



Funding Opportunity: NSF Releases Solicitation for National Center for Wireless Spectrum Research (SII-Center)

Lewis-Burke Associates LLC – March 20, 2020

Building on previous investments in spectrum wireless research, the National Science Foundation (NSF) has released a new crosscutting solicitation for the Spectrum Innovation Initiative: National Center for Wireless Spectrum Research (SII). The SII-Center, intended to be funded at up to \$5 million per year over five years, is the first solicitation under the Spectrum Innovation Initiative that was proposed in NSF's fiscal year 2021 budget request. The center will serve as a hub to "develop, innovate and sustain new solutions that enable more efficient use of the electromagnetic spectrum." In addition to conducting sustained spectrum research, the center will also foster scientific collaboration and develop the necessary workforce to ensure US leadership in future wireless technologies, systems, and applications.

Center proposals should demonstrate awareness of ongoing developments in spectrum. In particular, the solicitation highlights the 2019 World Radiocommunications Conference (WRC-19) and numerous Federal Communications Commission activities since 2015. Additionally, proposals should include activities that respond to contemporary questions relevant to spectrum research, innovation, and workforce development. This could include items for study identified for the 2023 World Radiocommunications Conference (WRC-23) and the ongoing activities of the Networking and Information Technology Research and Development Program's Wireless Spectrum Research and Development (WSRD) Interagency Working Group.

Specifically, the SII-Center calls for research in the following areas.

- **“Foundations:** Foundational spectrum research will focus on new methods and tools for interference mitigation, fast and accurate signal and image processing techniques, other communication theoretical approaches, medium-access and network protocols, innovative Machine Learning (ML) and/or Artificial Intelligence (AI) techniques tailored for efficient spectrum access and sharing, protection of passive users, the assessment of cumulative effects of electromagnetic (EM) exposure to humans, and socio-economic models.
- **Hardware:** Materials, devices, circuits, manufacturing, and algorithmic innovations that will be needed for large scale deployments of low-cost pervasive systems and/or sensors including reconfigurable and beam forming antennas, tunable filters, amplifiers etc., better control of undesired emissions, receiver technologies to enable tighter packing of applications, and fast, accurate and low-cost wideband RF sensing with high speed and low latency.
- **Networking; software and data:** This dimension focuses on software for managing the sensing data to allow robust and secure access to spectrum, as well as on developing software-defined wireless and network architectures that enable dynamic programmability across all layers of the network protocol stack. It also will focus on collecting and disseminating appropriately labeled datasets and semantic meta-data to help guide validation and assessment at-scale.

- **Security and privacy:** The spectrum research should address security and privacy considerations, and the tools and techniques for spectrum monitoring and enforcement.
- **Test and measurement:** The proposals should include a detailed plan for validation of theoretical models including new proposed designs or techniques. There currently exists a mismatch between theoretical evaluation and system performance in real-life scenarios, due for example to simplified assumptions in propagation models. The SII-Center should leverage existing theoretical models and experimentation platforms and develop new models and platforms as appropriate.
- **Spectrum Management:** Spectrum management encompasses several aspects, both technical and regulatory. Research in this dimension could address improvement in both areas.
- **Economic and social mechanisms:** Methods for allocating scarce spectrum resources across competing uses. Research in this dimension includes work in mechanism design, and may also address issues in regulatory policies.”

To support these activities, proposals should include plans to engage with and develop partnerships or arrangements with other universities, colleges, or other institutions, such as national laboratories, private sector research laboratories, federal, state and local government laboratories, and international organizations. Proposals will be reviewed based on how well they advance both foundational and use-inspired research through an integrated and collaborative effort, implement training efforts for a future wireless workforce, and pull together a multidisciplinary group of researchers.

The solicitation will accept two types of proposals:

- SII-Center Planning Grant Proposals: a one-year, \$300,000 grant support the development of proposals, NSF intends to award 12 and 15 planning grants during. Researchers are not required to receive a planning grant to submit a full proposal. Additionally, proposers should use planning grants to “develop networking and collaborations among potential partners to conduct research addressing spectrum-related open questions.” These proposals should foster partnerships across academia, industry, government, and non-profits, and clearly describe the organizational structure of the proposed SII-Center.
- SII-Center Proposals: Five-year center proposals that leverage partnerships across a broad array of stakeholders to serve as a national resource “addressing far-reaching spectrum research, innovation, and workforce development challenges.” NSF intends to make one SII-Center award funded at up to \$5 million per year.

Full proposals for the SII-Center program are due between March 1, 2021 and April 1, 2021 with a required letter of intent due on February 1, 2021. To support the development of proposals, NSF intends to award 12 and 15 planning grants. Researchers are not required to receive a planning grant to submit a full proposal.

NSF is planning several other investments as part of the Spectrum Innovation Initiative, including the development of National Radio Dynamic Zones, which can be used for testing of dynamic spectrum utilization techniques with minimal regulatory burden to speed innovation. NSF plans to leverage existing investments such as the Platforms for Advanced Wireless Research (PAWR) and its major facilities as part of the SII.

Due Date: Full proposals for the SII-Center program are due **between March 1, 2021 and April 1, 2021** with a required letter of intent due on February 1, 2021.

SII-Center Planning Grant Proposals are due by **June 12, 2020**.

Eligibility: There is no limit on the number of proposals per organization. However, individuals may be designated as PI, Co-PI on no more than two SII-Center Planning Grant Proposals to this solicitation. Individuals may be designated as PI, Co-PI on no more than one SII-Center proposal to this solicitation. The PI must be a full-time faculty member or staff member at an institution of higher education, or a member of a non-profit, non-academic organization, and have an established record of leading research teams.

Total Funding and Award Size: NSF anticipates availability of \$30 million total funding for the SII-Center program. In FY 2020, NSF intends to award between 12 and 15 planning grants of up to \$300,000. In FY 2021, NSF will award one SII-Center award funded at up to \$5 million per year for five-years, with a possible five-year renewal.

Sources and additional information:

- The full solicitation is available at https://www.nsf.gov/pubs/2020/nsf20557/nsf20557.htm#pgm_intr_txt.
- The program page for the SII-Center program is available at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505788.
- More information on WRC-19 can be found at <https://www.itu.int/en/ITU-R/conferences/wrc/2019/Pages/default.aspx>.
- More information on WRC-23 can be found at <https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-preliminary-studies.aspx>.