



Funding Opportunity: NSF Releases Joint Machine Learning for Wireless Networking System Opportunity with Intel

Lewis-Burke Associates, LLC – August 5, 2019

On July 30, the National Science Foundation (NSF) released a solicitation for a new NSF/Intel Partnership on Machine Learning for Wireless Networking Systems program. This program aims to explore Machine Learning (ML) as a potential tool to manage growing and increasingly complex wireless deployments by funding collaborative research into wireless-specific ML techniques that can solve identified, realistic problems and demonstrate improvements on existing model-based approaches to designing the wireless stack. Projects under this program should move towards the goal of creating a next-generation wireless system and architecture design that can “dynamically access shared spectrum, efficiently operate with limited radio and network resources, and scale to address the diverse and stringent quality-of-service requirements of future wireless applications.”

The solicitation lays out three Research Vectors (RV), of which proposals may address one or more:

- **RV1: ML for Wireless Networks** – will fund new ML solutions enabling “large scale, multi-radio, ultra-dense wireless networks.” This RV lays out example topics within four broad areas:
 - Physical (PHY) Layer
 - Medium Access Control (MAC)/Network Layer
 - End-to-end (E2E) Applications
 - Network Analytics and Management
- **RV2: ML for Spectrum Management** – This RV aims to build on efforts at the Defense Advanced Research Projects Agency (DARPA) in secure access, dynamic access and monitoring, and other spectrum sharing issues. Listed example topics are:
 - ML-based Spectrum Monitoring and Analysis
 - Real-time ML Tools for RF Spectrum Sensing and Channel Characterization
 - Learning-enabled Improved Coexistence
 - ML-based Dynamic Protocol Selection
- **RV3: Distributed ML over Wireless Edge Networks** – This RV aims to create an integrated ML and wireless networking framework that can address limitations of ML techniques ability to operate with incomplete or untimely data exchanges, as well as explore various distributed learning models. Listed example topics include:
 - Exploiting Redundancies in Computation and Communication
 - Adaptive Computing
 - Resource Management for Distributed ML
 - ML-driven Collaborative Learning Models
 - Real-Time Learning and Decision Making

The solicitation also addresses the underlying need to create curated data sets and interfaces/tools for accelerated research in ML for wireless networks. Specifically, the solicitation calls for datasets comprising:

- “parameters pertaining to large-scale, multi-radio, ultra-dense wireless networks;
- RF signals; and/or
- relevant computation traces of federated, collaborative, and decentralized learning algorithms that can be used for benchmarking and developing future algorithms for emerging applications.”

Of note, Intel and NSF will each conduct their own proposal reviews after which a joint NSF and Intel Working Group will recommend proposals for award.

Eligibility: While there is no restriction on who may serve as a PI or the number of submissions an institution may submit, an individual can appear as a PI or Co-PI on no more than one proposal. Proposals may only be submitted by Institutions of Higher Education (IHEs).

Due Date: Full proposals are due October 29, 2019.

Total Funding and Award Size: NSF anticipates 10 to 15 awards will be made, each between \$300,000 and \$1,500,000 total for a period of up to three years. Total funding for the program is anticipated to be \$9,000,000.

Sources and Additional Information:

- The full solicitation can be found at <https://www.nsf.gov/pubs/2019/nsf19591/nsf19591.htm>.
- The program page can be found at https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505687.