Fully Funded PhD Positions in Machine Learning/AI for RF/Microwave Communication and Radars
Villanova University

Job Title	Fully Funded PhD Positions in Machine Learning/AI for RF/Microwave Communication and Radars
Department	Electrical and Computer Engineering
Institution	Villanova University Villanova, Pennsylvania
Date Posted	May 16, 2024
Application Deadline	Open Until Filled
Position Start Date	Available Immediately
Job Categories	Graduate Student
Academic Field(s)	Engineering Physics Engineering Mechanics Electrical and/or Electronics Computer Engineering Computer Science
Apply By Email	

Job Description

The innovative and growing radio frequency (RF) and Microwave group at Villanova University is looking for an initiative-taking, enthusiastic researcher in machine learning (ML) and artificial intelligence (AI) algorithms for RF and microwave communication and radars. The positions are offered to start in Fall 2024/Spring 2025 and includes fully paid tuition and a competitive salary.

Villanova University is a research-intensive University located in Villanova, Pennsylvania, just 12 miles west of Philadelphia. A dynamic national institution—classified as a Doctoral University by the Carnegie Foundation and ranked among the top 50 by U.S. News & World Report. Villanova's Department of Electrical and Computer Engineering is one of the most respected engineering

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programs in the country. Our commitment to our values is evident in our excellent faculty and staff, innovative academic programs, cutting-edge research, and extensive service opportunities, which aim to leave a positive impact on the world.

Project: With the ever-increasing need for high data rates and spectral efficiencies on a wide variety of devices, RF/microwave transmitters and receivers need to be able to accommodate wide signal bandwidths and high reconfigurability while maintaining the highest energy efficiency possible. The recent advancements of machine learning/AI algorithms, typically implemented in the digital baseband of a communication/radar system can be applied, but not limited to the following research areas:

- Improve linearity, efficiency, and resilience of a communication and radar systems by means of ML/AI digital pre-distortion (DPD) and equalization algorithms.
- Use of ML/AI algorithms to create a self-reconfigurable RF hardware system capable of operating and adapting in a harsh environment.
- Fingerprinting of RF/microwave transmitters by observing and classifying hardware impairments such as noise, compression, distortion, etc.
- Implement deep learning algorithms on RF system-on-chips (RFSoCs) and FPGAs for transmitter linearity enhancement and real-time detection of rogue nodes.
- Use of ML/AI algorithms with wideband receivers (e.g. based on RFSoCs or software-defined radios, SDR) to rapidly classify multiple nodes to build a spectrum awareness.
- Implement ML/AI algorithms to aid nonlinear devices and circuits modelling, experimental characterization, and simulation in RF and microwave software.

Profile:

- You have a master’s degree in electrical, electronic, or computer engineering, or another master’s degree that provides significant knowledge in signal processing, analog/RF electronics, and programming.
- You are a precise, creative, and initiative-taking individual.
- You have excellent English proficiency (both oral and written).
- You can work on your own and be able to work within a team.

Offer:

- Fully funded PhD tuition with a competitive salary, fee and health insurance.
- Support to obtain the necessary visa required to study in the United States, if needed.
- An experienced, enthusiastic, and supportive supervision team that will provide you an excellent environment to further your education.

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- Access to top of the class research facilities, travel budget for conferences, a competitive salary with benefits (holidays, health insurance, transport costs, etc.).

How to apply:

We look forward to receiving your application with the following documents:

- Comprehensive CV.
- Your bachelor's and master's degree transcripts.
- Electronic copies of the bachelor's and master's thesis and/or your publications (if available).

To apply, please send the requested documents to Prof. Tommaso Cappello
tommaso.cappello@villanova.edu

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

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