Cyberinfrastructure Funding, Planning, and Successful Proposal Development

Kevin Thompson, NSF
Gwendolyn Huntoon, KINBER
Nili Tannenbaum, Internet2
Agenda

- Introductions
- Overview of Funding Opportunities
- Components of a Successful Proposal
- Proposal Submission
- Q&A
CONTENTS

• Best practices for successful proposals
• Common mistakes and roadblocks
• Proposal Submission
• Navigating Fastlane
• The Saga of Grants.gov
• Post-award: OMB Uniform guidance and audits
Presenters

• Kevin Thompson, Program Director, Office of Advanced Cyberinfrastructure, National Science Foundation

• Gwendolyn Huntoon, President & CEO, Keystone Initiative for Network Based Education and Research (KINBER)

• Nili Tannenbaum, Director of Sponsored Research Administration, Internet2
NSF Cyberinfrastructure Overview and Opportunities
NSF Budget Update

FY 2018

- FY18 Congressionally Appropriated Budget
  - +4%
  - +$300M over FY17 budget!
- 2nd largest increase in NSF research budget increase in 15 years! (not counting ARRA)

FY 2019 (Request)

- NSF: $7.47 billion
  - Flat with respect to FY 17 Enacted
- CISE: $925.4 million
  - -1.1% from FY 17 Enacted
- Big Ideas
  - Research Ideas: $30 million each
  - Process Ideas: Midscale infrastructure: $60 million
- Convergence Accelerators
  - $60 million
  - HDR, FW-HTF: $30 million each
- Continuing Resolution through December 07, 2018.
### The NSF Big Ideas

#### RESEARCH IDEAS

- **Harnessing Data for 21st Century Science and Engineering**
- **Work at the Human-Technology Frontier: Shaping the Future**
- **Navigating the New Arctic**
- **Windows on the Universe: Multi-messenger**
- **Quantum Leap: Leading the Next Quantum Revolution**
- **Understanding the Rules of Life: Predicting Phenotype**

#### PROCESS IDEAS

- **Mid-scale Research Infrastructure**
- **Growing Convergence Research at NSF**
- **NSF 2026**
- **NSF INCLUDES: Enhancing STEM through Diversity and Inclusion**

---

“...bold questions that will drive NSF's long-term research agenda -- questions that will ensure future generations continue to reap the benefits of fundamental S&E research.”

---

**Big Ideas => Big Cyberinfrastructure Challenges & Opportunities**
Harnessing the Data Revolution (HDR)

“Engage NSF’s research community in the pursuit of fundamental research in data science and engineering, the development of a cohesive, federated, national-scale approach to research data infrastructure, and the development of a 21st-century data-capable workforce.”

Educational pathways

Innovations grounded in an education-research-based framework

Advanced cyberinfrastructure

Accelerating data-intensive research.
Foster a cyberinfrastructure ecosystem to transform computational- and data-intensive research across all of science and engineering

- Cyberinfrastructure Research & Research Cyberinfrastructure
Office of Advanced Cyberinfrastructure (OAC) within CISE
Join NSF/OAC: Multiple Program Officer openings
CISE/OAC – Transforming the Frontiers of Science & Society

Advanced resources and services at all scales – MRI (clusters); Innovative HPC; Leadership Class; XSEDE coordination and user services; Research

- Data Building Blocks (DIBBS) Program
- Software Infrastructure for Sustained Innovation (SI2)
- Cyberinfrastructure for Sustained Scientific Innovation (CSSI)
- Campus Cyberinfrastructure (CC*), International Research Network Connections (IRNC), Cybersecurity Innovation for CI (CICI)
- Training-based Workforce Development for Advanced Cyberinfrastructure (CyberTraining), CAREER, CRII

Emerging Opportunities
- Cyberinfrastructure for Emerging Science and Engineering Research (CESER), Public Access, Big Data Hubs

OAC Core Research Program
NSF 18-567; Due 11/15/18
Rethinking CI – Computational Infrastructure*

Leadership Class Systems
- Highly specialized instruments
- Extreme-scale capabilities
- NSF 17-558

Innovative Capacity Capabilities
- Support small-medium scale computations, data analytics, long-tail users, gateway computation

Federated Resources
- Integrated distributed CI elements (capacity, capability, campus, network, storage, services, etc.)

Exploratory Pilots & Prototypes
- Explore novel technologies, architectures, usage modes, etc.
- Path for transition to production important

Cloud Services
- Coordination & Measurement

* Not mutually exclusive.
Networking Investments

- Networking as a fundamental layer and underpinning of CI Continuum
- CC* - Campus Cyberinfrastructure
  - Campus networking upgrades, e.g., re-design to scienceDMZ at campus border, 10/100Gbps
  - Innovation program area
- IRNC – International R&E Network Connections
  - Scientific discovery as a global collaborative endeavor
    - Provide network connections linking U.S. research with peer networks in other parts of the world – 100Gbps links, software defined exchanges
    - Supports all R&E US data flows (not just NSF-funded
  - Includes performance flow measurement, monitoring, training
OAC Core Research Program
SOLICITATION NSF 18-567

- **Translational research** (spanning design to practice) in all aspects of advanced cyberinfrastructure (CI) to transform science and engineering research
  - Multi-disciplinary, extreme-scale, driven by science and engineering research, end-to-end, or deployable as robust research CI

- **Research Areas**
  - Architecture and middleware for extreme-scale systems
  - Scalable Algorithms and Applications
  - Advanced Cyberinfrastructure Ecosystem

- **Research Communities**: Multiple disciplinary areas supported spanning Computer as well as Computational and Data-driven Science and Engineering

- Part of CISE’s coordinated core program solicitations
  - Only Small proposals in FY’19
  - Funding amount $7.5M
  - Max $500K/award

- Proposals due Nov 15, 2018
  - PI’s strongly encouraged to send 1-page project summary for further guidance.
  - Webinar in July/Aug
Research Experiences for Undergraduates Supplement (REU - NSF 13-542)

• Active research participation by undergraduate students
• REU Supplements: component of new or continuing proposals
• Deadline: Flexible – talk to a program officer
• Generally $8000/year for a student stipend. Can be done in summer or throughout school year
Max 2 students / 16k total
Mid-scale RI is an NSF Big Idea to address the growing needs for RI to advance research. NSF-wide program will support projects in the MRI – MREFC gap (~$6 to $70 million range). RI is broadly defined, from disciplinary instrumentation to mid-scale facilities, upgrades, cyberinfrastructure, and others.

- NSF anticipates **two solicitations this fall**, pending the availability of funds: one for projects between ~$6 M and ~$20 M and one for ~$20 - $70 million.

- Requirements: Strong scientific merit & responsive to identified community need; technical and management readiness; and plan for training and workforce diversity.

Stay tuned…

Components of a Successful Cyberinfrastructure Proposal
BACKGROUND INFORMATION

- NSF and other federal funding opportunities for campus cyberinfrastructure

- Many institutions haven’t been in a position to prepare competitive, successful, and sustainable proposals because of lack of experience in sponsored research and because of an absence of institutional campus CI planning

- Recognition by NSF and others that important science and education are derived from a broad set of higher education organizations
EXAMPLE NSF CYBERINFRASTRUCTURE OR INFRASTRUCTURE SOLICITATIONS

- Campus Cyberinfrastructure Program (CC*)
- Cybersecurity Innovation for Cyberinfrastructure (CICI)
- Data Infrastructure Building Blocks (DIBBs)
- Major Research Instrumentation Program (MRI)
BACKGROUND INFORMATION

- Campus-focused solicitation
  - Not an individual researcher/research project solicitation

- Data-driven
  - Relationship between requirements of scientific R&E and campus infrastructure

- Science-driven
  - Tie to science requirements in the campus or region
  - Proposals evaluation on strength of science enabled in proposal
GENERAL GUIDANCE

• Science Drivers and Applications
  – All NSF solicitations, including all infrastructure solicitations, require a connection to science or engineering research and education.
  – Ability to identify science drivers is critical to effectively responding to any NSF infrastructure solicitation.
  – Identify specific scientific R&E projects that would benefit from the proposed infrastructure – the science research and education applications drivers.
  – Highlight unique characteristics/qualifications of your team and campus (resources, STEM curriculum/investments, student demographics).
GENERAL GUIDANCE

• Cyberinfrastructure planning
  – General understanding of the connection between the campus infrastructure and the campus science drivers.

• Identify infrastructure barriers to supporting applications.
  – For example, inability to efficiently data sets in and out of your campus environment in support of a specific research project.

• Describe how proposed investment/improved infrastructure would benefit these examples, as well as other research within and beyond campus.
GENERAL GUIDANCE

• Collaboration is good and now expected
  – Interdisciplinary
  – With other colleges, universities or other entities
    • Can help with the broader impact requirements
• Use of Regional or National Resources
  – XSEDE, Open Science Grid, Telescopes, Genomics databases, etc.
  – With regional networks, national networks or organizations (Internet2, ESnet)
COMPELLING PROPOSALS

• **Compelling:**
  – Claiming that STEM faculty can’t participate in projects involving large data exchange or remote interaction

• **Not compelling:**
  – Claiming you need 10G or 100G campus network capacity,
  – Especially when your campus has no plans to sustain this
COMPELLING PROPOSALS

- **Compelling:**
  - Demonstrating that you can’t recruit/retain STEM faculty because your campus lacks adequate cyber resources.

- **Not compelling:**
  - Arguing about necessity of expanded broadband capacity when your campus has no plans for sustaining the investment.
BEST PRACTICES FOR SUCCESSFUL PROPOSALS

• Describe how you have the capacity to make this successful.
  – Demonstration your PI has a track record of coordinating/ leading campus-wide projects and a position of leadership.

• Include testimonials and confirmations of institutional commitment and evidence of how Campus IT will support your project.
  – Include commitment and sustainability of investment with Letters of Commitment confirming resource continuity.
BEST PRACTICES FOR SUCCESSFUL PROPOSALS

• Be very clear in wording; state project goal and focus near the beginning of summary and introduction of project description.
• State your case early on in the project description.
• Tell a story:
  – What problem have you identified,
  – What do you propose to address this,
  – How are you and your team qualified to do this,
  – How will you sustain the project’s results, and
  – What impact this have beyond the project/campus
BEST PRACTICES FOR SUCCESSFUL PROPOSALS

• Yours will not be the only proposal being reviewed.
• All part of the proposal are considered as part of the review process.
  – Project Summary is the first part of the proposal typically read by a reviewer; make sure it is a compelling summary of your proposal and includes required components including intellectual merit and broader impact.
• Reviewers want to understand value, cost-efficiencies, leveraging, and pedigree/proven ability beyond scientific merit.
  – Make sure to clearly articulate where appropriate.
IMPORTANT: INTELLECTUAL MERIT/BROADER IMPACT

- **Required** sections in 1-page Fastlane text-box summary.
- **Intellectual Merit**: potential to advance knowledge.
- **Broader Impact**: potential to benefit society/help achieve specific, desired societal outcomes.
- **Diversity**: broad opportunities for diversity from gender diversity, to under-represented organizations or individuals, disciplines or communities.
CREATING AND SUBMITTING SUCCESSFUL PROPOSALS
INTERNET2 NSF-FUNDED CAMPUS CI OUTREACH

- NSF AWARD 1342995 (“Support of Campus Cyberinfrastructure at Non-research intensive and ESPSCoR Institutions)
  - 4 Regional workshops, 30 campus visits
    - 69 institutions in 23 states (including 11 ESPSCoR jurisdictions)
    - 67 Campus CI awards supported by this program
  - Creation of Recommended Practices Document
    - Campus CI planning and Deployment
    - Working effectively with regional networks
    - Effective ways to achieve external funding

https://spaces.internet2.edu/display/RE/
Internet2+Campus+CI+Best+Practices+Manual
PROPOSAL SUBMISSION
GETTING PERSPECTIVE ON FEDERAL GRANTS POLICY

• OMB Memo M-18-24 (September 2018 memo outlining steps to reduce grant recipient reporting burden)

• Federal government spends about $700B on grants and cooperative agreements annually for 1,800 funding opportunities with 40,000 recipients
OMB MEMO M-18-24 HIGHLIGHTS

- More sharing of systems and services to reduce grant recipient burden
- SF-424B Form phase out as of 1/1/2019 (non-construction programs)
- Evolution of SAM.gov (System for Award Management)
- 1/1/2020: will be central repository for government wide-certifications used to comply with award requirements
- Integrating new data standards between agencies
COMMON MISTAKES

- Waiting until the last minute
- Not including required forms or completing them correctly
- Not completing text boxes in Fastlane’s program summary page for Intellectual Merit and Broader Impact
- Not uploading required forms in the appropriate places
- Not including the proposal for which you are applying in your required list of current/pending funding
- Not including Fastlane’s new mandatory collaboration template for each participant
- Not including an explanation in your facilities statement of why you profiled 0% effort for your PI in your budget
SUBMITTING YOUR PROPOSAL: FASTLANE

- Prepare/submit proposals, supplemental funding requests, no-cost extensions and other notifications
- Change Principal Investigators (PIs), transfer PIs, add subawards
- Administer proposals/awards by the Sponsored Research Office and NSF
- Prepare/submit reports (research.gov)
- NSF is in the process of transferring Fastlane functions to research.gov
THE SAGA OF GRANTS.GOV

• Certain agencies (DoE, DoC, NIH, IMLS) require submission of proposals via Grants.gov
• Had been less user-friendly with greater likelihood of inadvertent omission of mandatory materials
• Higher percentage of rejected/triaged proposals because of non-compliance
• As of November 2017, Grants.gov Workspace introduced with a shared, online, collaborative tool to complete and submit proposals
THE SAGA OF GRANTS.GOV

• Replaced by Grants.gov Workspace (online, cloud-based, secure proposal preparation mechanism optimized for team usage)

• Separate forms allowing simultaneous completion by multiple parties instead of the prior single PDF package

• Can be completed online or downloaded/completed/uploaded

• Upfront validation, minimization of rejection rate, facilitation of collaboration with outside colleagues
THE SAGA OF GRANTS.GOV

• Helpful guides, webinars, videos, and blogs at Grants.gov
• Webforms interface only accessible through Grants.gov Workspace
• See: https://www.grants.gov/web/grants/applicants/workspace-overview.html
• And for recent changes https://www.grants.gov/web/grants/outreach/releases.html
RELEASE 16.3: OCTOBER 2018 UPDATES

• Enhancements and updates to be released in October 2018
• Enhanced security in password reset process with email authentication
• New “Related Opportunities” and easier identification of resubmitted applications in search processes
• Applicant System-to-System (S2S) updates
• Email notification re: SAM registration and S2S certificate expirations
• Merging of accounts
MAKING FASTLANE/GRANTS.GOV YOUR BFF

• Be careful!

• Make a **checklist** of solicitation-specific requirements including supplementary documents and where they should be included!!

• **Pay attention** to page limits, font sizes, required components, limits on or requirements for supplementary documents!!!

• **Very important for format and content:** Biosketch, Current/Pending Funding lists, Intellectual Merit/Broader Impact, Collaborator Template!!!!
MAKING FASTLANE/GRANTS.GOV YOUR BFF

• Pay close attention to guidance for each area!
• Program-wide requirements
• Individual area requirements
• Program-wide review criteria
• Individual review criteria
MAKING FASTLANE/GRANTS.GOV YOUR BFF

• Make sure you:
  • Meet all the requirements
  • Incorporate solicitation language into your narrative
  • Respond to all review criteria
  • Pay careful attention to all solicitation instructions
FASTLANE, RESEARCH.GOV, GRANTS.GOV RESOURCES

• https://www.fastlane.nsf.gov/NSFHelp/webhelp/fastlane/FastLane_Help/fastlane_help.htm
• https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide0117
• https://www.grants.gov/web/grants/applicants/workspace-overview.html
• https://www.grants.gov/web/grants/outreach/releases.html
BUDGET ISSUES

- All budgeted costs must be allowable and allocable
- Pay attention to your negotiated indirect cost agreement, referring to expenses that can’t be attributed directly to the project
- Most agreements recover full indirects on salary/fringe benefits and travel
- Indirect costs can’t be recovered on equipment costs but can be recovered on operational expenses
- Most agreements limit indirect cost recovery by the primary recipient on subaward costs to the first $25K of subrecipient budgeted expenses
- Participant Support (meeting attendance, travel, accommodations, room rental, AV support) is immune from indirect cost recovery
BUDGET ISSUES

- Remember that fringe benefits must be included as a direct cost line item and be subject to indirect cost recovery.

- NSF proposals that don’t profile PI, CoPI, or staff effort must include mention of this in your Facilities Statement since voluntary cost sharing is not allowed.

- Post-award, your recording of percentages of effort need to include vacation and sick time since those represent fringe benefits included in budget calculations.
OMB UNIFORM GUIDANCE

- Recent administrative requirements, cost principles, and audit requirements for all federal awards
- Consolidates/streamlines OMB circulars A-110, A-122, and A-133 into a single set of policies
- Effective December 2015
OMB UNIFORM GUIDANCE

- **Pre-award process** changes (terminology)
- **Administrative costs** (subrecipient monitoring)
- **Fixed-Price Awards** (results reporting, no review of actual costs, acquisition thresholds)
- **Procurement** (conflict of interest, record-keeping, competitive bid thresholds)
- **Subrecipients** (more scrutiny, compliance, management)
- **Indirect costs** (must use negotiated rate w/o waivers/reductions)
- **Internal controls** (relaxed)
- **Time/Effort** (results-based reporting, processes to illustrate accuracy)
POST-AWARD ISSUES

- Everything is subject to audit and site visits, so make sure:
  - Expenditures match budget projections
  - You have effective systems for inventory control, monitoring of allocable/allowable costs, subawards, and vendor agreements
  - You monitor progress/expenditures and project upcoming activities/expenditures on a quarterly basis
  - All subawards/consulting contracts include award conditions, request prior audit result, and require quarterly progress reports/expenditure projections
HOW CAN INTERNET2 HELP?

- Proposal review
- Technical consultation
- Letters of Collaboration (LoC)
  - Most NSF solicitations limit supplementary documents, including LoC
  - Limited to partners directly involved in collaboration/committing resources
  - Larger solicitations (CC*, CICI) encourage them
HOW CAN INTERNET2 HELP?

Letters of Collaboration (continued)

• We sometimes provide 100+/year

• Require draft of project narrative; name/title/address of PI, solicitation link and proposal title

• Requests accompanied by expectation of proposal review should be submitted at least 7 working days prior to deadline

• Cannot guarantee letters for requests submitted less than 5 working days before solicitation deadline
Questions ?
For further information, contact:

Kevin Thompson (kthomps@nsf.gov)
Nili Tannenbaum (ntannen@internet2.edu)
Wendy Huntoon (huntoon@kinber.org)