

Software Defined Radio Framework for Cybersecurity and Information Assurance Education

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<https://research.coe.drexel.edu/ece/dwsl/research/#radiowars>



Challenge:

- Trade-off of more devices connected wirelessly over the air is increased risk to malicious groups specifically from wireless penetration technologies and cyberattacks.
- The pervasive use of wireless networks has created a demand for students who are trained to include security in the design constraints of new systems, not as an afterthought.

Scientific Impact:

- Drexel Grid Software-Defined Radio (SDR) Testbed utilized for Radio Wars offers a unified experimental framework to rapidly prototype and evaluate diverse systems.
- Develop an educational suite that uses our SDR testbed for undergraduate coursework teaching the fundamentals of analog and digital communication.

Solution:

- Two new classes are offered to use SDR to teach concepts ranging from basic analog and digital communication to a full-stack packet radio. Further exploration of wireless networking topics such as cybersecurity, cognitive radio, smart cities, and the Internet of Things are also included.
- visualizations are under continuing development for both desktop and augmented reality views. These visualizations will be used to demonstrate radio concepts to enhance the educational impact of the SDR testbed.

Broader Impact on Society:

The project is training students towards cybersecurity. It is expected that the project can create a positive impact in the cybersecurity workforce development and provide an increased number of undergraduates interested in this field, which could help improve the shortage of cybersecurity professionals in the nation.

Broader Impact (Education):

The two new classes, Wireless Network Security and Software Defined Radio Laboratory are expected to have an impact in cybersecurity and wireless communication education. We believe that by engaging students more and providing them with hand-on learning opportunities, there will be an increased interested in STEM fields.

Broader Impact (Quantified):

The project has involved more than 50 undergraduate and master students, 4 undergraduate student researchers, multiple PhD students, and 1 post-doctoral researcher,

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<https://wireless.ece.drexel.edu>

