WEBINAR:
Smart and Connected Communities (S&CC) Program Solicitation (21-535)

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Smart and Connected Communities (S&CC): Welcome

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Who is involved with SCC?

- NSF investments in S&CC includes participation from four NSF Directorates: CISE, EHR, Engineering (ENG), and Social, Behavioral, and Economic Sciences (SBE).

- NSF is also working with other agencies across the federal government interested in S&CC (coordination with USDA, DOT, NIST, Commerce, DOE, State, DHS), along with private and international partners (JST and ASEAN via the State Department).

S&CC: Program Contacts

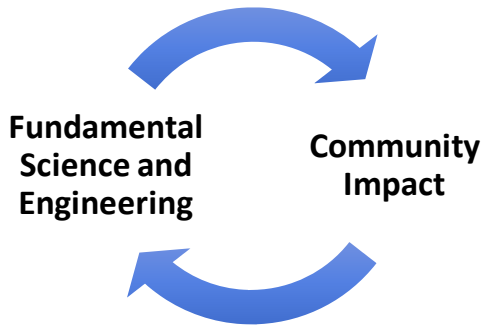| Point of Contact	Email	Telephone
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S&CC Program Overview

What is a "Smart and Connected Community"?

- **Communities:** geographically-delineated boundaries—such as towns, cities, counties, neighborhoods, community districts, rural areas, and tribal regions—consisting of various populations, with the structure and ability to engage in meaningful ways with proposed research activities.

- **A "smart and connected community":** a community that synergistically integrates intelligent technologies with the natural and built environments, including infrastructure, to improve the social, economic, and environmental well-being of those who live, work, learn, or travel within it.

- **Community stakeholders** may include some or all of the following: residents, neighborhood or community groups, nonprofit or philanthropic organizations, businesses, as well as municipal organizations such as libraries, museums, educational institutions, public works departments, and health and social services agencies.
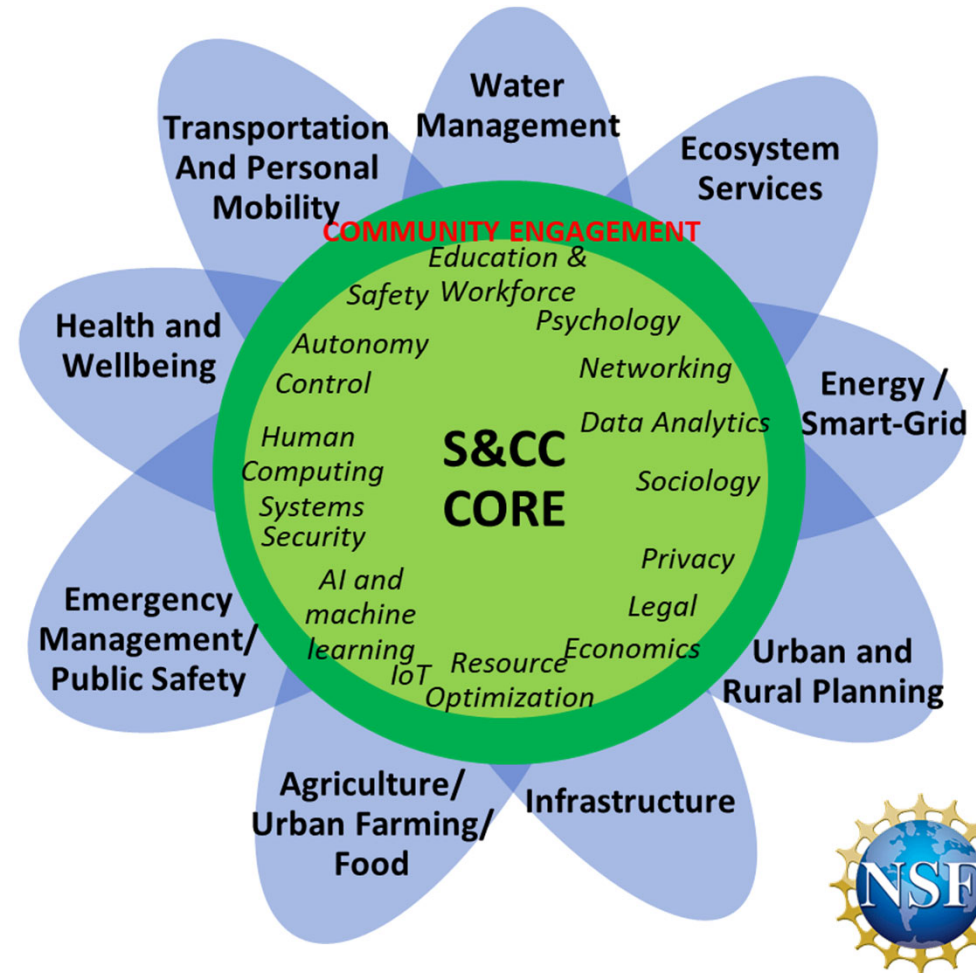
S&CC Program Goals and Motivation

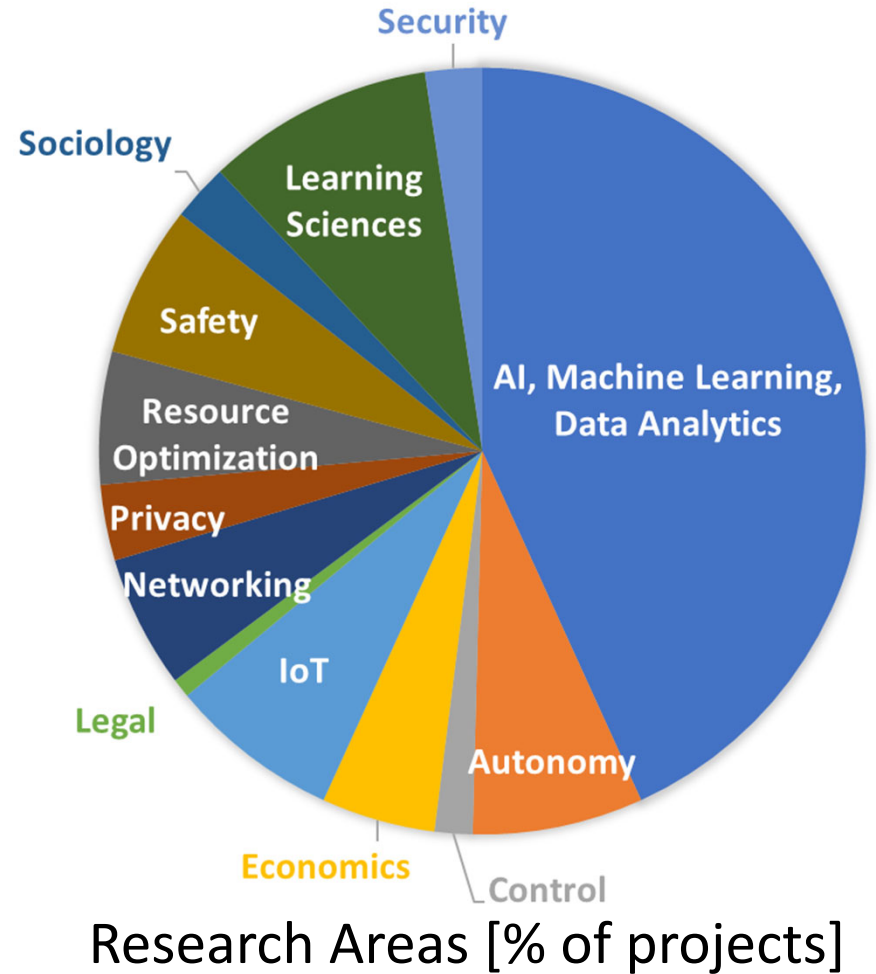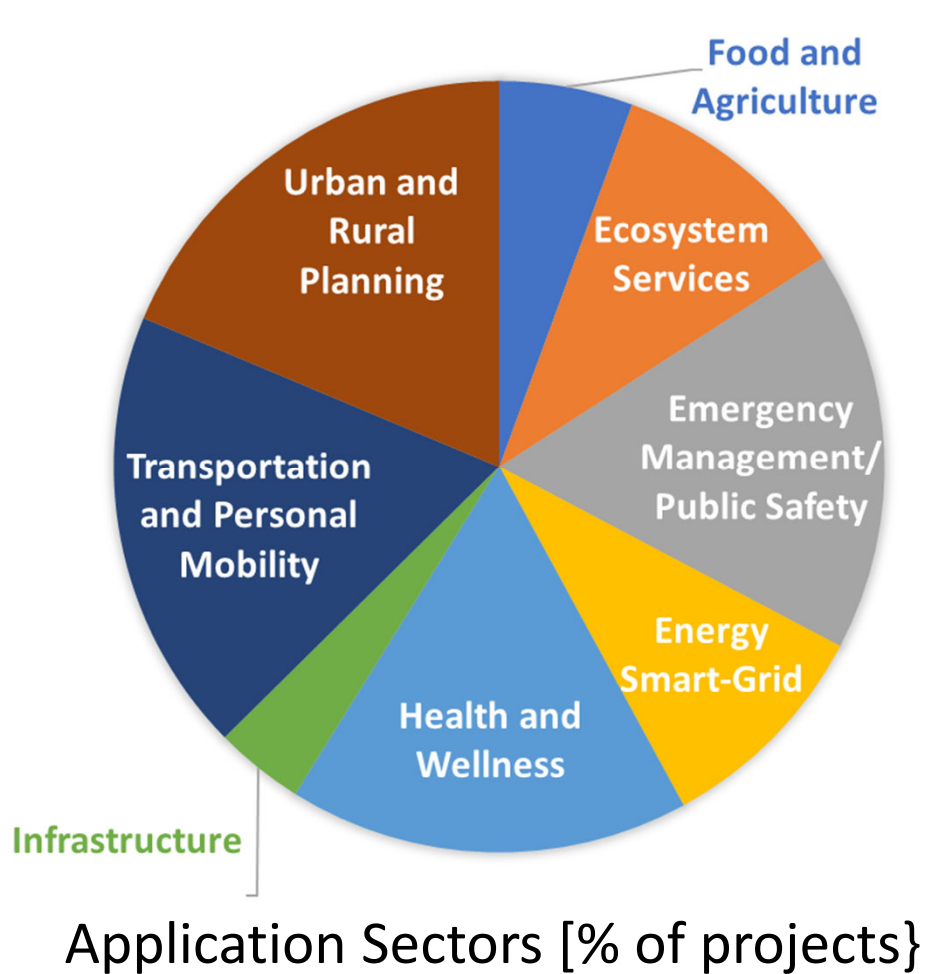**Fundamental Science and Engineering**

Community Impact

- **Use-inspired, community-focused research** to improve quality of life.

- Fundamental **technological and social science dimensions** of smart and connected communities.

- **Pilot research activities** together with communities.

- **Scalability and transferability** of research outcomes; sustainability beyond the life of the NSF award.

https://www.nsf.gov/cise/scc/.

Water Management

Transportation And Personal Mobility

Ecosystem Services

COMMUNITY ENGAGEMENT

Education & Workforce

Health and Wellbeing

Safety

Psychology

Autonomy Control

Networking

Energy / Smart-Grid

Human Computing Systems Security

S&CC CORE

Data Analytics

Sociology

AI and machine learning

Privacy

Legal

Emergency Management/ Public Safety

IoT

Resource Optimization

Economics

Urban and Rural Planning

Agriculture/ Urban Farming/ Food

Infrastructure

NSF

S&CC has a portfolio of projects from three solicitations [FY2017-FY2020], https://www.nsf.gov/cise/scc

Application Sectors [% of projects}

Research Areas [% of projects]

NSF 21-535: S&CC Solicitation Overview

Funding and Award Types

- Anticipated Funding: $23,500,000

- Estimated Number of Awards: 20-30

  - 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, NSF Merit Review Criteria and Solicitation Specific Review Criteria.

Proposal Category	Award Duration	Maximum Budget
Integrative Research Grants Track 1	Up to 4 years	$2.5M
Integrative Research Grants Track 2	Up to 3 years	$1.5M
Planning Grants	1 year	$150K
Virtual Organization	Up to 3 years	$250K

S&CC Proposal Category: Integrative Research Grants (IRG)

- Full awards, appropriate for teams will well developed concepts for (1) use-inspired, community-focused socio-technical research to improve quality of life and (2) piloting of solutions together with communities.

- Multi-disciplinary team in place of researchers ready to address those concepts.

- Clearly identified support and interest from community partners interested in co-development/participatory research around the project's research and piloting activities.

- Well-developed community partnerships and plans for community engagement– at both the level of the decision makers and end-users/residents.

- Awards are for either a maximum duration of 3 years with a maximum budget of $1.5M (Track 2) or a maximum duration of 4 years with a maximum budget of $2.5M (Track 1).

S&CC Proposal Category: Planning Grants (PG)

- Goal is to stimulate and enable future high-impact IRG projects.

- PGs are appropriate for project teams who require additional time to build their multi-disciplinary team of academic and community partners as well as refine their research concepts.

- Planning grants must address how local community engagement will inform the planning activities and are not meant to support research on the proposed concepts.

- Awards are for 1 year and must not exceed $150,000 for the total budget.

S&CC Proposal Category: Virtual Organization (SCC-VO)

- Goals of the Virtual Organization:
  - (i) Facilitate and foster interaction and exchanges among S&CC PIs and their teams, including community partners; and
  - (ii) Enable sharing of artifacts and knowledge generated by S&CC projects with the broader scientific and non-academic communities (e.g., local community stakeholders as described in this solicitation).

- No more than one S&CC-VO proposal will be funded. Funding of up to $250,000 per year for up to three years may be requested.

Joint Research Collaboration with the Japan Science and Technology Agency (JST): Sub-track Within IRG Track 2

- Project must focus on either recovery from COVID-19 and/or future resilience planning related to pandemics or other disasters.

- Examples of specific topic areas:
  - How the proposed research will enable community adjustment to life in the new normal of a post-COVID-19 society.
  - Resilience and emergency management planning for future pandemics.
  - The compound problem of other disasters occurring in the context of a pandemic.

- Proposals must be well integrated across the US and Japanese teams and proposals must be submitted to both NSF and JST.

- The maximum budget is $750K for the US and $750K for the Japanese team.

Additional Proposal Preparation Instructions

- Proposals in all categories must follow the most current version of <mark>Proposal & Award Policies & Procedures Guide (PAPPG; NSF 20-1)</mark> for guidance on the required sections for all proposals submitted to NSF.

- Project Description page lengths: 15 pages for Integrative Research Grants (IRGs) and Virtual Organization (VO); <mark>5 pages</mark> for Planning Grants (PG).

- Proposals can be submitted through NSF FastLane system, Research.gov, or Grants.gov.

- Multi-institution proposals must be submitted by <mark>one lead institution using subawards</mark> for funding all other participating institutions.

- Project Personnel and Partner Institutions are a required supplementary document for all proposal types.

Additional Submission Considerations

- No more than two proposals per PI/co-PI/Senior Personnel/Consultant.

- No restrictions on who may serve as PI.

- No restrictions on the number of proposals per organization.

- Letters of Collaboration are strongly encouraged for all proposal types.

- Think about which institution will lead the submission.

- Start submission preparation early for PIs and institutions who have not previously submitted to NSF; obtaining NSF individual and institution IDs can take several weeks!

All IRG and PG proposals (but not VO) require several additional <mark>labeled</mark> sections within the project description:

	Integrated Research	Community Engagement	Management Plan	Evaluation Plan	Scope and Scale
IRG	Required	Required	Required	Required	Required
PG	Required	Required			

S&CC Project Component: Integrative Research

- Encompasses innovation that addresses combined social and technological aspects of smart and connected communities and pilots solutions together with communities.

- Social Considerations
  - Attitudes, behaviors, and other characteristics of community inhabitants, groups and organizations within the community.
  - Relationships with other communities or the larger environment and institutions.
  - Processes of learning, adaptation, interaction, and collaboration.
  - Economic impacts on the community and future opportunities for growth.

- Technological Considerations
  - Data integration and management.
  - New algorithms and modeling frameworks for understanding and exploiting high volumes of diverse and complex data.
  - Security and privacy.
  - Innovations in the design and engineering of materials, sensors, structures, and systems.

Some examples from the S&CC solicitation specifically calling out education, learning, and workforce development

- Assessment of the role of emerging technologies in enhancing workforce and learning opportunities, such as tools to shape human-technology partnerships; development, adaptation, and/or evaluation of STEM teaching and learning efforts and resources; improvements in career longevity and job satisfaction, workforce capacity, and performance; and facilitation of lifelong learning, including of new skills and perspectives related to smart and connected communities;

- Innovative approaches, infrastructure, and/or STEM educational research that supports a significantly more equitable and inclusive distribution of new technology opportunities and resources;

- Advances in computational science, neuroscience, and psychometrics; theories of the brain, emotion, learning, and societal forces that will advance cyberlearning; distributed intelligence; knowledge-building communities; formal or informal educational environments; knowledge management; and communities of practice for a diverse and innovative workforce.

- Public participation and engagement in data collection, including through crowdsourcing and community science

S&CC Project Component : Community Engagement

- Essential component for both IRG and PG proposals.

- Refers to substantive interaction with individuals, institutions, and other organizations in target communities.

- Investigators and community partners are encouraged to work collaboratively to develop and evaluate creative approaches to achieving meaningful engagement for mutual benefit.

- Participation from both stakeholders who are decision makers and end-users/residents.

- Community members must not solely be subjects of the research.

S&CC Project Component : Management Plan

- Each IRG proposal must contain a Management Plan that describes the specific roles and responsibilities of the collaborating PI, co-PIs, other Senior Personnel, paid consultants, and stakeholder participants.

- It must also describe the expertise of the team to address the technical and social sciences dimensions of the project, and to work with the selected communities.

- The plan must also address how the project will be managed across disciplines, institutions, and community entities, and should identify specific collaboration mechanisms that will enable cross-discipline and cross-sector integration of teams.

- The plan must also describe how tasks will be integrated over the course of the project and provide a timeline with principal tasks and associated interactions.

S&CC Project Component : Evaluation Plan

- The Evaluation Plan should be specific to the IRG proposal's goals and milestones and describe how progress will be iteratively improved and evaluated.

- For example, describe criteria, metrics, and methods for assessing progress and outcomes, appropriate to the proposal.

- Proposals should anticipate providing Institutional Review Boards (IRB)/Institutional Animal Care and Use Committees (IACUC) approvals as appropriate prior to award.

S&CC Project Component : Scope and Scale

- This section should **provide insight into the design of the research activities for the IRG proposal,** specifically addressing:
  - 1) why the research outcomes can be achieved only with the selected scope and scale, and
  - 2) how the proposed activities are commensurate with the proposed budget.

- In designing the appropriate scope and scale for their projects, proposers are strongly encouraged to consider:
  - i) the transferability and scalability of the proposed solutions to other communities, and
  - ii) the population size that will be **directly** affected by **the specific proposed project**.

- Proposers are further encouraged to consider the scope, scale, and associated budget of previous S&CC IRG awards: https://www.nsf.gov/cise/scc/.

Examples of funded S&CC projects within education, learning, and workforce development

SCC STEMports: Community Workforce Development through Augmented Reality STEM Learning Experiences (#1831427)

PI: Byrd, Maine Mathematics and Science Alliance

This Smart and Connected Community (SCC) project will partner with two rural communities to develop STEMports, an innovative Science, Technology, Engineering and Mathematics (STEM) learning game for workforce development. The game's activities will take players on localized Augmented Reality (AR) missions to both engage in STEM learning challenges and discover emerging STEM careers in their community, specifically highlighting innovations in the fields of sustainable agriculture and aquaculture, forest products, and renewable energy. Community Advisory Teams (CATs) and co-design teams, including youth, representatives from the targeted emerging STEM economies, and decision-makers will partner with project staff to co-design STEMports that reflect the interests, cultural contexts, and envisioned STEM industries of the future for each community.

SCC: I4all (Interests for All): A Smart Socio-Technical Infrastructure to Identify, Cultivate, and Sustain Youth STEAM Interests in a Diverse Midsized American City (#1831685)

PI: Pinkard, Northwestern University

This project is a Smart and Connected Communities award. The community is part of Evanston, Illinois and is composed of the lead partners described below:

- EvanSTEM which is a in-school/out of school time (OST) program to improve access and engagement for students in Evanston who have underperformed or been underrepresented in STEM.
- McGaw YMCA which consists of 12,000 families serving 20,000 individuals and supporting technology and makerspace activities (MetaMedia) in a safe community atmosphere.
- Office of Community Education Partnerships (OCEP) at Northwestern University which provides support for the university and community to collaborate on research, teaching, and service initiatives.

This partnership will develop a new approach to learning enagement through the STEAM (Science, Technology, Engineering, Arts, and Mathematics) interests of all young people in Evanston. This project is entitled Interests for All (I4All) and builds upon existing research results of the two Principal Investigators (PIs) and previous partnerships between the lead partners (EvanSTEM and MetaMedia had OCEP as a founding partner). I4All also brings together Evanston school districts, OST prividers, the city, and Evanston's Northwestern University as participants.

SCC-PG: SUNRISE: Using Mobile Games in Rural Tribal Communities to Promote Social and Emotional Resilience in Youth (#1951911)
PI: Vigil-Hayes, Northern Arizona University

Youth living on tribal reservations experience behavioral health disparities at some of the highest rates in the United States due to disparities, including lack of community-based preventative measures, stigmas surrounding mental illness and accessing behavioral health care, and lack of perceived need for behavioral health care. This planning grant seeks to investigate the feasibility of a sociotechnical, community-based behavioral health intervention that integrates, for example, tribal community values, mobile health, and educational gaming. The research will be carried out in partnership with the Hopi Opportunity Youth Initiative (HOYI), an organization that seeks to address the social and emotional needs of youth living on the Hopi Reservation through service learning, mentorship, and community curriculum.

Integrating expertise from computer science, psychology, education, and applied Indigenous studies, this interdisciplinary approach aims to be impactful for many tribal and remote communities that struggle with access to behavioral health care services by making behavioral health education more palatable to youth and accessible to communities that lack robust telecommunications infrastructure.

S&CC Solicitation (21-535): Due Date

Full Proposal Deadline
<mark>February 24, 2021</mark>

*Proposals due by 5 pm submitter's local time

Key Reminder

1. Read the solicitation carefully (NSF 21-535) and visit www.nsf.gov/scc for more information on what has been funded in S&CC.

2. Focus on **socio-technical research** along with a clear concept for piloting activities. <mark>Clearly identify the discoveries to be made!</mark>

3. Deep **community engagement** is critical; community should help to inform the research and activities and not solely be subjects of the research. Additionally, community members (a.k.a. people, not solely institutions) should receive clear impact from the proposed project.

4. Projects concepts/approaches should have aspects that are transferable to other communities, rather than solely point-solutions.

5. Start early with proposal submissions, especially if you individuals or institution who has not previously submitted to NSF!

6. PIs are welcome to send 1-2 page concepts to a relevant program officer. Highly encouraged for EHR-focused projects.

S&CC: Program Contacts

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How is a "community" defined and how many communities are required for partnership?

For the purposes of this solicitation, communities are defined as having geographically-delineated boundaries—such as towns, cities, counties, neighborhoods, community districts, rural areas, and tribal regions—consisting of various populations, with the structure and ability to engage in meaningful ways with proposed research activities.

Proposers must define the community and reflect how the community will engage in meaningful ways with the proposed activities.

Participation of at least one community is required. It is expected that this participation will be undertaken through collaboration with one or more community partners.

What is a community stakeholder, and who might be a community stakeholder for my research?

Community stakeholders are those collaborators who are directly linked to the community.

As described in the solicitation, examples of community stakeholder organizations and anchor institutions may include some or all of the following: residents, neighborhood or community groups, nonprofit or philanthropic organizations, businesses; as well as municipal organizations such as libraries, museums, educational institutions, public works departments, and health and social services agencies.

When must a letter of collaboration be included in the proposal?

For all substantial collaborations and engagements (included or not included in the budget) with partner institutions including communities described in the Project Description, Letters of Collaboration are strongly encouraged. These should be provided in the Supplementary Documents section of the proposal and follow the format instructions specified in the NSF PAPPG(20-1).