



NATIONAL SCIENCE FOUNDATION
2415 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22314

NSF 20-081

Dear Colleague Letter: NSF's Spectrum Innovation Initiative and associated Supplemental Funding Opportunities

May 8, 2020

Dear Colleagues:

With this Dear Colleague Letter (DCL), the National Science Foundation (NSF) announces opportunities that fall under the purview of the Foundation's new ***Spectrum Innovation Initiative*** and **calls attention to opportunities under this initiative for supplemental support to existing NSF-owned and operated facilities, NSF platforms, NSF-supported projects, and NSF educational programs directly related to spectrum innovation as well as support for conferences and workshops.**

SPECTRUM INNOVATION INITIATIVE

Innovation is seen as essential to ensure better utilization of the electromagnetic spectrum and several national-level studies have highlighted the challenges and opportunities therein. For example, the *R&D Priorities for American Leadership in Wireless Communications*¹ produced by the National Science and Technology Council's Wireless Spectrum R&D Interagency Working Group (WSRD) identifies three research and development priorities: (1) Pursue spectrum flexibility and agility to use multiple bands and new waveforms, (2) Improve near real-time spectrum awareness, and (3) Increase spectrum efficiency and effectiveness through secure autonomous spectrum decision making. NSF's ***Spectrum Innovation Initiative***, described in the President's FY 2021 Budget Request for NSF², seeks to make advancements in these three identified priorities, progress in which is critical to United States economic, science, and technology leadership.

The goal of NSF's ***Spectrum Innovation Initiative*** is to promote dynamic and agile utilization of the electromagnetic spectrum, while fostering innovation and security for all users, passive and active. Reaching this goal will require basic research, infrastructure development, new collaborations, and education and workforce development. These efforts are vital to scientific enterprises and the Industries of the Future (IoTF).

NSF's ***Spectrum Innovation Initiative*** covers innovation in the following areas:

- I. **National Radio Dynamic Zones (NRDZ)** - establishing new pilot test ranges and enhancing existing test facilities to allow dynamic spectrum sharing research and development for passive and active users;
- II. **National Center for Wireless Spectrum Research** - connecting spectrum researchers with the nationwide challenges and growing the spectrum workforce in support of the IoT;
- III. **Spectrum Research Integrative Activities** - promoting and developing the means for increased and more effective use of the spectrum for passive and active applications, especially activities of a cross-disciplinary nature;
- IV. **Education and Workforce Development** - increasing awareness and participation among the public and encouraging the development of a skilled and diverse workforce through education and training programs.

KEY THRUSTS

I. ***National Radio Dynamic Zone (NRDZ)***

To facilitate the ongoing research and development of enhanced, next-generation spectrum management and to promote the nation's leadership in the efficient use of the electromagnetic spectrum, NSF intends to support the development and establishment of NRDZ³ test beds in a few geographic areas. Through the Spectrum Innovation Initiative, the NSF NRDZ effort intends to foster the testing and implementation of state-of-the-art wireless and spectrum-use technologies through the use of national test beds.

NRDZ test beds will foster innovation utilizing a new paradigm for testing dynamic sharing of electromagnetic transmitters and receivers to pilot this innovation. NRDZ test beds should build and expand upon experience with existing national quiet zones, innovation zones, and coordination zones, for example the National Radio Quiet Zone⁴, Table Mountain, the Puerto Rican Coordination Zone, and the NSF-funded Platforms for Advanced Wireless Research (PAWR) in Salt Lake City, New York City (both designated as FCC Innovation Zones⁵), and Raleigh, NC.

II. ***National Center for Wireless Spectrum Research (SII-Center)***

The goal of this Center, for which proposals are solicited in [NSF 20-557](#), is to go beyond fifth-generation ('5G') wireless networks, the Internet of Things, and other existing or forthcoming systems and technologies. The Center would help chart out a trajectory to ensure United States leadership in future wireless technologies, systems, and applications in science and engineering through the efficient use and sharing of the radio spectrum

III. *Spectrum Research Integrative Activities*

NSF has a rich array of ongoing programs, including SWIFT⁶, PAWR⁷, and divisional core programs, intended to promote research and development on spectrum-related matters. NSF will continue to support a suite of research activities, including opportunities with a special focus on cross-disciplinary efforts.

IV. *Education and Workforce Development*

A key facet of the Spectrum Innovation Initiative is the emphasis on education and workforce development, to enable the creation of a technical workforce that is aware of the technology and policy issues around wireless spectrum use and is skilled in the development and use of wireless technology.

SUPPLEMENTAL FUNDING OPPORTUNITIES:

National Radio Dynamic Zone (NRDZ)

NSF offers opportunities for existing awardees of facilities and/or platforms owned/operated/funded by NSF to request supplementary funds that will enable research related to the establishment of future NRDZ testbeds (see Dear Colleague Letter: Supplemental Funding Opportunity to explore feasibility of National Radio Dynamic Zones; [NSF 20-079](#)).

Spectrum Use and Needs for Research Activities

NSF recognizes that a detailed understanding of spectrum usage and potential interference issues may be essential to ensuring successful research outcomes. With this DCL, NSF expresses its interest to accept supplemental funding requests related to evaluation of spectrum use and needs that are critical to research activities in NSF-funded awards, including those at NSF-funded facilities, platforms, and research and infrastructure programs (including through the NSF Office of Polar Programs). Evaluations can include measurement studies of spectrum availability and activity across different spectral bands of interest. Proposers should describe in the request why such evaluations are critical to their research outcomes which will be otherwise hampered without this information. PIs requesting these supplements should commit to making these measurement datasets available to the spectrum research community in a timely manner.

Prior to submitting a supplemental funding request, proposers are required to email the SII program team at sii@nsf.gov with a one paragraph summary of the request and a notification of which award they will be requesting a supplement. The SII program team will subsequently invite the supplemental funding request submission.

Education and Workforce Development

NSF will accept supplemental funding requests to active education and workforce development program awards to add additional components that emphasize a broad knowledge of wireless spectrum domain. Supplemental funding proposals on workforce development are especially encouraged which leverage existing successful programs, partnerships with the ongoing educational efforts in spectrum of academic institutions, other federal agencies (e.g., NASA's Spectrum Awareness Education program⁸), non-profits, or industry. Furthermore, supplemental funding proposals are encouraged which broaden participation in Science, Technology, Engineering and Mathematics (STEM) through engagement with wireless technologies and spectrum management education and workforce development programs. This DCL also encourages proposers to leverage the Research Experiences for Undergraduates (REU): Sites and Supplements program that allows for supplemental funding requests to existing NSF awards to fund undergraduate research experiences.

Prior to submitting a supplemental funding request, proposers are required to email the SII program team at sii@nsf.gov with a one paragraph summary of the request and a notification of which award they will be requesting a supplement. The SII program team will subsequently invite the supplemental funding submission.

Conferences

NSF expresses its interest in proposals for the support of conferences and workshops to convene researchers around relevant spectrum research topics. Such workshops are typically identified as conferences in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) and will hereafter be referred to as conferences.

Conferences should be designed to facilitate the dissemination of information relevant to the scientific community, as well as solicit feedback from that community designed to inform further research activities.

SUBMISSION GUIDELINES:

Supplemental Funding Requests:

Guidance on the preparation and submission of supplemental funding requests is contained in PAPPG Chapter VI.E.4. Requests should be submitted using the "Supplemental Funding Request" function in FastLane and should include a brief description of the proposed activity, a budget and a budget justification. Requests must demonstrate how the proposed activity addresses goals of the ***Spectrum Innovation Initiative***, as noted in this DCL. If data are being collected, the request should address how any standards for requirements related to spectrum monitoring will be followed⁹. If the total supplemental funding for a project received

over the lifetime of the project exceeds 20% of the original award amount, including the proposed request, then the proposer is asked to bring this to the attention of the cognizant program officer prior to submitting the supplemental funding request. More details, including frequently-asked questions, will be made available on the [Spectrum Innovation Initiative](#) program page.

Proposals for Conferences:

Guidance on the preparation and submission of Conference Proposals is contained PAPPG Chapter II.E.7. Conference proposals must be submitted via FastLane or Grants.gov. The cognizant program officers listed below should be contacted by email to sii@nsf.gov prior to submission for further guidance.

This initiative is being supported by:

- Directorate for Biological Sciences, Division of Biological Infrastructure (BIO/DBI)
- Directorate for Computer and Information Science and Engineering, Division of Computer and Network Systems (CISE/CNS)
- Directorate for Engineering, Division of Electrical, Communications & Cyber Systems (ENG/ECCS)
- Directorate for Geosciences, Division of Atmospheric and Geospace Sciences (GEO/AGS)
- Directorate for Geosciences, Office of Polar Programs (GEO/OPP)
- Directorate for Mathematical and Physical Sciences, Division of Astronomical Sciences (MPS/AST)
- Directorate for Education and Human Resources (EHR)
- Directorate for Social, Behavioral and Economic Sciences (SBE)

This DCL will expire on July 1, 2021.

Cognizant Program Officers:

Please note that the following information is current at the time of publishing. See [the Spectrum Innovation Initiative website](#) for any updates to the points of contact. To contact any of the program officers listed below on matters relating to this solicitation, it is highly preferable to send an email to the **Spectrum Innovation Initiative Program Team** at sii@nsf.gov. This will ensure consistent and quick responses to your queries.

- Robert D. Fleischmann (BIO/DBI) (703) 292-7191
- Alexander Sprintson (CISE/CNS) (703) 292-2170
- Li Yang (EHR/DGE) (703) 292-2677
- Mohammad Ali (ENG/ECCS) (703) 292-4632
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Sincerely,

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REFERENCES:

[1] <https://www.whitehouse.gov/wp-content/uploads/2019/05/Research-and-Development-Priorities-for-American-Leadership-in-Wireless-Communications-Report-May-2019.pdf>

[2] <https://www.nsf.gov/about/budget/fy2021/pdf/fy2021budget.pdf>

[3] See Spectrum Innovation Initiative program page for more details:
https://nsf.gov/mps/oma/spectrum_innovation_initiative.jsp

[4] <https://greenbankobservatory.org/about/national-radio-quiet-zone/>

[5] <https://www.fcc.gov/document/fcc-establishes-first-two-innovation-zones>

[6] Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT); see [NSF 20-537](#).

[7] Platforms for Advanced Wireless Research (PAWR); see [NSF 16-585](#).

[8] <https://www.nasa.gov/directorates/heo/scan/spectrum/spears>

[9] For example, <https://nvlpubs.nist.gov/nistpubs/ir/2015/NIST.IR.8053.pdf>