

HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM

RESEARCH PROJECT #: HPCMP-FIX-24-014-F

Intra-Global Resilient Battle-space Power Distribution Optimizations for Energy Web Dominance

About AFIT:

The US Air Force Institute of Technology (AFIT) confers accredited graduate and PhD degrees to military and civilian professionals and yields outstanding technical leaders by providing superior education built on defense- and dual-use civilian-focused research. AFIT's cutting edge, applied education and consulting services support DoD and other US Government Agency needs while molding individuals capable of anticipating and providing solutions to requirements and adapting to any contingency or crisis.

RESEARCH LOCATION: Wright-Patterson AFB, OH

PROJECT DESCRIPTION:

Carrying forward prior-year High End Computing (HEC)-enabled analyses, the faculty intern will advance intra- and inter-theater wireless, speed of light, directed energy power transmission performance assessments of great utility to the emergent Defense Advanced Research Projects Agency's Persistent Optical Wireless Energy Relay (POWER) and Tactical RF Energy eXperiments (T-REX) programs, future force projection, and emergency response capabilities. Guided by the mentor, the faculty intern becomes an integral member of a cross-agency team using HEC resources, National Oceanic and Atmospheric Administration weather prediction models, and the DoD Laser Environmental Effects Definition and Reference and High Energy Laser End to End Operational Simulation models to optimize urban, regional, and global wireless power transmission architectures.

CDE's overarching HIP project goals seek to: a) guide the faculty intern to become proficient on use of HEC assets for advanced, worldwide meteorological data arrays and forecasted DE performance analyses based on real-world weather to support power beaming mission planning; and b) foster the faculty intern professional growth by introducing them to DoD science, engineering, and technology transition. The scoped FIX effort includes a DE laser and RF beaming mission planning concept demonstration based on regional/worldwide 4D Weather Cubes, capturing the impact of realistic atmospheric conditions, including clouds/precipitation, on said energy web concepts. The plan includes substantial orientation of the faculty intern on multi-spectral atmospheric propagation, radiative transfer, and performance simulation tools for DE system assessments.

ANTICIPATED START DATE:

May 2024 – Exact start dates will be determined at the time of selection and in coordination with the selected candidate.

QUALIFICATIONS:

The ideal candidate must be full-time faculty member from an accredited U.S. pre-college, college, or university in Computer Sciences. Adjunct and visiting faculty is ineligible.

Being familiar with MATLAB and Linux are also preferred to maximize the impacts of the program for both the participant and mentor-guided project.

ACADEMIC LEVEL:

- Doctoral

DISCIPLINE NEEDED:

- Computer, Information, and Data Sciences
- Science and Engineering related