VILLANOVA UNIVERSITY
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DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING (ECE)

# Fully Funded PhD Positions in RF/Microwave Power Amplifiers and Linearization Technologies

Advisor: Dr. Tommaso Cappello

The innovative and growing radio frequency (RF) and Microwave group at Villanova University is looking for an initiative-taking, enthusiastic researcher, with a passion for experimentally driven research in RF and microwave Power Amplifiers and Linearization Technologies. The position is 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 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 to cope with the scarcity of the available spectrum, power amplifiers (PA) in RF/microwave front ends need to be able to accommodate wider and wider signal bandwidths while maintaining the highest efficiency possible. In the last years, high-efficiency and non-linear PAs have been heavily researched, resulting in higher and higher DC-to-RF efficiencies, with pre-distortion linearization techniques recovering the linearity. Depending on the PA carrier frequency, digital or analog pre-distortion (DPD and APD) linearization techniques are used to allow the use of the PA deeper in compression and so with higher power efficiency.

This project aims to develop novel DPD algorithms and/or APD circuits to improve the linearity and efficiency of wide-band (>1GHz) PAs. To this aim, the RF/microwave lab at Villanova University is fully equipped to support your research: a top-end 4-port 26.5GHz Keysight PNA-X, a 5GHz bandwidth Xilinx RF System on Chip (RFSoC), a vector signal generator and analyser, and a high-frequency circuit manufacturing equipment for rapid prototyping of your circuits.

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**Profile**:

- You have a master's degree in electrical, electronic, or computer engineering, or another master's degree that provides significant knowledge in analog/RF electronics, signal processing, 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 12-month 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.
- 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