CNS Core Program

Webinar

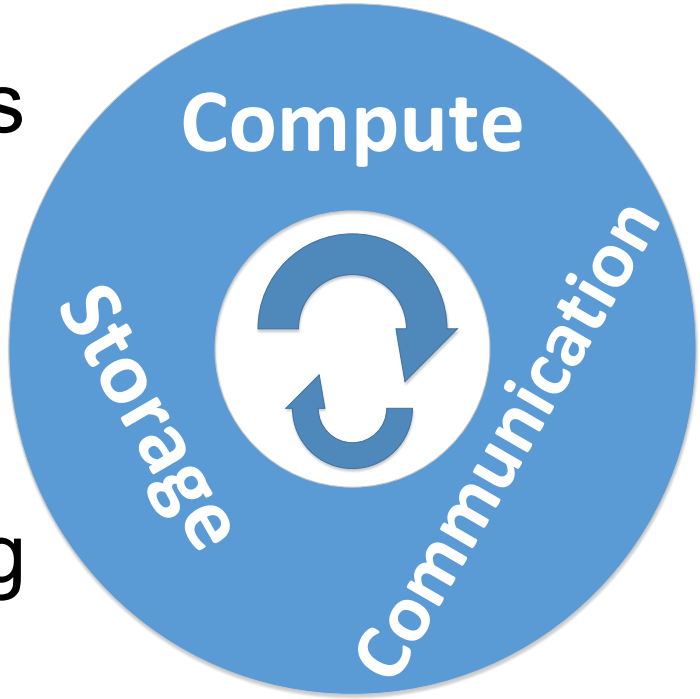
(Announcement of NSF 18-569)

Wednesday, August 1, 2018

Observations

- Our field moves very quickly; difficult to keep up, much less predict

- Blurring boundaries among compute, storage, networking



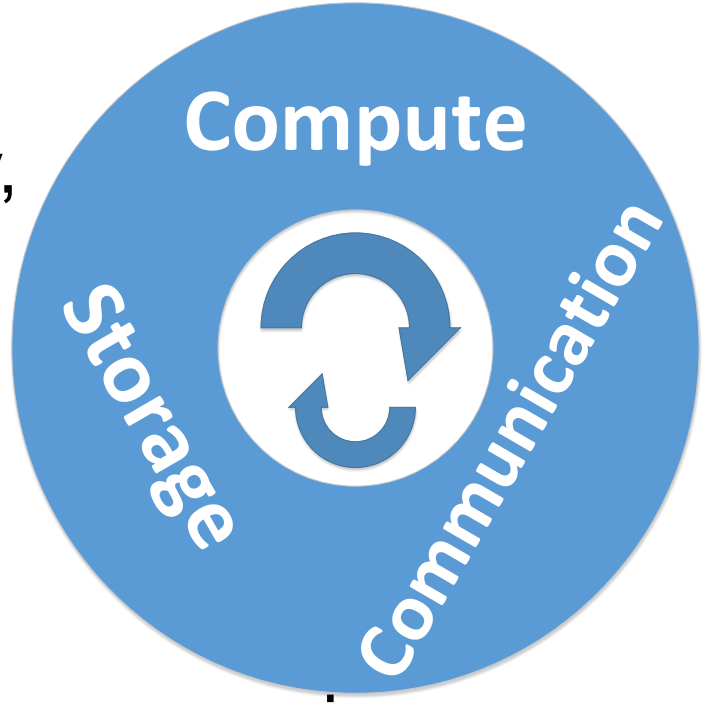
The Vision

- Innovative research; technology trends and emerging challenges; emphasizing a **systems** focus & awareness of the types of requirements

- Encourage cross-fertilization among CNS areas

The Vision

- Focus on system requirements, both generic and purpose-driven
  - General requirements: security, reliability, manageability, usability, and sustainability, as well as cost-effectiveness and fitness for purpose
  - Context-specific: performance, privacy-preservation, scalability, responsiveness, and survivability



Research of Interest

- Realistic systems – harnessing current & emerging technologies, trends, & applications
- Practical abstractions, techniques, or datasets
- System, component & environment interfacing
- Disseminates artifacts for reproducibility

Secure by Design

- Integrity & confidentiality of systems & data
- Establish security defaults in design processes
- Anticipate vulnerabilities
- Provide defense against unforeseen attacks

- Exclusive focus on cybersecurity threats and countermeasures – better fit for SaTC program

Robustness

- Adaptability and resilience
  - natural & anthropogenic hazards
  - Normal or expected events; e.g., failures, overloads

- Identify, communicate, and mitigate system anomalies

Manageability

- Support a diverse set of applications
- Pervasive; accurate; and near real-time system analytics
- Autonomous and self-managing systems

Program Boundaries

- Primarily at the device or application level and issues that are highly context-specific **will not be considered a good fit** for this program

- Exclusive focus on cybersecurity threats and countermeasures – better fit for SaTC program

- Primary focus on sensing, control, & interaction with physical world – better fit for CPS program

Project Validation Plan

- Setup, processes, mechanisms, and metrics
- Architectural validation may happen at a time-scale larger than the project duration
- Recommended to use community infrastructure
- Clarify the level of abstraction for validation

Results Dissemination Plan

- Make research results available publicly
- Facilitate independent validation
- NSF PAPPG – Chapter XI.D.4.

Data Management Plan

- Detail steps to ensure that artifacts are available (for a reasonable time) beyond the end of the project lifecycle

- For details, see CISE DPM at: https://www.nsf.gov/cise/cise_dmp.jsp.

Collaboration Plan

- Thoughtful coordination mechanisms that regularly bring together various participants
- Required for Large & Medium projects with more than a single investigator
- Such plans are optional for Small proposals

Additional Review Criteria

For all proposals:

- How well does the proposed work address and advance the following?
  - Secure-by-design systems;
  - Systems robustness;
  - Manageability of the system under consideration;

    and/or
  - Fundamental understanding of the system or system component.

Additional Review Criteria

- How well does the proposal describe an evaluation plan that assesses and where appropriate quantifies the expected research outcomes?

- How well does the proposal describe research dissemination plans to ensure that the research results can be validated independently?

Additional Review Criteria

For Large and relevant Medium proposals:

- Comment on the extent to which the project scope justifies the level of investment requested, and the degree to which the Collaboration Plan (for projects with more than 1 investigator) adequately demonstrates that the participating investigators will work synergistically to accomplish the project objectives.

Additional Review Criteria

For Large and relevant Medium proposals:

- Comment on whether key personnel, and especially lead PIs, have allocated adequate time for both their individual technical contributions and the leadership of collaborative activities necessary to realize the synergistic effects of larger-scale research.

Broadening Participation in Computing (BPC)

- CISE is expanding a pilot effort started last year
- Each Medium & Large project **must**, by the time of **award**, have in place an **approved** BPC plan
- Submission of a 1–3 pg. description of BPC activities as a Supplementary Documents is strongly encouraged.
- More information: https://www.nsf.gov/cise/bpc/

Eligibility

- Institutions of Higher Education (IHEs)
- Organizations in the U.S. associated with educational or research activities
- Personnel must hold primary, full-time, paid appointments in research or teaching positions at US-based campuses/offices of organizations eligible to submit to this solicitation, with exceptions granted for family or medical leave, as determined by the submitting institution

Eligibility

- Individuals with primary appointments at for-profit, non-academic organizations, or overseas branch campuses of US IHEs are not eligible, even if they also have an appointment at a US campus.

- Fulltime as defined by your institution

- Contact Cognizant PDs for clarification

Eligibility

- **Limit on No. of Proposals per PI/Co-PI:** 2

The limit on the number of proposals per PI, co-PI or Senior Personnel applies only to the *coordinated solicitations* – CNS, OAC, CCF, & IIS

- **Additional Eligibility Info:** Subawards are not permitted to overseas campuses/offices of US-based organizations eligible to submit

Project Classes

- 100 to 150 Grants are expected to be awarded
- Anticipated Funding Amount: $60M
- Small – up to 3yrs; up to $500K budget
  - Nov. 01, 2018 – Nov. 15, 2018
- Medium; up to 4 yrs; budget [$500,001–$1.2M]
  - Sep. 24, 2018 – Oct. 02, 2018
- Large; up to 5 yrs; budget [$1,200,001–$3M]
  - Sep. 24, 2018 – Oct. 02, 2018

Start Dates

- Discouraged from seeking project start dates between July 2 and Sep. 30 of a given year

- Allowable pre-award costs can occur 90-days prior to the award, see PAPPG guidelines

Changes in Submission

- Title – should begin with “CNS Core”
  - **CNS Core: Medium: Title**
  - **CNS Core: Large: Collaborative Research: Title**
  - **CNS Core: Small: RUI: Title**
  - **CNS Core: Small: GOALI: Title**

  - **CNS Core: CHS: Medium: Title**

Changes in Submission

- Summary – **must** select keywords
  - *Dimension 1: Topic Area*
    - o Compilers and Programming Languages
    - o Computer Architecture
    - o Distributed Systems
    - o File Systems
    - o Middleware/Services
    - o Operating Systems
    - o Software Defined Infrastructure/Virtualization
    - o Wired Networks
    - o Wireless Networks

Changes in Submission

- Summary – **must** select keywords
  - *Dimension 2: Target Context or Platform Class*
    - o Access Networks
    - o Content Delivery Networks
    - o Mobile Systems
    - o Cloud/Edge
    - o High Performance Computing
    - o Network Protocols
    - o Storage Systems
    - o Application Services
    - o Data Center Networks
    - o Cluster/Data Center
    - o Enterprise Networks
    - o Network Architecture
    - o Optical Networks
    - o Vehicular Networks

Changes in Submission

- Summary – **must** select keywords
  - *Dimension 3: Target Requirement*
    - o Cost
    - o Quality of (experience, service)
    - o Performance (throughput, latency)
    - o Power/energy improvements
    - o Reliability
    - o Security
    - o Spectrum Coexistence
    - o Fairness
    - o Manageability
    - o Measurability
    - o Real-time
    - o Robustness
    - o Scalability

Changes in Submission

- Summary – **must** select keywords
- *Dimension 4: Techniques*
  - E.g., graph theory, game theory, control theory, machine learning, network coding, … . or **NONE**

- Up to 6 additional proposal specific keywords may be added following these 4 required classifiers, *without square bracket delimiters*

Changes in Submission

- Summary – **must** select keywords
  - *Examples*
    - [File Systems] [Access Networks] [Cost, Performance] [machine learning]
    - [Compilers and Programming Languages] [Enterprise Networks] [Manageability] [none]
    - [Wireless Networks] [Access Networks] [Performance] [Machine Learning] mmWave, Beamforming

- **<u>Keywords should be the last paragraph of the "Overview" section of the Summary</u>**

Changes in Submission

- Project Description
  - *Small and Medium* **– max 15 pages**
  - *Large* **– max 20 pages**

Changes in Submission

- Supplementary Documents
  - *List of Project Personnel and Partner Institutions*
  - *Collaborative Plans for Medium & Large proposals*
    - Up to 2 pages for proposals with more than 1 investigator
  - *Data Management Plan*
    - Up to 2 pages (expectations were described earlier)
  - *Results Dissemination Plan*
  - *BPC Plans for Medium & Large proposals*
    - Up to 3 pages (expectations were described earlier)
  - Other as allowed by PAPPG

Cognizant PDs

- Ann C. Von Lehmen, avonlehm@nsf.gov
- Darleen L. Fisher, dlfisher@nsf.gov
- John T. "Jack" Brassil, jbrassil@nsf.gov
- Matt Mutka, mmutka@nsf.gov
- Mimi McClure, mmcclure@nsf.gov
- Monisha Ghosh, mghosh@nsf.gov
- Samee Khan, skhan@nsf.gov
- Sandip Kundu, skundu@nsf.gov

Q&A

- My research domain is not adequately reflected in the keywords, what do I do?
- Dimension 2 reads networking heavy, is that where the program is leaning?
- Do “secure by design” and “system robustness” and “manageability”, all have to be part of the a CNS Core proposal?