

INTERNET<sup>2</sup>

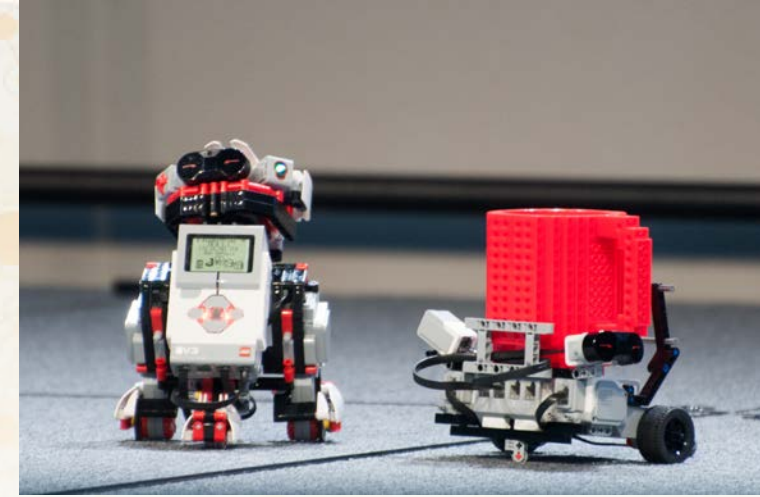
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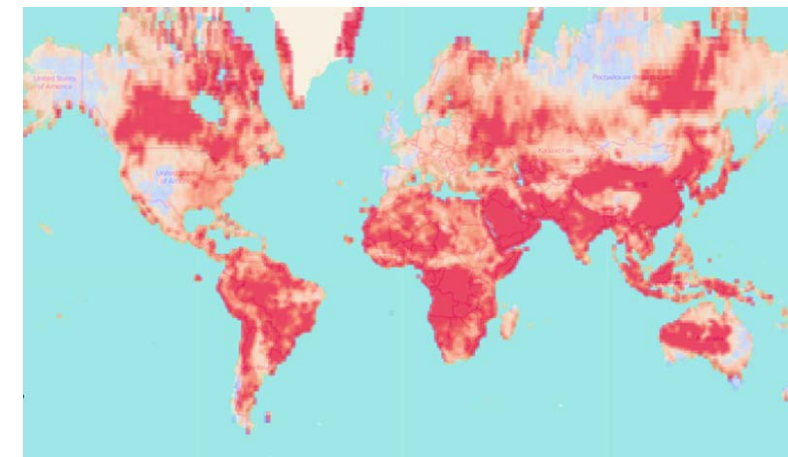
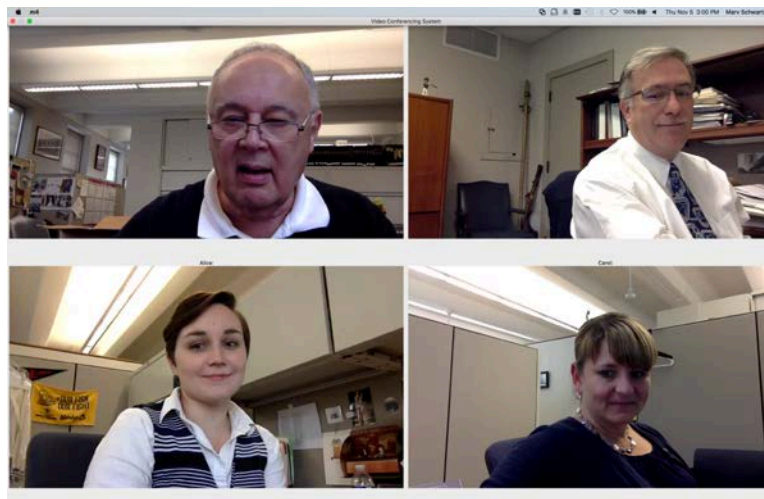
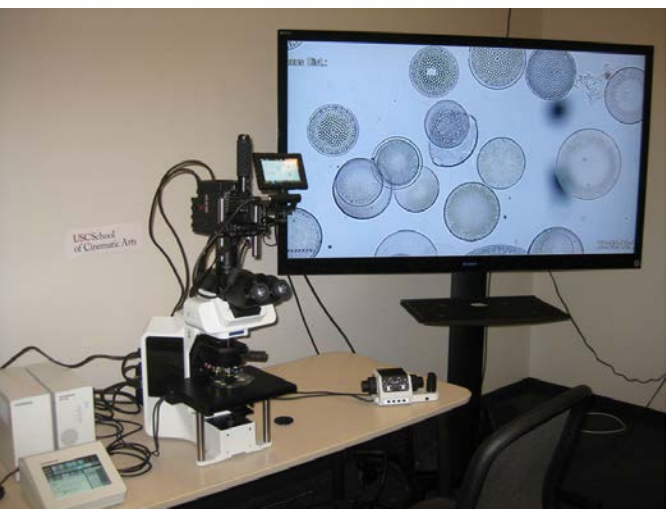
# NSF 16-610 Smart and Connected Communities

Glenn Ricart  
Florence Hudson  
Jen Leasure  
Nishal Mohan

October 31, 2016



Applications and services leveraging advanced cyberinfrastructure in smart and connected communities



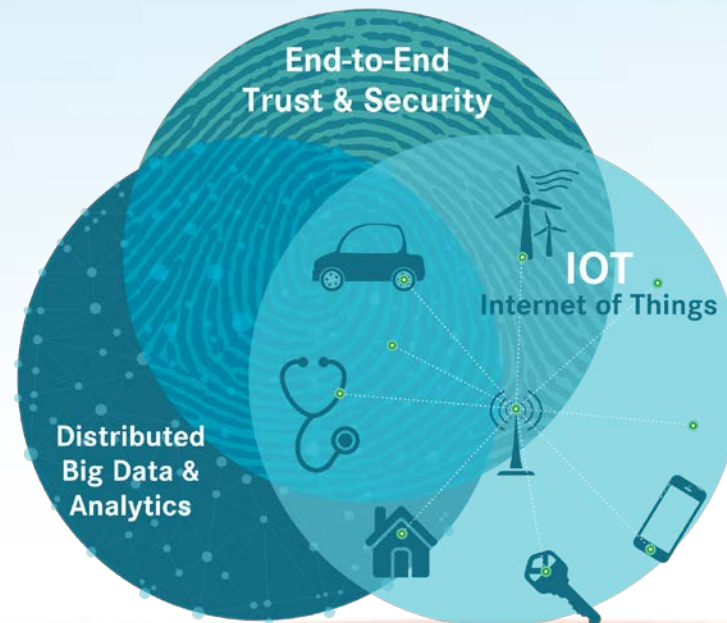
# Collaborative Innovation Community Working Groups are exploring future, strategic innovations in advanced networking and trust & identity for the research and education community.

## E2E Trust & Security (E2ET&S):

- End to End Trust and Security for the Internet of Things (IoT)
- TIPSSS – Trust, Identity, Privacy, Protection, Safety, Security
- *SDP (Software Defined Perimeter), Network Segmentation for IoT*

## Distributed Big Data & Analytics:

- Health & Life Sciences
- **Smart Campuses and Cities**
- Digital Humanities



## Internet of Things:

- IoT Sandbox
- **Smart Campuses and Cities**
- Smart Grid Testbed

### Key:

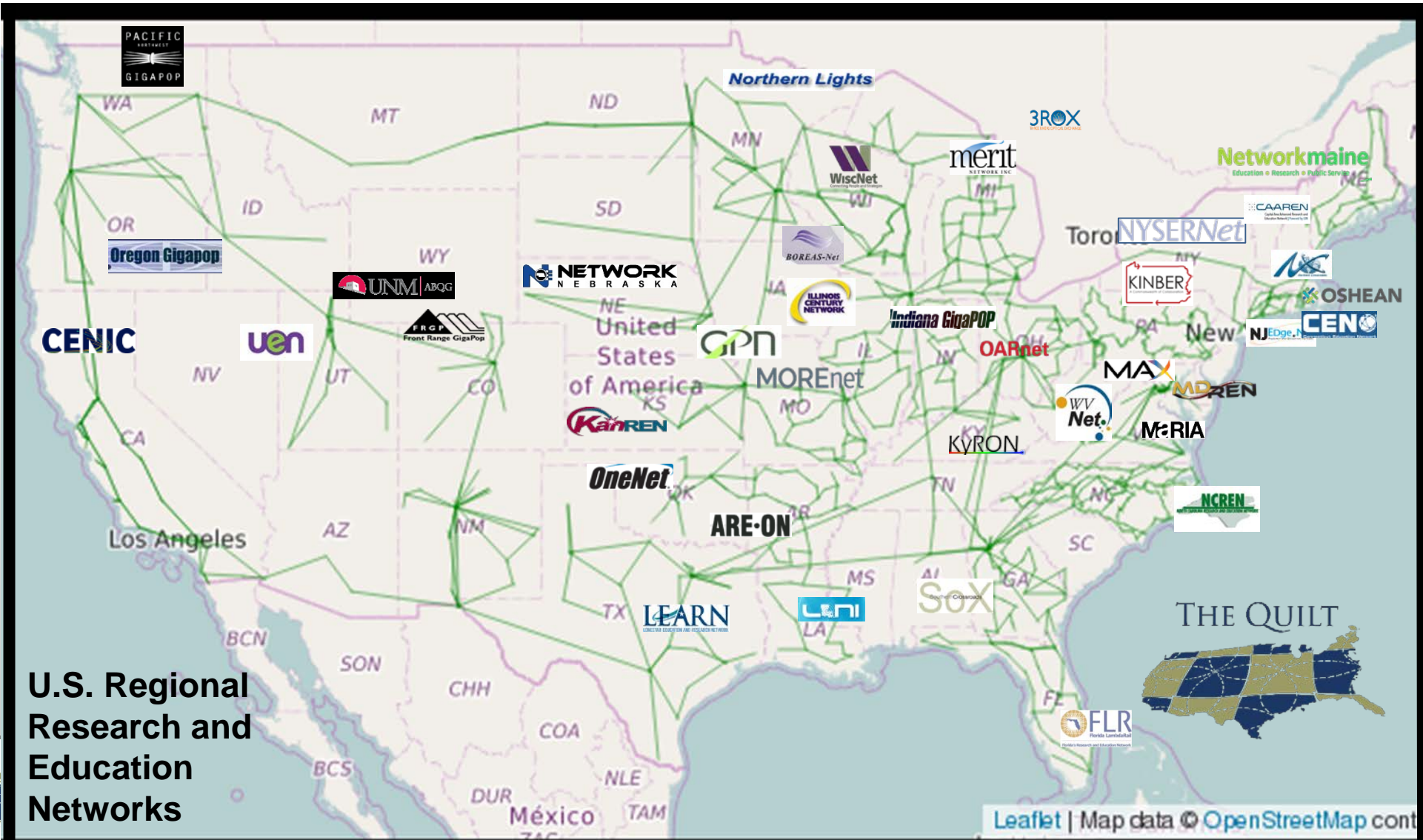
Advanced Networking plus Trust & Identity  
*Advanced Networking focus only*

Interested in participating? Email [CINO@Internet2.edu](mailto:CINO@Internet2.edu)

# Collaborative Innovation Community CINC UP Calls

- The Collaborative Innovation Community consists of members from all Innovation Working Groups in addition to participants interested in exploring open collaboration with the community
- Monthly calls are held on a variety of topics, including:
  - Network Segmentation for IoT
  - OpenFog Consortium
  - Best Practices for researcher engagement and cyber-infrastructure support
  - Virtual and Augmented Reality
  - LoRa low-power wireless WAN pilot for IoT research
  - Internet of Things Security and Blockchain: December 6, 2016
- Interested in participating? Email [CINO@Internet2.edu](mailto:CINO@Internet2.edu)

# The Quilt: A Collaboration of U.S. Research and Education Networks



U.S. Regional  
Research and  
Education  
Networks

THE QUILT



# Smart & Connected Communities (S&CC)

NSF Dear Colleague Letter 16-140 and  
NSF S&CC Program Solicitation 16-610

October 2016



# NSF 16-140\* Dear Colleague Letter: Opportunities for Research in Smart & Connected Communities

- NSF 16-140 DCL is a notification of opportunities to support, foster, and accelerate fundamental research and education that addresses challenges in enabling Smart & Connected Communities (S&CC), supported by the following directorates:
  - Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), Social, Behavioral and Economic Sciences (SBES)
- Aligns with the [National Smart Cities Initiative](#) and the President's Council of Advisors on Science and Technology (PCAST) report on [Technology and the Future of Cities](#).

[\\*https://www.nsf.gov/pubs/2016/nsf16140/nsf16140.jsp](https://www.nsf.gov/pubs/2016/nsf16140/nsf16140.jsp)



# NSF 16-610\* Smart & Connected Communities (S&CC) Program Solicitation Genesis

- NSF 16-610\* is a notification of opportunities to support, foster, and accelerate fundamental research and education that addresses challenges in enabling Smart & Connected Communities (S&CC), supported by the following directorates:
  - Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), Social, Behavioral and Economic Sciences (SBES)
- Aligns with the [National Smart Cities Initiative](#) and the President's Council of Advisors on Science and Technology (PCAST) report on [Technology and the Future of Cities](#).

[\\*https://www.nsf.gov/pubs/2016/nsf16610/nsf16610.htm](https://www.nsf.gov/pubs/2016/nsf16610/nsf16610.htm)





# NSF 16-610 S&CC Synopsis of Program

Cities and communities in the U.S. and around the world are entering a new era of transformational change, in which their inhabitants and the surrounding built and natural environments are increasingly connected by smart technologies, leading to new opportunities for innovation, improved services, and enhanced quality of life.

The **goal** of this Smart & Connected Communities (S&CC) solicitation is to support **strongly interdisciplinary, integrative research and research capacity-building activities that will improve understanding of smart and connected communities and lead to discoveries that enable sustainable change to enhance community functioning.**

Unless stated otherwise, for the purposes of this year's solicitation, communities are physical, geographically-defined entities, such as towns, cities, or incorporated rural areas, consisting of various populations, with a governance structure and the ability to engage in meaningful ways with the proposed research.



# What makes a successful proposal?

**Successful S&CC projects** are expected to pursue

- **research and research capacity-building activities** that
- **integrate multiple disciplinary perspectives** and
- **undertake meaningful community engagement**, and to include
- **appropriate and robust evaluation plans** for assessing activities and outcomes.

To meet the **multidisciplinary criterion**, proposals must meaningfully integrate across both

- **Social** and
- **Technological** research dimensions.

In this solicitation, the social dimensions reflect areas typically included in the portfolios of the NSF's Directorates for Social, Behavior, and Economic Sciences (SBE) and Education and Human Resources (EHR), while the technological dimensions reflect disciplinary areas typically included in the portfolios of the Directorates for Computer and Information Science and Engineering (CISE) and Engineering (ENG). Proposals may also pursue integration with other disciplines as needed, including but not limited to those typically encompassed in the portfolio of the NSF's Directorate for Geosciences (GEO).



# NSF 16-610 S&CC Award Information

Type	How many?	Duration	Total Grant	Prelim?	Due Date
Integrative Research Grant (larger)	1-3	3-5 yrs.	Up to \$5M	<b>11/30/16</b>	Feb. 16, 2017
Integrative Research Grant (smaller)	5-8	3-4 yrs.	Up to \$1M	<b>11/30/16</b>	Feb. 16, 2017
Research Coordination Networks	2-3	Up to 5 yr	Up to \$500K	No	Feb. 16, 2017
Planning Grant	10-15	1 year	Up to \$100K	No	Feb. 16, 2017

- In each of these categories, **successful proposals** will reflect integrative, multidisciplinary research, tangible research capacity-building, and meaningful community engagement, the nature of which will vary by the proposal category.
- The number of awards in each category will be dependent on the overall mix of proposals and the degree to which they meet the solicitation goals, Merit Review Criteria and Solicitation Specific Review Criteria.
- **Estimated Anticipated Number and Type of Awards:** 18 to 29, Standard Grant or Continuing Grant
- **Anticipated Funding Amount:** \$18,500,000
- Subject to the quality of proposals received and availability of funds.



# NSF 16-610 S&CC Integrative Research Grants Tracks 1 & 2

The ultimate goal is to develop integrative research understanding in aspects of S&CC meaningful to communities, and by example point the broader research community toward S&CC research frontiers.

S&CC Integrative Research Grant (IRG) proposals should

- **Pursue a visionary and transformative research agenda, building research capacity addressing fundamental, multidisciplinary, integrative research challenges underpinning future S&CC.**
- May focus on advances across multiple application domains.
- Take a holistic and integrative approach to addressing research problems central to understanding, adapting to, and developing S&CC systems, **both from social and technological perspectives.**
- Describe activities directed at building research capacity, namely activities to develop or attract research talent to address S&CC integrative research challenges.
- Involve and demonstrate **substantive community engagement.**
- Have a project kickoff meeting within 90 days of the award issuance during which awardees will present their research plans, steps for community engagement, overall integration & coordination strategies.

*Awards:*

*Track 1: 3 to 5 years of support for projects at a level not to exceed \$5,000,000 for the total budget.*

*Track 2: 3 or 4 years of support for projects at a level not to exceed \$1,000,000 for the total budget.*

*Track 1 and 2 proposals will be distinguished by team size, scope and duration of the proposed activities.*



# NSF 16-610 S&CC Research Coordination Networks

The ultimate goal is to nurture & grow the S&CC research & education ecosystem, cultivate new research directions in this area and/or otherwise advance the field through communication and sharing of ideas.

**S&CC Research Coordination Networks (RCN)** awards are intended to:

- Significantly advance the S&CC field or create new directions in research by **supporting groups of investigators to communicate and coordinate their research, training, and educational activities** across disciplinary, organizational, and geographical boundaries. Although an S&CC RCN should support neither planning nor conduct of individual research projects, it should engage in activities that will facilitate future fundamental research across scientific communities.
- Support activities by which investigators foster synthesis and new collaborations, and communicate and share information and ideas, including advances in science, engineering, and education.
- Enable novel participant networking strategies, collaborative technologies for interdisciplinary or distributed work, and research community standards for data and meta-data.
- Address how community engagement will inform the activities of the RCN, and describe how it will build research capacity.
- Support establishment of a network of multidisciplinary researchers & others who will collectively & significantly advance S&CC research through active exchange of ideas, development of fundamental research directions, & other approaches.
- Note: **Not meant to support existing activities of established collaborations.**

*Award provides 4 or 5 years years of support for projects at a level not to exceed \$500,000 for the total budget.*



# NSF 16-610 S&CC Planning Grants

**The ultimate goal of S&CC Planning Grants is to stimulate and enable a future high-impact project that can contribute to the S&CC vision.**

S&CC Planning Grants are supported in order to:

- **Build multidisciplinary research teams** that will engage community stakeholders to develop a holistically integrated fundamental S&CC research concept.
- Align research concepts with the definition of Integrative Research outlined in the Program Description.
- Present a description of the fundamental, integrative research concept along with a strategy for developing this concept. This strategy may include, but is not limited to, identifying academic collaborators, building partnerships with appropriate community stakeholders, planning regular interactions with the team or cross-training of students, and exploring unique needs of the community.
- Address how local community engagement will inform the planning activities.
- Note: Planning grants are not meant to support research on the proposed concepts.

Awards will provide 1 year of support to stimulate research capacity through multidisciplinary team-building and the development of high-impact, fundamental research concepts, at a level not to exceed \$100,000 for the total budget.



# NSF 16-610

## Successful Proposals

YES	NO
Bold and innovative	Successful examples already exist
High risk and high reward	Straight-forward
Novel use of commercial product	Commercially-available for this use
Imaginative	Requires everyone to adopt it
Potentially big impact	
Replicable across multiple communities	
Technical, Social, Community impact	Missing one of these components
Multi-disciplinary	Single research group



# NSF 16-610 S&CC Eligibility & Submission Requirements: Individuals

**Limit on Number of Proposals per PI or Co-PI:** 4; By award category as follows:

- Integrative Research Grants Track 1 or Track 2: 1;
- Research Coordination Networks: 2; and
- Planning Grants: 1.

An individual may appear as a PI, Co-PI, or other Senior Personnel on only one proposal submitted to either S&CC IRG Track 1 or Track 2 (not both), only two proposals submitted to the S&CC RCN category, and only one proposal submitted to S&CC Planning Grant category. *This limitation includes proposals submitted by a lead organization and any sub-awards included as part of a collaborative proposal involving multiple institutions.*

In the event that an individual exceeds these limits, the proposals received within the limits will be accepted based on the earliest date and time of proposal submission (i.e., the first one or two proposals received depending on project category will be accepted and the remainder within that project category **will be returned without review**). **No exceptions will be made.**

While allowable, it is not anticipated that an individual will appear as a PI, Co-PI, or other Senior Personnel on 4 proposals.





# NSF 16-610 S&CC Eligibility & Submission Requirements: Organizations

**Limit on Number of Proposals per Organization:** There are no restrictions or limits.

For collaborative proposals involving multiple institutions, the proposal must be submitted by one lead institution with funding for all other participating institutions made through subawards.

**Proposals submitted as separately submitted collaborative proposals will be returned without review.**

For U.S. universities and two- and four-year colleges with overseas campuses, this solicitation restricts eligibility to research activities using the facilities, equipment, and other resources of the campus(es) located in the U.S. only. (Note: this restriction is directed at institutional eligibility only; it is not intended to restrict international collaborations or research activities by subsequent awardees.)



# NSF 16-610 S&CC Supplemental Documents (1 of 4)

## 1. Project Personnel and Partner Institutions (required for all award categories):

Provide current, accurate information for all personnel and institutions involved in the project.

NSF staff will use this information in the merit review process to manage conflicts of interest.

The list must include all PIs, Co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Subawardees, Postdocs, project-level advisory committee members, and writers of letters of support.

This list should be numbered and include (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon.

Each person listed should start a new numbered line. For example:

1. Mary Smith; XYZ University; PI
2. John Jones; University of PQR; Senior Personnel
3. Jane Brown; XYZ University; Postdoc
4. Bob Adams; ABC Inc.; Paid Consultant
5. Mary White; Welldone Institution; Unpaid Collaborator
6. Tim Green; ZZZ University; Subawardee



# NSF 16-610 S&CC Supplemental Documents (2 of 4)

## 2. Integration and Management Plan (for Integrative Research Grants Tracks 1 and 2 only):

- A **two-page** supplementary document containing the following two sections – titled as listed below - must accompany all S&CC IRG proposals (**proposals failing to include an Integration and Management Plan will be returned without review**):
  - **Integration and Multi-Disciplinary Context-** Characterize the multidisciplinary, holistic nature of the approach by identifying the disciplines involved in the research and how the proposed research elements, including social and technological dimensions, are integrated together. Summarize the community engagement including a clear statement defining the community, who the community stakeholders are, and what the activities are that reflect meaningful engagement for the proposed research, as described in Section II of this program solicitation.
  - **Management:** The plan must address the roles and responsibilities of all named participants and should describe how tasks will be integrated over the course of the project. The plan should describe the management, communication and administrative structure for the team with sufficient detail to demonstrate the capability for successfully conducting the proposed work. For example, information on how the project will be managed across all the investigators, institutions, and/or disciplines; and identification of the specific coordination mechanisms that will enable cross-investigator, cross-institution, and/or cross-discipline efforts (e.g., yearly workshops, graduate student exchange, project meetings at conferences, use of the grid for videoconferences, software repositories, etc.).



# NSF 16-610 S&CC Supplemental Documents (3 of 4)

## 3. Letters of Collaboration:

- Any substantial collaboration with individuals not included in the budget should be described in the Facilities, Equipment and Other Resources section of the proposal and documented in a letter of collaboration from each collaborator. Such letters should be provided in the supplementary documents section of the proposal and follow the format instructions specified in the NSF PAPPG\*.
- Collaborative activities that are identified in the budget should follow the instructions in the NSF PAPPG\*.
- Letters of collaboration should be limited to stating the intent to collaborate and should not contain endorsements or evaluation of the proposed project. The recommended format for letters of collaboration is as follows:
  - "If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment or Other Resources section of the proposal."

*Note: \*NSF PAPPG (Proposal and Award Policies and Procedures Guide) can be found at [https://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](https://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg)*



# NSF 16-610 S&CC Supplemental Documents (4 of 4)

## 4. Human Subjects Protection:

Proposals involving human subjects should include a supplementary document of no more than two pages in length summarizing potential risks to human subjects; plans for recruitment and informed consent; inclusion of women, minorities, and children; and planned procedures to protect against or minimize potential risks.



# Steps

1. **Read the solicitation.** Good ideas that don't fit the solicitation aren't funded.
2. Form an idea for a proposal.
3. Form responses to the key issues NSF wants addressed: technical, social, community engagement
4. Contact the relevant NSF Program Director and have a conversation (optional)
5. Write a proposal keeping in mind the Program Director's suggestions
6. Submit it through your Grants and Contracts Office



# Write a Proposal

Talk to your Grants and Contracts Officer – they can help  
Use FastLane

Prepare and paginate each section (except cover page and certifications)  
11 point type; 1 inch margins in all directions  
Submit each section as a separate PDF document  
Each 2 page biosketch is a separate PDF document



**Sections** – details at [http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg\\_2.jsp#IID2](http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg_2.jsp#IID2)

May have changed based on FY17 guidelines to be issued!

Cover Sheet – generated in FastLane – not a collaborative proposal

List of recommended reviews and reviewers not to include (optional)

Certifications – generated in FastLane

Project Summary – one page

Project Description – max 15 pages including **broader impacts** and **prior results**

References Cited

Biographical Sketch(es) – no more than 2 pages; no personal info; separate PDFs

Budget and Budget Justification – justification no more than 3 pages

Current and Pending Support – fill out the forms

Facilities, Equipment and Other Resources – are necessary facilities available?

Special Information and Supplementary Documentation

Data Management Plan – how will you deal with data collected? (required)

Postdoctoral Mentoring Plan (if applicable)



# Project Summary

Your first impression on the reviewer

One page

Three sections

Overview

Intellectual Merit

Broader Impact



# Project Description

Format is largely up to you

Must contain **Broader Impact section**

Must contain **results from prior NSF awards** (even if it says “no prior awards”)

Should address all the key issues

Should explain who will do what

Should have a project plan and timeline

Relevance, innovation, credibility, impact

Does not have to be 15 pages long – that’s a maximum



# Budget

Talk to your grants and contracts people



# Submit through Your Grants and Contracts

Usually one to two weeks to fill in their parts and make sure yours are compliant

They must upload to FastLane by February 16 for NSF 16-610



# Questions & Answers... Thank You

[Glenn.Ricart@us-ignite.org](mailto:Glenn.Ricart@us-ignite.org)  
[Nishal.Mohan@us-ignite.org](mailto:Nishal.Mohan@us-ignite.org)

[FHudson@internet2.edu](mailto:FHudson@internet2.edu)

[Jen@thequilt.net](mailto:Jen@thequilt.net)

