The CI Funding Landscape

Dan Voss
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Professional Presenter/Consultant/Contractor/Graduate Student
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Henry Neeman's 2018 Super Awesome ACI-REF Virtual Workshop on Intermediate Residency

2018 ACI-REF
Virtual Residency
Intermediate Workshop

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Virtual Residency Intermediate Workshop

2018 ACI-REF
Virtual Residency
Intermediate Workshop

Secret Agenda!

Where's the $$?

Everywhere...

FEDERAL RESERVE NOTE
FE 52339545 A
E5
THE UNITED STATES OF AMERICA
100
FE 52339545 A
100
THIS NOTE IS LEGAL TENDER FOR ALL DEBTS, PUBLIC AND PRIVATE
SERIES 2003 A
100
ONE HUNDRED DOLLARS

Funding Agencies

National Science Foundation (NSF)

- eXtreme Science & Engineering Discovery Environment (XSEDE)
- Open Science Grid (OSG)
- Campus Cyberinfrastructure (CC)
- Computer & Information Science & Engineering (CISE) Research Infrastructure (CRI)
- CISE Research Initiation Initiative (CRII)

Funding Agencies

National Science Foundation (NSF) cont'd

- Major Research Instrumentation (MRI)
- Experimental Program to Stimulate Competitive Research (EPSCoR)
- Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining)
- Computational and Data-Enabled Science and Engineering (CDS&E)
- Cybersecurity Innovation for Cyberinfrastructure (CICI)

Funding Agencies

Department of Energy (DOE)

- Innovative and Novel Computational Impact on Theory and Experiment (INCITE)
- National Energy Research Scientific Computing Center (NERSC)

Department of Defense (DOD)

- Defense University Research Instrumentation Program (DURIP)

Funding Agencies

National Institutes of Health (NIH)

- Shared Instrument Grant (SIG)
- High-End Instrumentation Grant (HEI)

Funding Agencies

United States Department of Agriculture (USDA)

- National Institute of Food and Agriculture (NIFA)
  - Agriculture and Food Research Initiative's
    - Food and Agriculture Cyberinformatics and Tools (FACT)
  - Innovations at the Nexus of Food, Energy and Water Systems (INFEWS), a federal research partnership between NIFA and the National Science Foundation (NSF)

XSEDE Advisory Board (XAB)

NSF

User Advisory Committee (UAC)

XD Service Providers Forum (SPF)

XSEDE Program Office *Payne*

Project Office *Payne*

External Relations *Williamson*

Project Management, Reporting, & Risks *Gendler*

Business Operations *Payne*

Strategic Planning, Policy, & Evaluation *Payne*

Community Engagement & Enrichment *Gaither*

Director's Office *Gaither*

Broadening Participation *Akli*

Workforce Development *Houchins*

User Interfaces & Online Information *Dahan*

User Engagement *Hempel*

Campus Engagement *Neeman, Brunson*

Extended Collaborative Support Service *Blood, Sinkovits*

Directors' Office *Blood, Sinkovits*

Extended Support for Community Codes *Cazes*

Extended Support for Research Teams *Crosby*

Extended Support for Science Gateways *Pierce*

Novel & Innovative Projects *Sanielevici*

Extended Support for Education, Outreach & Training *Alameda*

XSEDE Cyberinfrastructure Integration *Lifka*

Director's Office *Lifka*

Requirements Analysis & Capability Delivery *Navarro*

Cyberinfrastructure Resource Integration *Knepper*

XSEDE Operations *Peterson*

Director's Office *Peterson*

Cybersecurity *Slagell, Marsteller*

Data Transfer Services *Boerner*

XSEDE Operations Center *Pingleton*

Systems Operational Support *Rogers*

Resource Allocations Service *Hart*

Director's Office *Hart*

Allocations Process & Policies *Hackworth*

Allocations, Accounting, & Account Management CI *Soriano*

https://confluence.xsede.org/pages/viewpage.action?pageId=1671768

Community Engagement & Enrichment
Gaither

Director's Office
Gaither

Broadening Participation
Akli

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Campus Engagement
Neeman, Brunson

Community Engagement & Enrichment
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Broadening Participation
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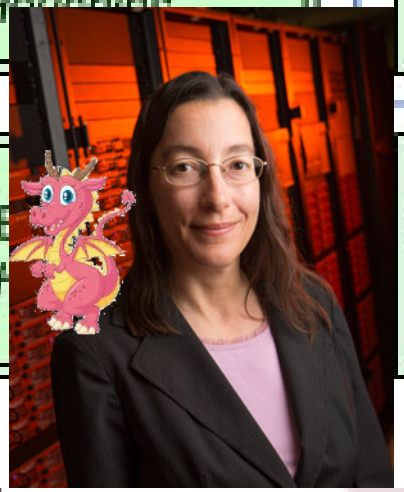

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2018 ACI-REF
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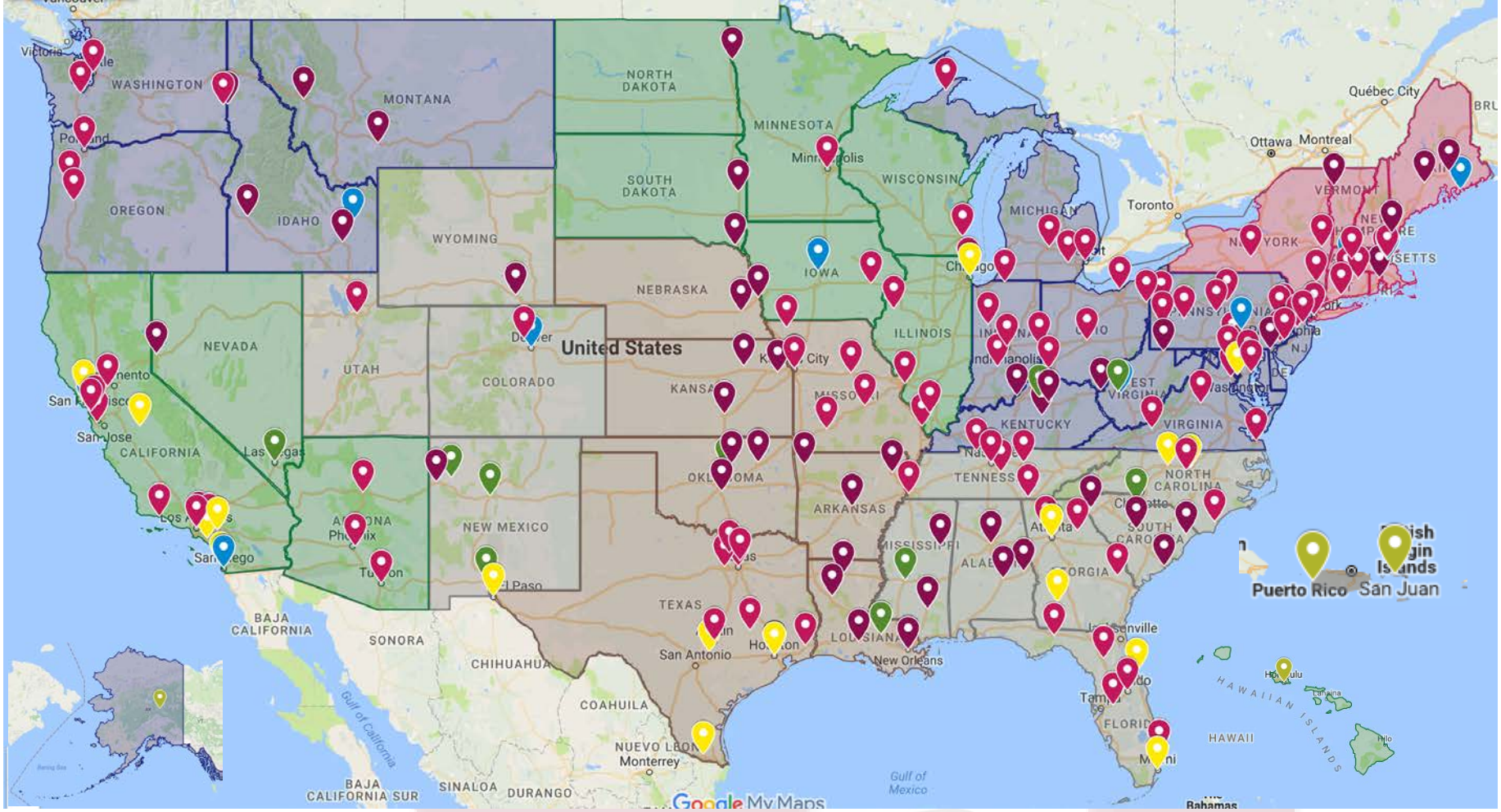
WASHINGTON
MONTANA
NORTH DAKOTA
MINNESOTA
OREGON
IDAHO
WYOMING
SOUTH DAKOTA
WISCONSIN
MICHIGAN
Toronto
Ottawa
Montreal
Québec City
NEBRASKA
IOWA
ILLINOIS
NEVADA
UTAH
COLORADO
United States
KANSAS
KENTUCKY
VIRGINIA
CALIFORNIA
NEW MEXICO
ARKANSAS
TENNESSEE
NORTH CAROLINA
TEXAS
BAJA CALIFORNIA
SONORA
CHIHUAHUA
COAHUILA
San Antonio
New Orleans
Monterrey
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Gulf of Mexico
BAJA CALIFORNIA SUR
SINALOA
DURANGO
HAWAII
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Puerto Rico
San Juan
Google My Maps

NSF XSEDE = Free $$ (cycles)!!

portal.xsede.org/allocations-overview

XSEDE | USER PORTAL

Extreme Science and Engineering Discovery Environment

Search XSEDE...

SIGN IN

MY XSEDE | RESOURCES | DOCUMENTATION | ALLOCATIONS | TRAINING | USER FORUMS | HELP | ECSS | ABOUT

Overview | Announcements | Allocation Policies | Request Steps | Submit/Review Request | Manage Allocation | Successful Requests | ECSS Justification

- Allocations Overview
- Eligibility
- Metrics
- Allocation Types
- Trial
- Campus Champions *New!*
- Startup
- Education
- Research
- Writing and Submitting Proposals

XSEDE Allocations Overview

An XSEDE allocation provides access to computing, visualization, and/or storage resources as well as extended support services at XSEDE service provider (SP) sites. An allocation is allotted to a researcher who serves as the principal investigator (PI) of an approved project. An account is the specific method through which an individual (or community, in the case of science gateways) logs in to a resource to utilize the allocation.

- **Computational Resources**: XSEDE SPs offer a variety of high-performance computing (HPC) and high-throughput computing systems for allocation. Computing platforms include clusters, scalable-parallel systems, and shared-memory systems with various CPU, memory, communication, and storage configurations. It is important that the platform you choose is a good match for your computational plans.
- **Visualization Resources**: SPs provide a variety of visualization resources and software services to the XSEDE user community. These systems provide a powerful way to interact with and analyze data at any scale. For complete information on available visualization resources, visit XSEDE Visualization.
- **Storage Resources**: Several XSEDE SPs host storage platforms providing services such as data management, data

  ıd large-scale persistent storage. XSEDE will provide storage allocations both in support of
  usage and storage independent of those compute/visualization allocations. As with compute and
  ıs, storage allocation durations are one year with the option to renew for subsequent one-year
  ɔreserved for at least one quarter beyond the expiration of the storage allocation end date.
  quarter will be at the discretion of the SP. Storage is allocated in GigaBytes (GB). Please visit

FEEDBACK

DOE & NSF OSG = Free $$ (cycles)!!

Might have to trade cycles/sysadmin time

display.opensciencegrid.org

Open Science Grid

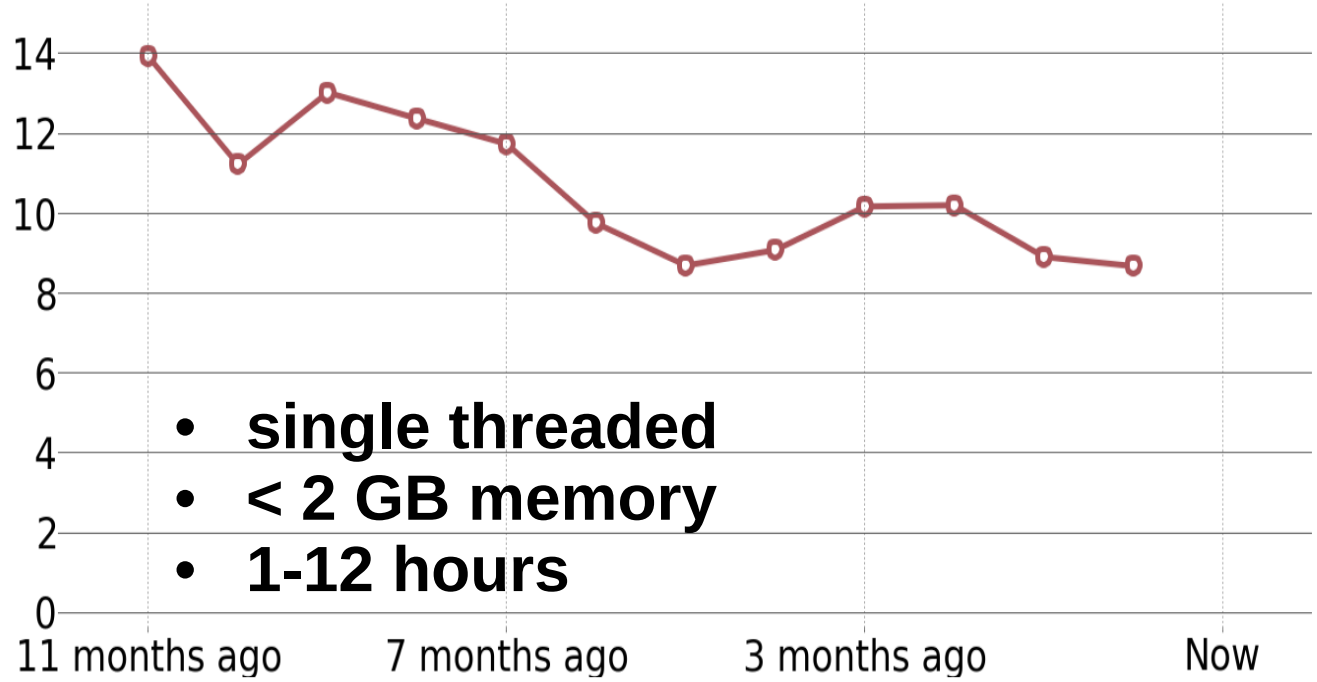
A national, distributed computing partnership for data-intensive research

Status Map | Jobs | CPU Hours | Transfers | TB Transferred

Millions of Jobs/Month

August 2018

24 Hours | 30 Days | 12 Months



- **single threaded**
- **< 2 GB memory**
- **1-12 hours**

In the last 24 Hours	
265,000	Jobs
3,909,000	CPU Hours
15,369,000	Transfers
530	TB Transfers
In the last 30 Days	
8,307,000	Jobs
129,679,000	CPU Hours
130,940,000	Transfers
15,258	TB Transfers
In the last 12 Months	
127,926,000	Jobs
1,618,441,000	CPU Hours
2,098,318,000	Transfers
236,000	TB Transfers

OSG delivered across 122 sites

tes ago
15 minutes

U.S. DEPARTMENT OF ENERGY

DOE & NSF OSG = Free $$ (cycles)!!

Might have to trade cycles/sysadmin time

display.opensciencegrid.org

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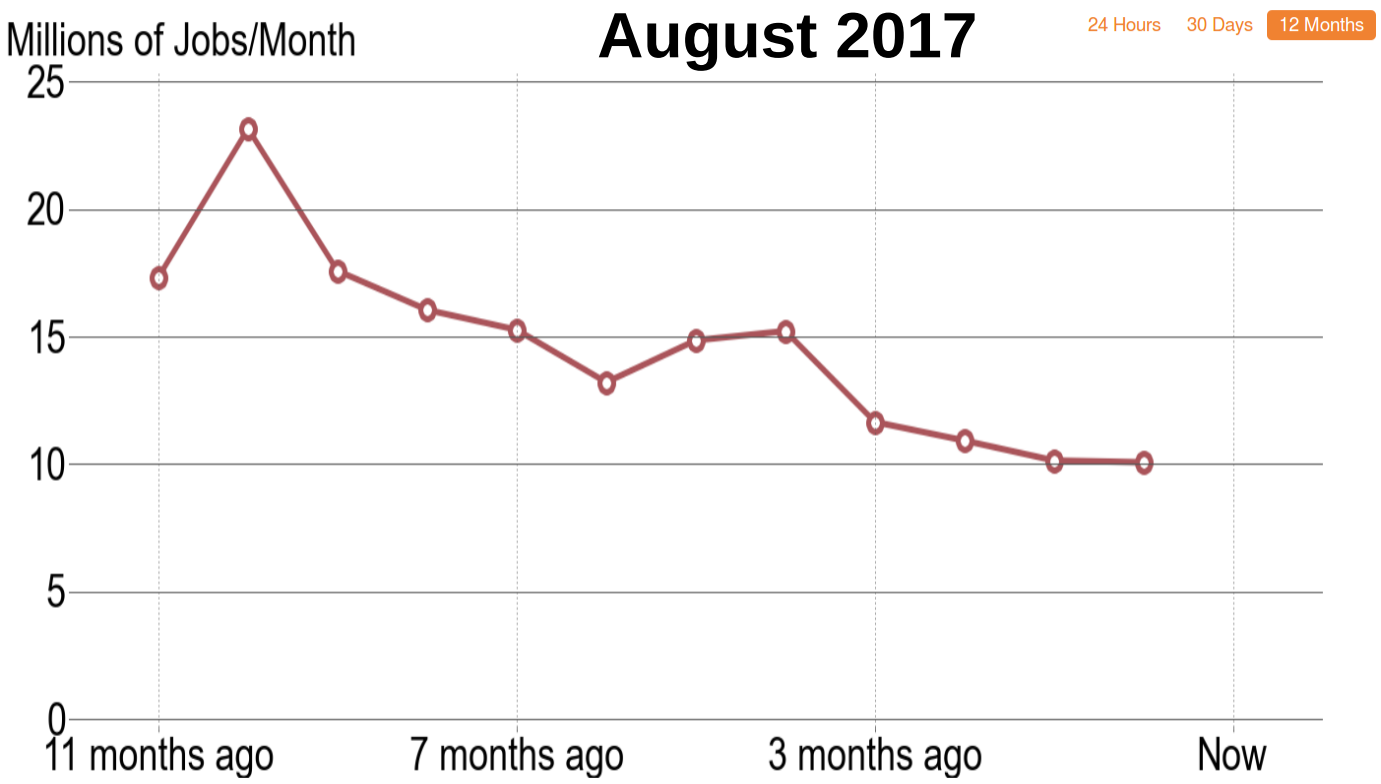

In the last 24 Hours	
295,000	Jobs
1,791,000	CPU Hours
6,432,000	Transfers
448	TB Transfers
In the last 30 Days	
9,436,000	Jobs
99,863,000	CPU Hours
181,490,000	Transfers
11,936	TB Transfers
In the last 12 Months	
175,459,000	Jobs
1,217,897,000	CPU Hours
1,864,142,000	Transfers
239,000	TB Transfers

OSG delivered across 130 sites

tes ago
15 minutes

U.S. DEPARTMENT OF ENERGY

NSF CC-NIE, CC*IIE, CC*DNI, CC*

- **Network Infrastructure and Engineering, 2012 - 2013**
- **Infrastructure, Innovation, and Engineering, 2014**
- **Data, Networking, and Innovation, 2015**
- ***, 2016**
- ***, January 30, 2018**

www.nsf.gov/funding/pgm_summ.jsp?pims_id=504748

NSF CC*

www.nsf.gov/funding/pgm_summ.jsp?pims_id=504748

1. **Data Driven Networking Infrastructure** for the Campus and Researcher: $500,000, 2 years

2. **Network Design and Implementation** for Small Institutions: $750,000, 2 years

3. **Network Integration and Applied Innovation**: $1,000,000, 2 years

4. **Network Performance Engineering and Outreach**: $3,500,000, 4 years

NSF CISE
Community Research Infrastructure (CRI)

www.nsf.gov/funding/pgm_summ.jsp?pims_id=12810

The CRI Solicitation is being revised as of 7/23/18. NSF anticipates the new solicitation by early Fall 2018. Please watch this webpage for further updates.

Two classes of awards:

1. **Institutional Infrastructure (II)**
   - ***New*** (II-NEW) CISE research infrastructure
   - **Enhancement** (II-EN) of existing CISE research infrastructure

2. **Community Infrastructure (CI)**
   - **Planning** (CI-P) for new CISE community research infrastructure
   - **Creation** of new (CI-NEW) CISE research infrastructure
   - **Enhancement** (CI-EN) of existing CISE infrastructure
   - **Sustainment** (CI-SUSTAIN) of existing CISE community infrastructure

   "extend well beyond the awardee institutions… provide a high quality of service"

NSF CISE Research Initiation Initiative (CRII)

https://www.nsf.gov/pubs/2018/nsf18554/nsf18554.htm

Deadline: August 8, 2018 (tomorrow!)

Goal: encouraging research independence immediately upon obtaining one's first academic position after receipt of the PhD.

127 = compute: **Scalable Cyberinfrastructure for Big Graph and Matrix/Tensor Analytics,** Da Yan yanda@uab.edu

5 = cyberinfrastructure: **A Hybrid Finite Element and Molecular Dynamics Simulation Approach for Modeling Nanoparticle Transport in Human Vasculature,** Ying Li yingli@engr.uconn.edu

4 = hpc: **MPI-ACC_GIS: Accelerating Geo-Spatial Computations on HPC Platform,** Satish Puri satish.puri@marquette.edu

NSF Major Research Instrumentation (MRI)

FY 2014/2015 AWARD INFORMATION

- Biological Sciences 20/13%
- Computer and Information Science and Engineering 45/28%
- Engineering 20/13%
- Geosciences 32/24%
- Mathematical and Physical Sciences 25/24%
- Social Behavioral and Economic Sciences 37/39%

* Success varies - some directorates co-fund MRI awards with non-IA program funds while others do not.

NSF Major Research Instrumentation (MRI)

www.nsf.gov/od/oia/programs/mri/

January 01, 2019 - January 22, 2019

FY 2014/2015 AWARD INFORMATION

- **811/822 proposals reviewed**
- **205/167 awards (a success rate of 25/20%).**
- **25/20% development (<24/19% success)**
- **75/80% acquisition (<26/21% success)**
- **12.5/14% requested budgets > $1 million (20/16% success)**

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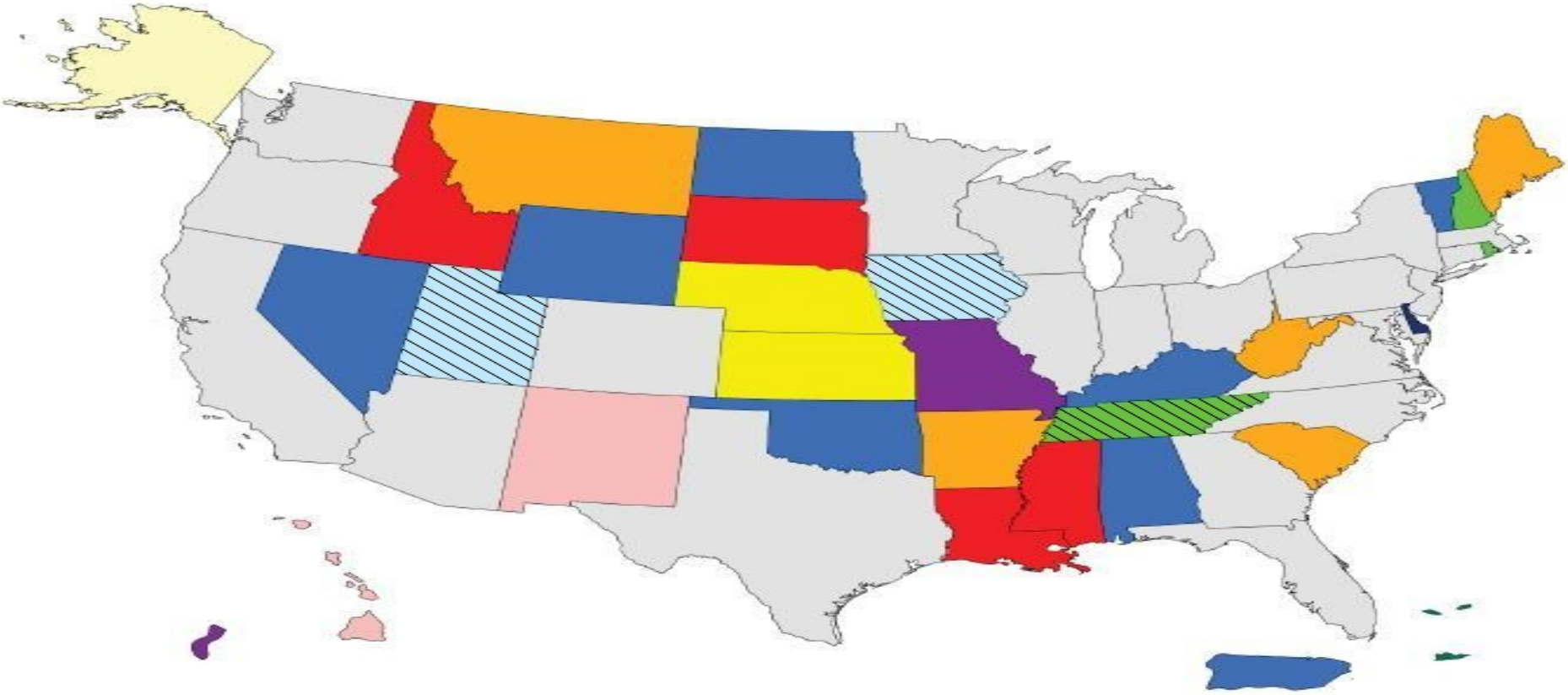
EPSCoR Jurisdictions



1980
Arkansas
Maine
Montana
South Carolina
West Virginia

1985
Alabama
Kentucky
Nevada
North Dakota
Oklahoma
Puerto Rico
Vermont
Wyoming

1987
Idaho
Louisiana
Mississippi
South Dakota

1992
Kansas
Nebraska

2000
Alaska

2001
Hawaii
New Mexico

2002
U.S. Virgin Islands

2003
Delaware

2004
New Hampshire
Rhode Island
Tennessee

2009
Iowa
Utah

2012
Guam
Missouri

* Beginning in FY18, Missouri is graduating to non-EPSCoR status

Note: Iowa, Tennessee, and Utah are no longer EPSCoR-eligible

Experimental Program to Stimulate Competitive Research (EPSCoR)

www.nsf.gov/od/oia/programs/epscor/

Research Infrastructure Improvement Program Track-1 (RII Track-1)

- July 3, 2018, letter of intent, July 30, 2018 deadline
- $4m/year, 5 years to support physical, human, and ***cyber infrastructure*** improvements
- Jurisdiction's EPSCoR steering committee
- Best potential to improve future R&D competitiveness

Experimental Program to Stimulate Competitive Research (EPSCoR)

Research Infrastructure Improvement Program Track-2 (RII Track-2)

- Nov 27, 2017, letter of intent, Jan 26, 2018 deadline
- $1m/year between 2 EPSCoRs, 4 years
- $1.5m/year 3+ EPSCoRs, 4 years
- Collaborations in all areas of science, engineering, and education supported by the NSF.
- Drive discover and train a skilled workforce for science and engineering challenges of regional, thematic, and national relevance.

it INFORMATION TECHNOLOGY THE UNIVERSITY OF OKLAHOMA

Experimental Program to Stimulate Competitive Research (EPSCoR)

Research Infrastructure Improvement Program Track-3 (RII Track-3)

- Pilot year, 2013 only
- $750k total for 5 years
- Underrepresented minorities, women, persons with disabilities and those in underserved rural regions of the country

Experimental Program to Stimulate Competitive Research (EPSCoR)

Research Infrastructure Improvement Program Track-4 EPSCoR Research Fellows (RII Track-4)

- Deadline: March 13, 2018 (2nd week in March)
- $300k total for 2 years
- Non-tenured investigators to further develop their individual research potential through extended collaborative visits to the nation's premier private, governmental, or academic research centers.

Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining)

www.nsf.gov/funding/pgm_summ.jsp?pims_id=505342

- Deadline: January 25, 2019
- **Overarching goals**

1. Prepare, nurture, and grow the national scientific workforce for *creating, utilizing,* and *supporting* advanced CI
2. Ensure broad adoption of CI tools, methods, and resources
3. Integrate core literacy and discipline-appropriate advanced skills in advanced CI as well as computational and data science and engineering into the Nation's educational *curriculum/ instructional material fabric* spanning undergraduate and graduate courses

Computational and Data-Enabled Science and Engineering (CDS&E)

www.nsf.gov/funding/pgm_summ.jsp?pims_id=504813

- **Deadline:** September – December, depending on Division
- **Divisions:** Astronomical Sciences, Mathematical Sciences, Chemistry, Engineering, Advanced Cyberinfrastructure, Materials Research, & Physics.
- **Overarching goal**
  - Identify and capitalize on opportunities for major scientific and engineering breakthroughs through new computational and data analysis approaches.

Cybersecurity Innovation for Cyberinfrastructure (CICI)

www.nsf.gov/funding/pgm_summ.jsp?pims_id=505159

- **Deadline:** June 4, 2018
- **Overarching goal**
- Develop, deploy and integrate security solutions that benefit the scientific community by ensuring the integrity, resilience and reliability of the end-to-end scientific workflow. CICI seeks three categories of projects:

    1. **Secure Scientific Cyberinfrastructure**
    2. **Collaborative Security Response Center**
    3. **Research Data Protection**

DOE Innovative and Novel Computational Impact on Theory and Experiment (INCITE)

www.doeleadershipcomputing.org/incite-program/

- Call for Proposals ran from mid-April through late June, 2018
- **Argonne and Oak Ridge Leadership Computing Facility (LCF) centers**
  - Summit, the 200-petaflop IBM 922AC machine
  - Titan, the 27-petaflop Cray XK7
  - Mira, the 10-petaflop IBM Blue Gene/Q
  - Theta, the 12-petaflop Cray XC40 machine
- **Nearly six billion core-hours allocated for CY 2018, 50% of machine time**
- **55 projects (33 new, 34% acceptance rate, 22 renewals), up to 3 years**
- **Requests for small awards of time (typically 1 to 5 million core-hours) can be requested throughout the year from the Director's Discretionary Program**

DOE NERSC

www.nersc.gov/users/accounts/allocations/overview/

- **Last Deadline:** October 16, 2017
- **2018 Allocations:** Jan 9, 2018 – Jan 7, 2019

- NERSC supports research that reflects the mission of DOE's Office of Science.

- Principal Investigators funded by the Office of Science may apply for an allocation of NERSC resources.

- In addition, researchers who aren't directly funded by DOE SC but with projects that are relevant to its mission may also apply to use NERSC resources. If you are not funded by the DOE Office of Science you should explain how your research falls within the DOE mission.

DOD Defense University Research Instrumentation Program (DURIP)

www.defense.gov/News/News-Releases/News-Release-View/Article/1483307/department-of-defense-announces-fy18-research-equipment-awards/

- **Deadline: July 6, 2018**

- Army Research Office (ARO)
- Office of Naval Research (ONR)
- Air Force Office of Scientific Research (AFOSR)

Current Awards

- 175 proposals funded from 91 academic institutions in 36 states (26%)

- $53 million

- Received 671 proposals requesting $254 million

- Awards range from $50,000 to $1.5 million, 1 year
- Average approximately $300,000 per award

NIH SIG & HEI

dpcpsi.nih.gov/orip/diic/shared_instrumentation

Office of Research Infrastructure Programs (ORIP)

Deadline: May 31, 2018

- Identify 3+ PIs with active NIH awards
- Shared Instrumentation Grant Program (S10)
  - $50,000 to $600,000 range
  - FY 2015/2016, 91/83 awards to biomedical research institutions in 31/25 states totaling $40.3M / $37.5M
- High-End Instrumentation Grant Program (S10)
  - $600,000 to $2,000,000 range
  - FY 2015/2016, 19/24 awards to research institutions in 13/13 states totaling $26.2M/$33.7M

United States Department of Agriculture (USDA) NIFA FACT

- Letter of Intent: July 25, 2018, Deadline Oct 31,2018
- National Institute of Food and Agriculture (NIFA)
  - Agriculture and Food Research Initiative's
    - Food and Agriculture Cyberinformatics and Tools (FACT)
  - Focus on fundamental or core big data analytics and tool development
  - Apply big data concepts to specific science domains or across domains and sectors for any of the Plant health and production and plant products program area priorities.

NSF + USDA/NIFA = INFEWS

www.nsf.gov/funding/pgm_summ.jsp?pims_id=505241

- Deadline: September 26, 2018

Innovations at the Nexus of Food, Energy and Water Systems (INFEWS)

- **Cyber-components** (such as sensing, networking, computation and visualization for decision-making and assessment)

1. Significantly advance our understanding of the food-energy-water system of systems
2. Develop real-time, **cyber-enabled** interfaces
3. Enable research
4. Grow the scientific workforce

NSF + USDA/NIFA = INFEWS

Estimated Number of Awards: 15 to 30

Tracks 1-2 (Track 1, modelling; Track 2, solutions) will request **3 - 5 years** of support with a total budget less than or equal to **$2,500,000** per project.

Track 3 (Track 3, Research Coordination Networks, RCN) will request **4 - 5 years** of support with a total budget less than or equal to **$750,000** per project.

United States Department of Agriculture (USDA) Telemedicine

www.rd.usda.gov/programs-services/distance-learning-telemedicine-grants

- FY 2018 funding window closed June 4th, 2018
- Awards can range from $50,000 to $500,000
- The intent of the DLT program is to benefit rural areas with populations of 20,000 or less

States, Private, Internal?

States: https://goo.gl/arn874

- Nebraska Research Initiative (NRI)
  - https://nebraska.edu/administration/academic-affairs-provost/nebraska-research-initiative.html
- Research North Dakota
  - https://www.commerce.nd.gov/research/
- South Dakota Board of Regents Research and Development Innovation grant program
  - https://www.sdbor.edu/administrative-offices/academics/research/Documents/RFPs/FY18_RDInnovationRFP.pdf
- New York State Energy Research and Development Authority
  - www.nyserda.ny.gov
- Division of Science and Research, WV Higher Education Policy CommissionWest Virginia
  - https://wvresearch.org

Silicon Mechanics Research Grant

- www.siliconmechanics.com/i43744/research-cluster-grant-winners-circle.php

Cloud

Amazon Programs for Research and Education
https://aws.amazon.com/grants/

Google Cloud Platform Education Credits
https://cloud.google.com/edu/

Microsoft Azure for Research
https://www.microsoft.com/en-us/research/academic-program/microsoft-azure-for-research/

NVIDIA GPU Grant Program
https://developer.nvidia.com/academic_gpu_seeding

Intel University Research Programs
https://www.intel.com/content/www/us/en/education/highered/university-research-programs.html

Questions?

Comments?