorder and optical properties*
 - NCSA Staff: Santiago Nunez-Corrales

Fellows are encouraged to partner with NCSA groups

- **NCSA major projects and programs:**
 - Center for AI Innovation (Contact: Volodymyr Kindratenko)
 - Innovative Systems Laboratory (Contact: Dan Lapine)
 - Visualization Program Office (Contact: Kalina Borkiewicz)
 - Healthcare Innovation Program Office (Contact: Maria Jaromin)
 - Cybersecurity (Contact: Alex Withers)
 - Midwest Big Data Hub (Contact: John MacMullen)
 - Software Directorate (Contact: Kenton McHenry)
 - Research Consulting (Contact: Seid Koric)
 - Center for Astrophysical Surveys (Contact: Joaquin Vieira)
 - Center for Digital Agriculture (Contact: Matt Hudson & Vikram Adve)

NCSA Fellows Responsibilities to NCSA

- **Contribute to NCSA culture of research and innovation**
- **Pursue continued collaboration and interdisciplinary funding efforts, when possible**
- **Act as liaisons with their home departments**

NCSA Commitment to Fellows

- Provide a 0% NCSA appointment
- Have direct access to NCSA research scientists, staff, student programs and services, including:
 - Students Pushing Innovation Internship Program
 - NSF-funded REU FoDOMMaT (Future of Discovery: Training Students to Build and Apply Open-Source Machine Learning Models and Tools)
 - NCSA International Research Internship Program (self contained)
 - Proposal Development Office
- Fellows are provided drop-in office space at NCSA
- Where possible, NCSA will provide access to compute, data storage, and other cyberinfrastructure, including software licenses, needed for fellowship projects

Collaborations 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
- Multiple NCSA staff could be included
- **Support for NCSA staff can come from their existing project or grant funds, or can be requested as part of the proposal from the NCSA Director's Office*.**

* Requests for funding for staff time should be limited to the total of \$10,000 for NCSA staff of their effort. Staff should discuss their plans with their supervisor.

Proposal Preparation and Submission

- Competitive proposals will include:
 - Individual or multiple Illinois faculty and/or researcher
 - 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 continued collaboration and may include the pursuit of new external funding
- Easychair used for proposal submission, beginning October 8 (see “NCSA wiki” on NCSA Fellowships 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

Review criteria (continued)

- 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

Review criteria (continued)

- 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

Review criteria (continued)

- 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?
 - Does the project demonstrate a compelling need for the NCSA funding and involvement?

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
- 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)

*Use NCSA budget and Budget Justification templates found on “NCSA wiki” on NCSA Fellowships website

**Template may be found on “NCSA wiki” on NCSA Fellowships website

Budgets

- Up to \$25,000 up to 15 months (appointments May 16, 2023 - August 15, 2024)
- Fellowship funds can be used for the following purposes:
 - Research assistant support (undergraduate or graduate hourly, GRA, postdoc, etc.)
 - Teaching Release
 - Workshop support (to be held at NCSA)
 - Travel support—maximum of \$1,500 for conference travel or travel to other sites
 - 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

Fiddler Innovation Endowment Award

- Opportunity for additional support from the Fiddler Innovation Endowment Award to selected NCSA Fellow awardees
- Consideration for projects that allied with the Fiddler Innovation Endowment goals
- To further and augment Fellows' research project
- Additional \$10K post-award per project
- Anticipate one award per year per project
- The selection process will take place in fall 2024, based on a review process and research project progress
- Fiddler Innovation Fellowship is given in support to the (eDream) Institute, which is based at NCSA

Program Oversight

- **NCSA Fellows Program coordination**
 - Olena Kindratenko, kindrat2@illinois.edu
 - Amanda Lombardo, alombar@illinois.edu
- **NCSA Fellows account management**
 - Shawn Quigley, Grants and Contracts Specialist, sfquigle@illinois.edu
- **Fellows & Student Appointments**
 - Jewel Goodly, HR Specialist, jgoodly@illinois.edu
 - Devin Scheidemantel, HR Specialist, wds@illinois.edu
- **Proposal Development for External Funding**
 - Tamara Roosevelt, Lead, NCSA Proposal Development Office, roosevel@illinois.edu

Idea Acceleration Workshop – October 7, 2022, 11 a.m.- 1 p.m., NCSA 1030 and on zoom

- Potential applicants encouraged to present 1 slide on:
 - Project ideas and/or skills/resources needed from NCSA
 - Contact information (e.g. email address)
 - Submit slide to Olena Kindratenko (kindrat2@illinois.edu) by 5pm on **October 5, 2022.**
- NCSA staff will present to share information on major NCSA program areas

Questions/Comments??

- All information from today and the Idea Acceleration Workshop will be available on the NCSA Wiki via NCSA Fellows website:
<http://www.ncsa.illinois.edu/about/org/fellowships>