

Background

The National Renewable Energy Laboratory (NREL) Cybersecurity Center (CRC) research seeks to address today's most critical energy security challenges—like the exponential increase in grid-connected devices, split incentives for robust cyber defense, and control of the technology supply chains that directly impact grid services.

Whether the research involves cyber threat emulation, novel security technology for complex energy systems, site risk analysis, or the development of new cyber-inclusive standards for renewables, NREL researchers are working at the leading edge of cybersecurity for clean energy technologies and highly distributed energy systems.

Project Description

This project aims to extend NREL's Next Generation Cyber Range capabilities by adding the ability to virtually emulate wireless local area networks (WLANs). NREL uses the tools [minimega](#) and [phenix](#) to rapidly define and deploy large scale emulations of energy systems. However, to study next generation energy systems, the ability to model wireless networks is required. In order to do this, students will combine open-source software defined networks like [mininet](#) with the existing emulation tool phenix. The result will be a highly configurable and rapidly deployable tool that allows NREL researchers to study next-generation energy systems and potential attacks against renewable energy resources.

Desired Skillset

A background in any of the following topics would be helpful but is not required: virtualization / containerization, networking, 802.11 / Wi-Fi, software defined networking

Team Size

Teams of 2-5 students can be accommodated, with the size of the effort scaled to meet the size of the team.

Internship

Internships are available at the conclusion of the project if students and NREL are both interested in continued collaboration.

Work Location

All work will be remote. Students will meet with NREL researchers via teleconferencing software like Microsoft Teams. An optional visit to the NREL lab is available but not required.

NDA

N/A



CSM CS370 FA24
NREL 2
Wireless Network Emulation

The results will be released under GPLv3.0.

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