

Funding Opportunity: NSF and USDA/NIFA Release Dear Colleague Letter for Research at the Intersection of Agricultural Science, Informatics, and Smart Communities

Lewis-Burke Associates LLC – March 27, 2019

Recently, the National Science Foundation (NSF) and the U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA/NIFA) released a dear colleague letter (DCL) expressing their intention to jointly fund "convergent research that combines methods in agricultural, biological, and computer and information science and engineering to address pressing challenges and opportunities in digital agriculture." The DCL steers proposals toward three solicitations and seeks to advance research at the nexus of agricultural science, informatics, and smart communities. These three solicitations align with NSF's Harnessing the Data Revolution Big Idea, aiming to prepare for large-scale investments at the intersection of computational, agricultural, and biological sciences.

This DCL seeks out projects with applications for economically important plants, animals, and their environments and the ability to transfer findings to or use findings to inform research in other agricultural application areas. The leveraging of data-science in agriculture is consistent with NSF's continued emphasis on convergence as well as the broader agricultural research communities drive toward transdisciplinary research. This also builds on NSF and NIFA's history of collaboration including the Innovations at the Nexus of Food, Energy and Water Systems (INFEWS) program or the ongoing Plant Biotic Interactions (PBI) program.

Specific topics of interest for these projects include:

- "New methods for analyzing existing large datasets, such as artificial intelligence (AI), machine learning, and computer vision;
- Models for genetic x environment x management x socioeconomic interactions (G x E x M x S) to predict livestock, aquaculture, and plant phenotype outcomes, such as yield, environmental stressor resistance, pest and drought resistance, etc.;
- Data storage, management, and integration across a range of data to enable a systems-level approach, including real-time systems;
- Wired and wireless networking challenges in rural settings;
- Security, privacy, and management for access and sharing of farm and community data; and
- Learning science innovations, which may include development of computational skills for biological and agricultural science majors, and communities of agricultural practice for a diverse and innovative future workforce."

Proposals may also pursue the development of curriculum or "workforce development pathways" with the intent not only to expose students to cross-disciplinary approaches to agriculture and computer science but also to "improve retention and capabilities of a region's agricultural workforce."

Per the DCL, relevant proposals can be submitted to one of three programs:

Cyber-Physical Systems (CPS)

The CPS program solicitation seeks proposals that will develop the core research needed to engineer complex CPS. Core research areas of the program include control, data analytics, autonomy, design,

information management, internet of things (IoT), mixed initiatives including human-in- or on-the-loop, networking, privacy, real-time systems, safety, security, and verification. Note that in a February DCL, NSF announced that for FY 2019 only it would be increasing its investment in CPS.

Information and Intelligent Systems (IIS) - Information Integration and Informatics (III) program

One of three programs funded under the IIS core programs, Information, Integration and Informatics (III) supports research “to realize the full transformative potential of data, information, and knowledge in this increasingly digital and interconnected world.” III applications should focus on contemporary applications of societal importance through advances in information integration and informatics, including the full knowledge lifecycle.

Smart and Connected Communities (S&CC)

This program supports integrative research that addresses fundamental technological and social science dimensions of smart and connected communities. These communities are defined as having geographically delineated boundaries – such as towns, cities, counties, neighborhoods, community districts, rural areas, and tribal regions – with the structure and ability to engage in meaningful ways with proposed research activities. This research supports taking the integration of technology into the natural and built environment and is encouraged to include a demonstration or pilot activities that are designed and carried out with one or more communities. Note that in the aforementioned February DCL, NSF indicated its interest in increasing its investment in S&CC next year.

All submissions under this DCL should include the prefix “DATAg” following the title prefixes required in each solicitation, where appropriate. Additional instructions are available in the DCL and in the relevant program solicitations.

Award Size: The size of awards for these funding opportunities vary by solicitation and application:

- CPS program applications have three levels: Small (\$500,000 over up to three years), Medium (\$500,000 to \$1.2 million over up to three years), and Frontier (\$1.2 to \$7 million over four to five years);
- IIS-III program applications have three levels: Small (\$500,000 over up to three years), Medium (\$500,000 to \$1.2 million over up to four years), and Large (\$1.2 to \$3 million over up to five years); and
- S&CC program applications have two categories:
 - S&CC Integrative Research Grants with two tracks: Track 1 (for budgets greater than \$1.5 million with no recommended budget limit, and for up to four years of support) and Track 2 (budgets not to exceed \$1,500,000, and for up to three years of support).

Eligibility: These programs are open to institutions of higher education, non-profit, and non-academic organizations—Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Due Date: The due dates for these funding opportunities vary by solicitation:

- For the CPS program, full Small and Medium proposals are due between **April 1 and April 12, 2019**. Frontier applications are due between **September 12 and September 26, 2019**;

- For the IIS program, full Small proposals are due between **October 31 and November 14, 2019**. Full Medium proposals are due between **September 9 and September 16, 2019**. Full Large proposals are due between **September 18 and September 25, 2019**.
- For S&CC program applications, required letters of intent are due by **August 6, 2019**. Full proposals are due by **September 6, 2019**.

Sources and Additional Information:

- The full Dear Colleague letter can be found at https://www.nsf.gov/pubs/2019/nsf19051/nsf19051.jsp?WT.mc_id=USNSF_25&WT.mc_ev=click.
- The Cyber Physical Systems (CPS) program page can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503286.
- The Information and Intelligent Systems (IIS) - Information Integration and Informatics (III) program page can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503303&org=NSF.
- The IIS solicitation can be found at <https://www.nsf.gov/pubs/2018/nsf18570/nsf18570.pdf>.
- The Smart and Connected Communities (S&CC) program page can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505364.
- The Plant Biotic Interactions (PBI) program page can be found at <https://nifa.usda.gov/funding-opportunity/nsf-nifa-plant-biotic-interactions-program-pbi>.
- The Innovations at the Nexus of Food, Energy and Water Systems (INFEWS) program page can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505241.
- The February 15 DCL on Revisions to CPS and S&CC can be found at <https://www.nsf.gov/pubs/2019/nsf19040/nsf19040.jsp>.