Developing a Successful
Smart and Connected Communities
Proposal & Avoiding Common Mistakes

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First, the caveats

- These slides are meant to inspire you and your research team. They are not a recipe for success.

- Panelists review proposals, not program directors.

- Program directors consider a range of factors in final proposal recommendations, including, of course, the reviews and panel discussion.

As a reminder:
S&CC Program Objectives

- Enhance **scientific and engineering knowledge** in ways that improve the quality of life within communities.

- Support **sociotechnical research** that brings together computer and information scientists; engineers; social, behavioral and economic scientists; and learning scientists.

- Support **community engagement** that is directly informed by the needs, challenges, and opportunities of communities.

- Conduct **robust evaluation** of project outcomes.
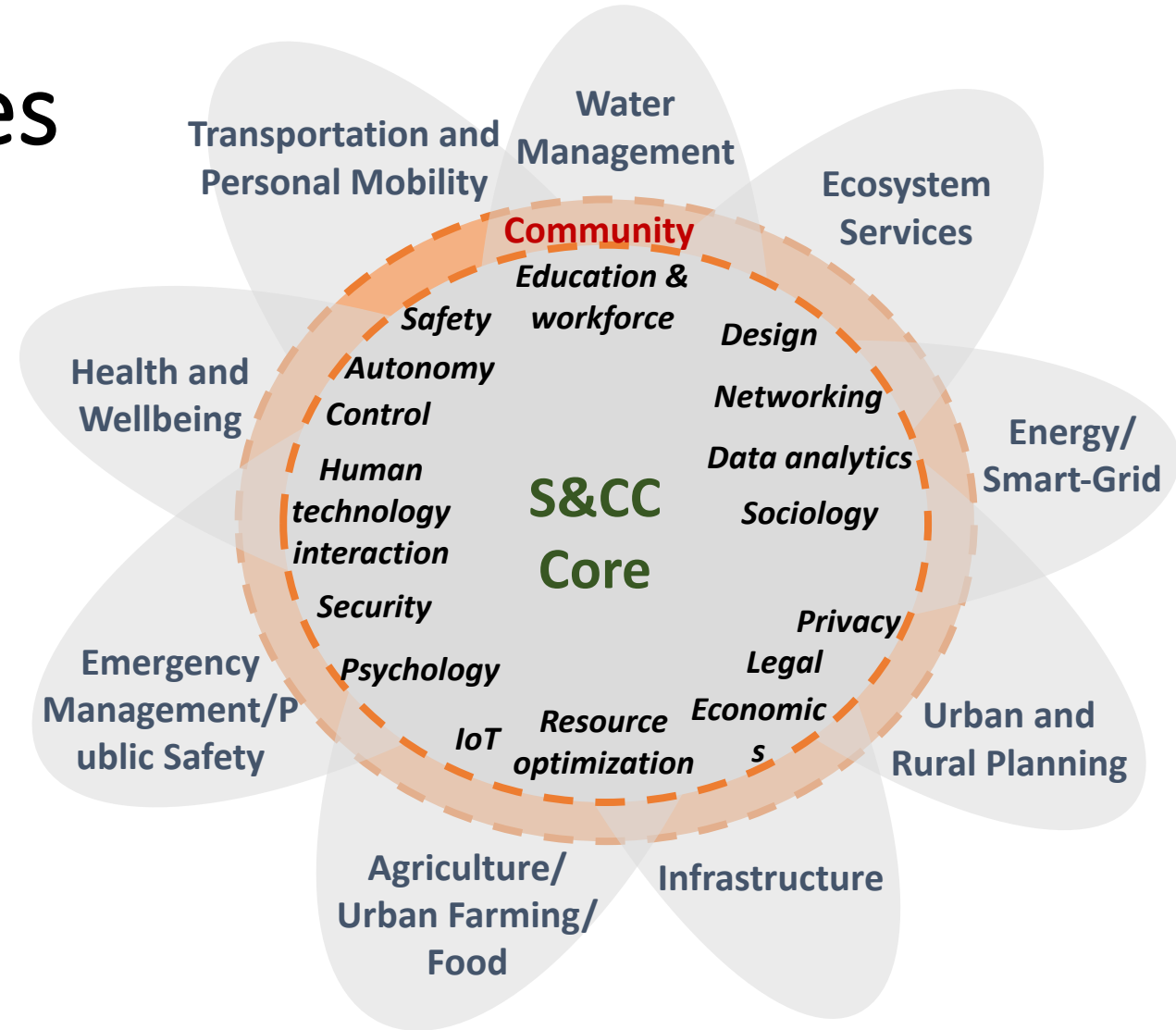
Example Technological and Social Dimensions

Technological Dimensions

- Data integration and management, and computing and network resource management.
- New algorithms and modeling frameworks.
- Systems engineering approaches for integrating cyber, physical, and social concerns.
- Ubiquitous and persistent connectivity.
- Improved cybersecurity and privacy.
- Innovations in integrating materials, sensors, structures, and systems.
- Design of interfaces, controls, and feedback systems.

Social Dimensions

- Improved understanding of institutional and social responses to technological change within communities.
- Processes of learning or collaboration within and across communities.
- Long-term responses of communities to disasters or other existing or predicted adversities.
- Improved methods for measuring and predicting community challenges and opportunities.
- Innovations in the evaluation of community interventions.
- Innovations in community behaviors or social change experiments facilitated by intelligent technologies.

Critical 'Heilmeier' Questions for S&CC Proposals

What is the problem? Why is it hard?

What are the limits of current practice?

What's new in your approach?

What are the risks and the payoffs?

What impact will success have?

Who cares?

How much will it cost?

How long will it take?

How will success be measured?

S&CC Project Description (15-Pages)
- Outline specific social and technological research questions, hypotheses, and research gaps.
- Explain the rationale and breadth of community engagement and how this engagement will be sustained through the duration of the award.
- Describe management of the project and the proposed approach to data collection and evaluation.
- Describe the vision of success for the proposal.

Common Proposal Mistakes

- Imbalance in technology and social science innovations, often tacking on social science as an after thought
- Confuse community engagement for social science
- Research questions not clear
- Starting too late (Q's the day before)
- Missing important deadlines (LOIs)
- Not starting/building relationships over time
- Scale of the impact is mismatched with the budget

- Transferability and sustainability not clear
- Unclear evaluation plan/metrics
- Not using all space/incomplete proposal
- Asking for volunteerism from community
- Not "use inspired"/community inspired research
- Engage community, but not the necessary decision-makers or stakeholders

How do panelists evaluate the proposal?

INTELLECTUAL MERIT

PROPOSAL OBJECTIVES AND APPROACH
[Summarize the proposal briefly in an objective manner.]

[Assess the strengths and weaknesses of the proposal from the intellectual merit perspective. Preface
statements of strengths with "+" and weaknesses with "−".]

Strengths:
+

Weaknesses:
−

BROADER IMPACTS

[Assess strengths and weaknesses. Preface statements of stre
impact encompasses the potential to benefit society and contr
societal outcomes.
]

Strengths:
+

Weaknesses:
−

SOLICITATION-SPECIFIC REVIEW CRITERIA

[How effectively does the proposal address each of the following?]

Integrative research:

Community engagement:

Project management:

Evaluation plan:

SUMMARY STATEMENT

[Provide a short (one- or two-sentence summary of the principal strengths or weaknesses mentioned above that
led to your rating of Excellent, Very Good, Good, Fair, or Poor. e.g., "The principal reasons for my rating
of Excellent are ... ."]

What do panelists see?

Reviewer Template

Program Solicitation

Panel Briefing

…and your proposal…

Some patterns in successful proposals

- Compelling research that required both social science and technical innovation to carry out, as apparent in the Integrative Research section

- The community is well-defined, and the engagement with the community was substantial, with the needed stakeholders as part of the engagement

- Teams had worked together longer than the proposal cycle; contributors to tasks were clear in the Collaboration and Management Plan

- Metrics for success were tied to research activities, and were seen as appropriate for the proposed work

- Budget scale matched the proposed scope of research and community impacts

Smart and Connected Communities (S&CC)

National Science Foundation

Directorate for Computer & Information Science & Engineering
    Division of Computer and Network Systems
    Division of Information & Intelligent Systems
    Division of Computing and Communication Foundations

Directorate for Education & Human Resources
    Research on Learning in Formal and Informal Settings

Directorate for Engineering
    Division of Chemical, Bioengineering, Environmental and Transport Systems
    Division of Civil, Mechanical and Manufacturing Innovation
    Division of Electrical, Communications and Cyber Systems

Directorate for Geosciences

Directorate for Social, Behavioral & Economic Sciences
    Division of Behavioral and Cognitive Sciences
    Division of Social and Economic Sciences

NSF 18-520 (p5)

Integrative Research

Integrative research must address both technological and social dimensions of smart and connected communities, and describe how the dimensions are integrated together. Proposals should engage the multidisciplinary perspectives of scientific areas supported by participating NSF directorates. Integrative research may add following: agriculture, civil infrastructure, disaster mitigation a and wellness including healthcare, resiliency, safety, social s planning, and water resources.

Technological dimensions include but are not limited to the fo resource management; (2) new algorithms and modeling fran complex infrastructure- and community-related data; (3) syst concerns in a large-scale system-of-systems context with mu data collection and instantaneous dissemination of informatio materials, sensors, structures, and systems to support smart

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NSF 18-520 (p6)

Community Engagement

Proposals should clearly identify and define the community and participating community stakeholders, and also describe activities that reflect meaningful community engagement. Such activities should extend beyond a single point of engagement, such as a public hearing prior to the start of the research project or a survey community stakeholders as integral to the research. Investi and evaluate creative approaches to accomplish the goals roles within the proposing team.

Community stakeholders may include some or all of the fol philanthropic organizations, businesses, and municipal org services agencies, and schools. In addition, stakeholder er local, county, and state governments and departments as v

Examples of community engagement activities include but

1. Holding roundtables and community meetings as concerns, and to develop and refine the research;
2. Incorporating communities into processes for iden evaluating outcomes;
3. Providing data, facilities, resources, and expertise

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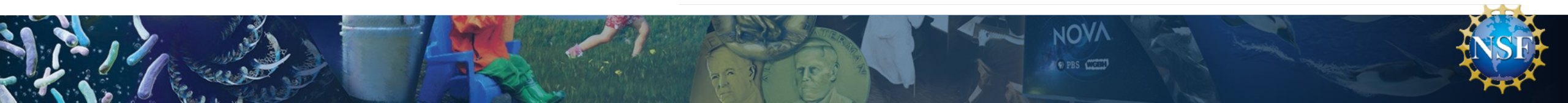
NSF 18-520 (p6)

Management Plan

Researchers from diverse fields are expected to work collaboratively and interdependently, creating shared visions, models, methods, and discoveries. Each proposal must contain a Management Plan that describes how the project will be managed across disciplines, institutions, and community entities. This plan should identify specific collaboration mechanisms that will enable cross-discipline and cross-sector integration of teams, and provide a timeline including principal tasks and associated interactions.

Each proposal must provide a summary of expertise of the te specific roles and responsibilities of the collaborating PI, Co- participants, and describe how tasks will be integrated over t

Evaluation Plan

The Evaluation Plan should be specific to the proposal's goa example, describe criteria, metrics, and methods for assessi employ any of a variety of systematic methods: qualitative ar and/or longitudinal analyses, experiments, or other approach anticipate providing IRB/IACUC approvals as appropriate pri

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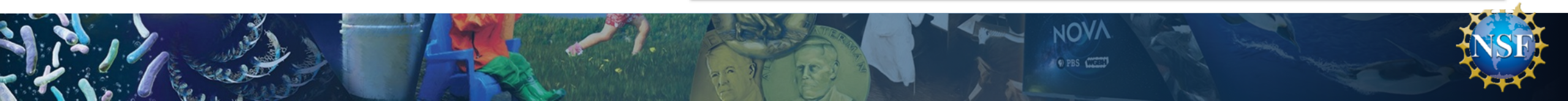
NSF 18-520 (p6)

C. Proposal Category

This S&CC solicitation will support **S&CC Integrative Research Grants (S&CC-IRGs).** Awards will support the conduct of fundamental, integrative research with meaningful community engagement. S&CC-IRG proposals may request total budgets ranging from $750,000 to $3,000,000 for periods of up to four years

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9/9/18   12   Footer

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Project Description:

Project Descriptions are **limited to 15 pages in length**. (Note: proposals may be submitted only if a Letter of Intent for the same topic by the same PI has been submitted by the LOI deadline.)

The Project Description **must include separate sections labeled Integrative Research, Community Engagement, Management Plan, and Evaluation Plan, as described in the Program Description above. Proposals lacking one or more of these sections will be returned without review.** The Project Description must provide details on an integrative research approach and describe how the community engagement components infuse and support the proposed research. Specifically, the Project Description must:

- Outline specific **social and technological research questions**, hypotheses, and research gaps;
- Fully describe the community; and explain the rationale and breadth of community engagement, and how this engagement will be sustained through the duration of the award;
- Describe management of the project, and the proposed approach to data collection and evaluation; and
- Describe the vision of success for the proposal—specifically defining the project goals and the definition of a successful outcome, and how success will be evaluated.

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mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

How effectively does the proposal address integrati

B. Review and Selection Proce

Proposals submitted in response to this program s
Review.

Reviewers will be asked to evaluate proposals usin
additional program specific criteria. A summary rati
reviewer and/or panel. The Program Officer assign
formulate a recommendation.

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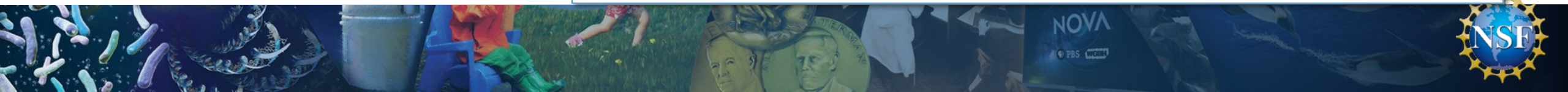
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of Excellent are ... ."]
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What questions can you ask yourself from reading this solicitation?

- What specific social and technological research questions, hypotheses, and research gaps does the proposal address ?

- What are the project's goals? What will success mean?

- What is the community? How will engagement be sustained through the duration of the award? What is the transferability to other communities?

- Are the potential outcomes of this project comparable to the budget proposed? Are these the right activities to carry out the research?

A few final words...

- Ultimately, the goals and approach should meet the criteria laid out in the solicitation, and need to stand above other proposers in Intellectual Merit, Broader Impacts, and solicitation-specific review criteria.
- Portfolio diversity remains a priority for NSF. Be sure to take a look at what has been previously funded.

Visit NSF.gov/scc for a link to previously funded projects.

Other Funding Opportunities

- NSF CRII (17-552) and CAREER (17-537)
- NSF National Robotics Initiative (18-518)
- NSF Cyber-Physical Systems (17-538)
- NSF CISE Core Programs: CNS (18-569), IIS (18-570), CCF (18-568)
- NSF Secure and Trustworthy Cyberspace (18-572)
- NSF Long-Term Ecological Research (17-593)

- Other funders as well, including foundations and non-profits and other Federal agencies.
- Search online for the Smart Cities and Communities Federal Resource Guide for a list of Federal programs.

What to do during the Breakout Session?

- White paper submitters present their idea in 3 minute lightning talk, and other volunteers present lightning talk as interested.

- After each 3 minute lightening talk, 6 minute discussion about each proposal, following the review template:
  - Intellectual Merit, Broader Impacts, Solicitation-Specific Criteria
  - 1 person volunteers as mock scribe to capture the discussion on a review template form for each presenter. Rotate mock scribes between presenters.

- Last 10 minutes, 1 person volunteers to report out.
  - Report on 1-2 strategies discussed in the group which made a project stand out, above and beyond the recurring challenges.

Roles for the Breakout Session

Presenters	Mock Scribes	Other Participants at the Table (Mock Panelists)	Reporter
Present 3 Minute Lightning Talk regarding your idea. Respond to questions/listen to discussion of project: 6 Minutes (9 minutes total)	One person appointed as mock panel scribe to capture the discussion on a Review Template for each presenter (see Mock Panelist). Rotate mock scribes between presenters.	All others discuss Intellectual Merit, Broader Impacts, Solicitation-Specific Criteria (Integrative Research, Community Engagement, Project Management, Evaluation Plan) for each presenter.	Volunteer to report back to the full group, after discussion. Should ask group for 1-2 strategies they heard that helped a project stand out, above and beyond the recurring challenges.

Smart and Connected Communities

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