NHERI Council Monthly Meeting No. 5 in Y-4
7 November 2019, 2:00 – 3:00 PM EDT

NHERI Council Fall 2019 Meetings
Sep 5, 2019 02:00 PM
Oct 3, 2019 02:00 PM
Nov 7, 2019 02:00 PM
Dec 5, 2019 02:00 PM

Zoom Meeting Details:
Join Zoom Meeting: https://DesignSafe-ci.zoom.us/j/789554634
One tap mobile
+16465588656,,789554634# US (New York)
+16699006833,,789554634# US (San Jose)
Dial by your location
+1 646 558 8656 US (New York)
+1 669 900 6833 US (San Jose)
Meeting ID: 789 554 634
Find your local number: https://zoom.us/u/abv90zrfOo

Attending:

- Florida International University: Ioannis Sizis (CoPI) WOW
- Lehigh University: Jim Ricles (EF Dir.)
- Oregon State University: Dan Cox (EF Dir.)
- Purdue University: Julio Ramirez (NCO Dir., Council Secretary), and Dan Zehner (NCO Sch./Op. Coord.)
- University of California, Berkeley: Matt Schoettler (Assoc. Dir. – Ops), Stanford University: Greg Deierlein (Co-Dir), SimCenter
- University of California, Davis: Ross Boulanger (EF Dir)
- University of California, San Diego: Joel Conte (EF Dir., Council Vice Chair) LHPOST
- University of Colorado Boulder: Lori Peek (Dir., CONVERGE)
- University of Florida: Forrest Masters (EF Dir.; Council Chair)
- University of Texas at Austin: Ellen Rathje (CI Dir.)
- University of Texas at Austin: Farn Yuh Menq (EF Manager) Texas Mobile Equipment Facility
- University of Washington: Joe Wartman (EF Dir.)
- National Science Foundation: Joy Pauschke (Prog. Dir, NHERI)

Minutes

1. Attendance, Review and Approval of Minutes (previously distributed by e-mail) for Meeting No. 4 (10/3, 2019) in Y-4 (Masters)
   Approved Minutes are posted at: https://www.designsafe-ci.org/facilities/nco/governance/nheri-council/
   Minutes were approved as distributed, Dan Cox moved and Lori Peek seconded the motion.

2. Continuing Business
   a. NCO- (Julio Ramirez)
      i. NHERI Metrics-document distributed with the Agenda (Dan Zehner)
      Metrics document was distributed to the Council. The metrics were proposed were discussed. Ross pointed out that the purpose of this metric was to report utilization to NSF and for management from an operational point of view. To be responsive to our sponsor, we need one metric. January 2020 was proposed as the roll out target date.

      Action Item: Dan Wilson and Dan Zehner would like a couple of sites to volunteer to try it for a quarter. Ross will prepare it for next meeting by going back one quarter.

ii. NHERI Booth Deployment (Dan Zehner)- UIUC Tornado Conference (October 2019), AGU Meeting (December 2019 in San Francisco, CA), and NEC 2020 (March 4-6, 2020 in San Diego, CA)
Booth will be deployed at the upcoming December AGU meeting in SF. The NHERI Science Plan, 2019 will be available at the booth.

b. CONVERGE (Lori Peek)

- CONVERGE, DesignSafe, and RAPID Partnership*: Publish Your Data Event for Social Scientists, Friday, April 17, 2020, Boulder, Colorado*
- CONVERGE Leadership Corps Meeting, November 14-15, 2019, at NSF - "Writing an External Response Plan for Extreme Events Research"
- CONVERGE Social Vulnerability and Disasters Training Module (w/ additional funding from the CDC), live. If you assign to your students, you can track progress through their completion of the online quiz/module certificate: https://converge-training.colorado.edu/
- Coming next, CONVERGE Disaster Mental Health Training Module (w/ additional funding from the CDC)

c. DesignSafe-CI: data re-use and citations (Ellen Rathje)
Citation practices could be improved by using the DOI when citing data. Analysis papers should cite version of software. Data management plan is available for researchers to use in their proposals.

3. New Business
   a. NSF Items (Joy Pauschke)
   b. NHERI-wide meeting with researchers (NHERI Impact 2020)– (Forrest Masters)
   c. 2020 Large Facilities Workshop: Tuesday, April 14 to Thursday, April 16, 2020 (Forrest Masters)
   Put on your calendars for attendance
   d. Review of Upcoming/Active Funding Opportunities (Forrest Masters)
   See attached information.

4. Schedule of Meetings January – May 2020 (Julio)
Action Item: let Julio know if there are issues with continuing monthly meetings on the first Thursday of the month at 2:00 PM Eastern. If no issues are raised prior to the week of Thanksgiving, Julio will release the schedule for January-May 2020.

5. Next Meeting- **December 5, 2019; 2:00-3:00 PM (EST)**

6. Adjourn: Meeting adjourned at 3:05 PM.

Proposed Set of Reportable Metrics

Purpose:

This document attempts to define a set of reportable metrics for utilization that NHERI Equipment Facilities can report uniformly. The metrics are meant to both reflect level of participation and operating efficiency.

Background:

In the cooperative agreements, NSF defines utilization as: *actual days of equipment utilization by NSF supported projects / total planned days of utilization as included in the approved final Annual Work Plan, including days planned for routine equipment maintenance and calibration*.

It follows, then, that NSF has set forth the following definitions:

Throughput = days of equipment utilization by NSF supported projects

Capacity = planned days of utilization as included in the approved final annual work plan, including days planned for routing equipment maintenance and calibration.

There exists a fundamental conflict, however, in enforcing a single capacity metric across the multiple equipment facilities because each facility has a unique business model. Capacity metrics must be internally consistent with the local business model, and, in general, equipment facilities do not currently base their business models on days of utilization. Expressing capacity in terms of days across all sites would require either an abstract mapping of capacity expressed in local terms to globally defined utilization days, or a complete restructuring of each facility's business model to build capacity around days. The former requires high level interpretation when reporting the metric, making it non-intuitive to evaluate. The latter is not recommended because expressing funded capacity in terms of utilization days puts the site in conflict with the user and requires considerable effort to implement. That is, days of utilization by the user are inversely proportional the level of resources dedicated to the project by the operator – the project goes faster when the site incurs more cost. Furthermore, adopting new business models across the sites will incur major costs at each site (through extensive staff effort), and is subject to local review and acceptance by campus business units.

Proposed solution:

1. Adopt a uniform set of metrics to demonstrate throughput at the equipment facilities that can be used to reflect level of engagement, or research impact. It is suggested to use metrics defined using days of use, similar to the structure reported by the Academic Research Fleet. For example, a large number of science days would intuitively reflect that the equipment facility is being commonly used in science applications and would be a useful evaluation. The metric could not be used to demonstrate utilization as a percentage of capacity, and would not reflect the efficiency of use.
2. Adopt a uniform practice of reporting utilization as throughput divided by capacity using local definitions of throughput and capacity. A uniform set of categories may be possible, so, for

example, equipment facilities could report X% supporting the science of project A, Y% in maintenance, Z% administration, etc. The utilization percentage would be comparable across sites by category, but the raw throughput and capacity numbers likely would not be.

A strawman implementation of the reporting solution is given below.

An example reporting structure:

The University-National Oceanographic Laboratory System has the following list of Activity/Day types (https://strs.unols.org/Public/diu_faq_view.aspx?short=DayTypesDefinitions):

- **At Sea for Science Day:** All days at sea incident to the scientific mission.
- **Available for Service Day:** Ship is mechanically and administratively prepared for at sea operations but not currently scheduled for any mission or project. Routine outfitting and general upkeep can occur during these days.
- **Inspection Day:** A day in which the ship is undergoing an inspection by Navy, INSURV, NSF, USCG, ABS, other regulatory body, or an insurance company.
- **Outreach Day:** A day in which the ship is primarily devoted to conducting an open house or other public outreach event. Include days spent mobilizing and demobilizing for the event.
- **Standby Day:** Days in port for purposes of crew rest (e.g. weekends if that fits your ship) or weather/environmental reasons.
- **Overhaul or Repair Day:** Planned shipyard overhaul or emergency repairs. Days undergoing overhauls, dry-docking, or other scheduled or unscheduled repairs during which the ship is not available for service. Also would include at sea shakedown of ship's overhauled equipment.
- **General Upkeep and Outfitting Day:** Days in port for purposes of fitting out, general upkeep, and routine outfitting and minor pier side maintenance, which does not take the vessel out of service.
- **Out of Service Day:** Days in which a ship is laid up out of service for an extended period for reasons of economy, unemployment, or unfitness for service.
- **Transit Day:** At-sea days primarily for the purpose of going from one port to another or to/from a port and an area of research.

Days are exclusive such that the major category of activity each day is reported for that day.

The fleet's business model is structured around days of use such that annual work plan capacity and utilization can be expressed with activity days. *(needs further confirmation)*

Strawman implementation A – throughput

Goals – produce an easy to track metric that:

- can be captured by operations staff during their normal workflow
- does not require additional high-level interpretation before reporting
- is intuitively obvious to a reviewer
- provides quantifiable data reflective of the level of engagement of the equipment facility by science users

Data gathering:

Data should be tracked on the use of the facility via components at the discretion of the facility, using as few of components as reasonable to accurately reflect engagement of the facility. For example, the academic fleet reports at the individual ship level, not the fleet level, and not at the individual resource level. At UC Davis, for example, they plan to report at the facility level. They could easily track at the centrifuge level, logging use of the 1m and 9m centrifuges separately. These machines are used independently and often in parallel. But, they feel independent tracking of these machines does not accurately reflect staff engagement for the facility. For example, in the spring they began a maintenance cycle on the 1m centrifuge that made the machine unavailable for use. This summer they have chosen to leave the 1m machine idle as the staff have been saturated supporting multiple projects working simultaneously on the 9m centrifuge, and there has not been an immediate project need for the 1m centrifuge. Every day of the summer has been a science day for the staff. It would be inaccurate to report 90 Science Days for the 9m centrifuge and 90 repair days for the 1m centrifuge.

The following data should be collected on a daily basis:

Projects active on site, or staff actively engaged in project-specific research support: Typically means students are on site, actively and significantly using shared resources within the lab. It may also mean facility staff are actively working on the project science independent of project personnel (e.g., RAPID facility personnel independently process data from the field following missions). Minor support of research, such as remote planning meetings, would not count, and students simply using office space would not count. The goal is to capture days of significant engagement. The daily log should track which projects are active each day.

Tours and events: Maintain a daily log of tours and events that significantly engage the equipment facility. This should include events hosted at the site (common) as well as events where site personnel significantly participate in off-site outreach events (less common).

Inspections: Any day where an external entity performs an inspection on site. E.g. site visits, BSR, EH&S safety inspection.

Repairs: Make note of any day where the tracked resource is unavailable to users due to planned overhaul or emergency repairs. Tracking at the facility level might result in zero repair days even when major equipment is taken offline if users continue to work with other facility resources.

Maintenance: If you are tracking at the facility level it can be assumed that every work day includes maintenance activities. If you are tracking at the individual equipment level you can log that maintenance work was being performed.

Reporting:

The following event logs should be reported as totals to reflect total engagement. Days are not exclusive, five projects active on one day will be reported as five project days.

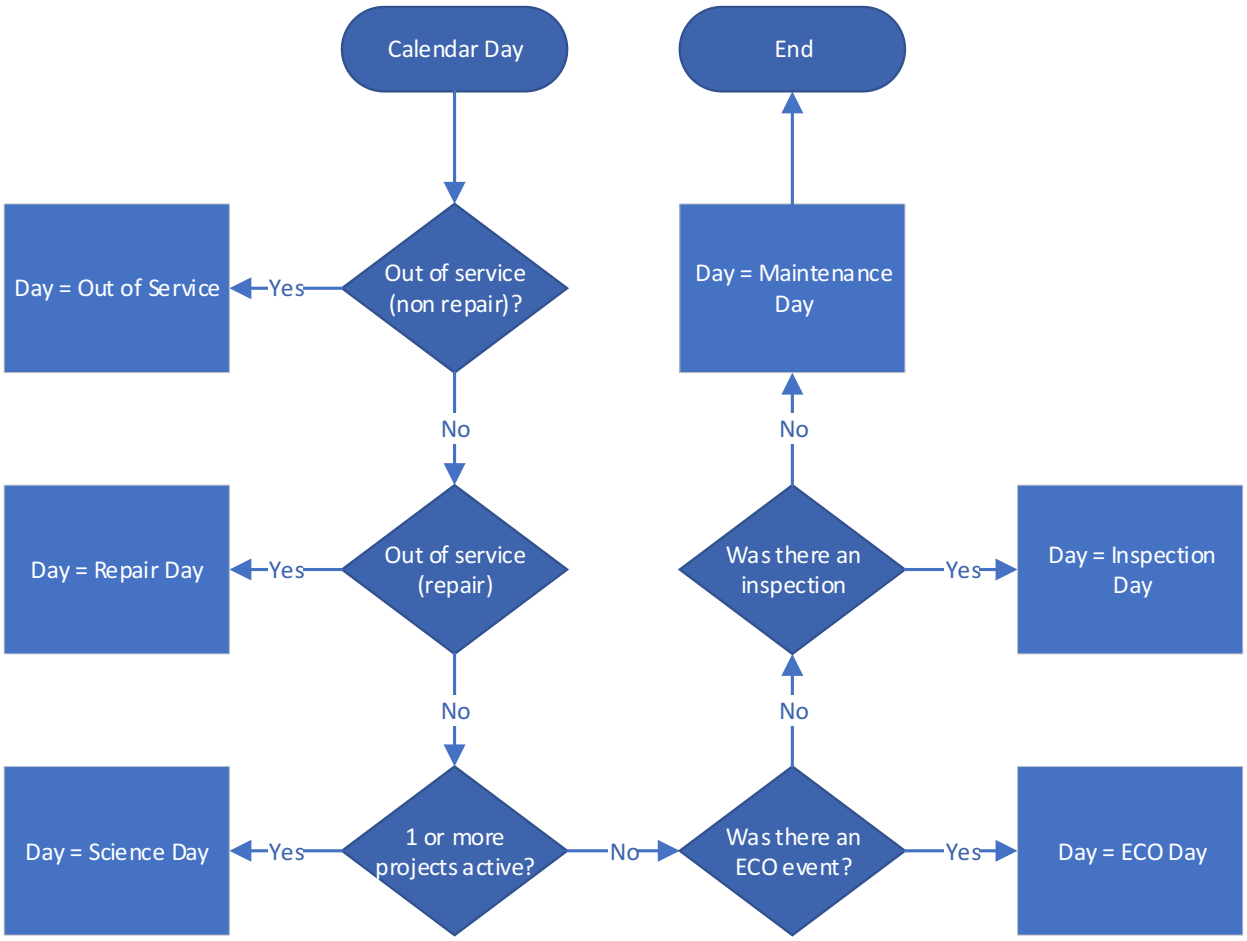
Project Days:

NSF Project Days

Non-NSF Project Days

Tours and event Days

The event logs should be processed according to calendar days to generate the following calendar day events. Reported days are exclusive – each calendar day can be represented only once in the tally. The sum of these days should add to 365 (or 366) for the year.



Strawman implementation B – throughput

TBD – but basically each site uses their local business model / work breakdown structure to calculate utilization as a percentage of throughput divided by capacity. Common categories should be adopted.

Other Reporting Metrics:

In addition to the proposed utilization metrics outlined above, we propose to gather the following metrics that will show the network wide user base and the projects that they are engaged in. We are following the similar model to the research ship fleet, tracking users, their characteristics, and the projects they are involved in so that further cross-examination and analysis of our user base can be done as needed.

USER

EF Lab User (as opposed to a data user, etc.): someone who works (or has worked) in the lab (or supervises work in the lab – ie remote PI), who is using physical resources on site or remote. This user has characteristics – (ORCID) Name, role (grad student, postdoc, PI, etc.), project, demographic info, etc.

For example, we do not count technicians, analysts, etc. as users.

Cross reference projects to enumerate NSF user, non-NSF user, repeat user.

Quarterly- report total NSF users for the award, and new NSF users for that quarter.
Optional – report non-NSF users for the award and new non-NSF users for that quarter

Sponsor Awards

Number of awards from different sponsors, distinguished by funding agency or source.

PROJECT

A project is a coordinated research activity (or a single RAPID deployment), run by a team of users. xEER deployments are counted individually.

NSF Opportunities Update | 7 November 2019

Prepared by Forrest Masters, University of Florida

Opportunity sourcing for natural hazards research, with emphasis on cross-directorate programs

Solicitation	Due Date	Status / notes
Civil Infrastructure Systems (CIS)	Full proposals accepted anytime	"supports … research in the design, operation and management of civil infrastructure that contributes to creating smart, sustainable and resilient communities at local, national and international scales. … focuses on civil infrastructure as a system in which interactions between spatially- and functionally- distributed components and intersystem connections exist. All critical civil infrastructure systems are of interest, including transportation, power, water, pipelines and others."
Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII)	12 Aug 2020	Considered to be the "mini-CAREER." Funds faculty outside of CS depts
Computational and Data-Enabled Science and Engineering (CDS&E)	Sep - Nov Annually; Division specific	"Identify and capitalize on opportunities for major scientific and engineering breakthroughs through new computational and data analysis approaches." One CBET example: "2) Innovative modeling methodologies for turbulent flows and for flows of complex fluids and suspensions." From CMMI: "design of innovative materials and building technologies, infrastructure resilience and sustainability and tools and systems for decision-making, robotics and controls"
Computer and Information Science and Engineering (CISE): Core Programs	Small: 29 Oct 2020. Med: 7 Sep 2020. Large: 16 Sep 2020	CISE's annual call for proposals, which are tiered into "$500K small," "$1.2M medium", and "$7M frontier" grants. Smalls are the best target to "break into" this funding. Familiarize yourself with the divisions before reaching out. Some are theory/algorithm based, others are more application focused (e.g., human computer interaction in CHS)
Critical Aspects of Sustainability (CAS)	Full proposals accepted anytime	Heavy on chemistry and materials (led by MPS CHE and DMR) but also involving ENG CBET/CMMI. "Improve the efficiency with which natural resources are used to meet human needs for products and services … meeting the goals of protecting and enhancing human health and the environment."
Cyber-Physical Systems (CPS)	Currently closed	Cross-directorate program supporting "$500K small," "$1.2M medium", and "$7M frontier" grants. "Smart CPS drive innovation and competition in a range of application domains including … building design, civil infrastructure, … transportation."
Engineering Design and System Engineering (EDSE)	Proposals accepted anytime	"supports fundamental research into the basic processes and phenomena of engineering design and systems engineering. The program seeks proposals leading to improved understanding about how processes, organizational structure, social interactions, strategic decision making, and other factors impact success in the planning and execution of engineering design and systems engineering projects."

Emerging Frontiers in Research and Innovation (EFRI)	(1) DCL around Oct: topic input and (2) prelim proposals due around Dec	Two parts: topic suggestion and proposal submission to address selected topics. Assists ENG in determining topical calls for the following year, e.g., "Chromatin and Epigenetic Engineering" was one of two topics selected for FY19. LOIs due in November
Engineering for Civil Infrastructure (ECI)	Full proposals accepted anytime	"supports fundamental research that will shape the future of our nation's constructed civil infrastructure, subjected to and interacting with the natural environment, to meet the needs of humans. In this context, research driven by radical rethinking of traditional civil infrastructure in response to emerging technological innovations, changing population demographics, and evolving societal needs is encouraged."
Expeditions in Computing	Prelim proposals due 22 April 2020	A CISE crowing jewel program to: "define the future of computing and information." 1-2 $10M awards to teams that crosscut CS with domain experts in other fields (e.g. SynBio, visual cortex)
Faculty Early Career Development Program (CAREER)	Jul annually	$500K for 5 yrs. "support of early-career faculty who have the potential to serve as academic role models in research and education"
Future of Work at the Human-Technology Frontier: Core Research (FW-HTF)	Currently closed	"support convergent research to understand and develop the human-technology partnership, design new technologies to augment human performance, illuminate the emerging socio-technological landscape, understand the risks and benefits of new technologies, understand and influence the impact of artificial intelligence on workers and work, and foster lifelong and pervasive learning." Supports planning ($150K) and research ($1.5M) grants
Growing Convergence Research (GCR)	3 Feb 2020	"targets multi-disciplinary team research that crosses directorate or division boundaries and is currently *not supported by NSF programs*, initiatives and research-focused Big Ideas. Proposers must make a convincing case that the research to be conducted is within NSF's purview and cannot be supported by existing NSF programs and multidisciplinary initiatives. Proposals involving convergence in areas covered by existing programs and solicitations will be returned without review."
Humans, Disasters, and the Built Environment (HDBE)	Full proposals accepted anytime	"supports … research on the interactions between humans and the built environment within and among communities exposed to natural, technological and other types of hazards and disasters. The program's context is provided by ongoing and emerging changes in three interwoven elements of a community: its population, its built environment (critical infrastructures, physical and virtual spaces, and buildings and related structures) and the hazards and disasters to which it is exposed."
Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES)	3 Dec 2019 and 13 Jul 2020	"bringing together diverse disciplinary perspectives to support convergence research." Supports pilot projects, hubs, networks, alliances, etc.

Leading Engineering for America's Prosperity, Health, and Infrastructure (LEAP HI)	LOI due 15 July 2020. Proposal due 1 Sep 2020	CMMI program. "challenges the engineering research community to take a leadership role in addressing demanding, urgent, and consequential challenges for advancing America's prosperity, health and infrastructure."
Major Research Instrumentation (MRI) Program	1 January 2020	NSF "equipment" and "facility" grants: • MRI Track 1: $100K - $1M • MRI Track 2: $1-4M • MSRI-1: $6M - $20M (3-10 Awards) • MSRI-2: $20M - $70M (4-6 Awards) • Major Research Equipment and Facilities Construction Program (MRFEC): $70M+
Mid-scale Research Infrastructure-1	Previous LOI due Feb 2019	
Mid-scale research infrastructure-2	Previous LOI due Feb 2019	
National Artificial Intelligence (AI) Research Institutes	Institute proposals due 28 Jan 2020. Planning proposals due 30 Jan 2020	$20M per center. See National Artificial Intelligence Research and Development Strategic Plan, Note Theme 3: AI-Driven Innovation in Agriculture and the Food System. New themes will be introduced in subsequent years
National Robotics Initiative 2.0: Ubiquitous Collaborative Robots (NRI-2.0)	22 Jan 2020	"accelerate the development and use of collaborative robots (co-robots) that work beside or cooperatively with people. The focus of the NRI-2.0 program is on ubiquity, which in this context means seamless integration of co-robots to assist humans in every aspect of life."
Navigating the New Artic (NNA)	11 Feb 2020	"seeks innovations in fundamental convergence … that address the interactions or connections between natural and built environments and social systems and how these connections inform our understanding of Arctic change and its local and global effects." Program funding two tracks: planning ($250K) and research ($3M). 25 awards total
NSF Engineering - UKRI Engineering and Physical Sciences Research Council Lead Agency Opportunity (ENG-EPSRC)	Full proposals accepted anytime	ENG Directorate seeking to support projects jointly funded by the NSF and the UK Engineering and Physical Sciences Research Council (EPSRC). 5-10 awards with a total funding ceiling of $6M
National Science Foundation Research Traineeship (NRT) Program	LOI due 25 Nov annually	Successor to IGERT. Watch for internal competition notices at your university. Engineering and science efforts will compete for one of two slots.
Partnerships for International Research and Education (PIRE)	New solicitation forthcoming	"support high quality projects in which advances in research and education could not occur without international collaboration."
Research Experiences for Teachers (RET) in Engineering and Computer Science	Third Wed in Sep Annually	"supports active long-term collaborative partnerships between K-12 Science, Technology, Engineering, Computer and Information Science, and Mathematics (STEM) in-service and pre-service teachers, full-time community college faculty, and university faculty and students to enhane the scientific disciplinary knowledge and capacity of the STEM teachers and/or community college faculty through participation in authentic summer research experiences with engineering and computer science faculty ."

Smart and Connected Communities (S&CC)	Currently closed	Offers planning and research grants. “Shifts in … built and natural environments … impact overall community culture, needs, and opportunities. A fundamental understanding of the complex, dynamic interactions between technology and society is essential for unlocking the potential benefits of smart and connected communities.” “New technologies and practices to improve decision making under uncertainty, including to evaluate and mitigate risks, associated with highly complex systems (spanning technologies, infrastructures, and the community) over the short-, medium-, and long-term”

Others not covered (some may have sunset):

- Accelerating Research through International Network-to-Network Collaborations (AccelNet).
- ADVANCE: Organizational Change for Gender Equity in STEM Academic Professions (ADVANCE).
- Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP)
- Critical-Zone Collaborative Network. Full proposals due 2 December
- EPSCoR opportunities
- Engineering Research Centers (ERC)
- Harnessing the Data Revolution (multiple solicitations)
- National Science Foundation Research Traineeship (NRT) Program. LOI due 25 November (limited submission)
- NSF Convergence Accelerator
- Research Coordination Networks
- Science and Technology Centers (STC)
- US-Japan Big Data and Disaster Research (BDD)