PhD position in learning for smart grid optimization at Virginia Tech

The Power & Energy Center (PEC) at the Electrical and Computer Engineering Department at Virginia Tech (VT) invites applications for a fully funded PhD student position lying at the intersection of machine learning and smart grids. Computational tasks such as coordinating rooftop photovoltaics, electric vehicles, batteries, or temperature and lighting controls in smart buildings, entail large-scale optimization problems over complex cyber-physical systems with possibly incomplete models and limited communication. Learning from historical datasets and carrying computations offline rather than real time has been suggested as a promising solution. Contrary to the generic learning paradigm however, the data involved in the aforesaid smart grid tasks feature rich structures as they oftentimes constitute the outputs of an optimization problem driven by uncertain inputs and partially known parameters. Leveraging such unique features, the research to be pursued aims at data-driven and physics-aware algorithmic solutions for the effective integration of renewables and smart grid technologies. This position is supported by research grants from the US National Science Foundation (NSF).

Contact

This PhD position is available in the laboratory directed by Dr. Vassilis Kekatos, Associate Professor at PEC. For more information, please contact kekatos@vt.edu.

Application

Please submit your online application by **September 1, 2021** to be admitted in Spring 2022. Visit https://ece.vt.edu/grad/phdadmissions for more details on the application process and the required qualifications.

Dr. Kekatos's research group

Our group currently consists of four PhD and two MSc students working together on 4 research awards granted by the NSF and one by Next Era Analytics. We also collaborate with researchers within VT and other universities (UT Austin, Cornell University, Un. of Minnesota) and national labs, such as the National Renewable Energy Lab (NREL) and the Los Alamos National Lab (LANL). Our students have interned over summers at NREL, LANL, and Dominion Energy. Our alumni have achieved research positions at NREL, Siemens, and the UMN.

Power & Energy Center (PEC) at VT

PEC has a long tradition of global leadership in power systems research. In recent decades, PEC researchers made a great impact on power engineering worldwide through the development of phasor measurement units (PMUs) and computer relaying. With aggressive hiring over the last five years, PEC currently counts 10 faculty members and 40 graduate students conducting cutting-edge collaborative research supported by the US NSF, the US Department of Energy, national laboratories, and a consortium of industry partners including Dominion Energy, American Electric Power, ABB, Mitsubishi Electric, and Siemens. PEC further offers a comprehensive power systems curriculum with more than 14 courses at the undergraduate and graduate level.

ECE Department at VT

Over the last seven years, the Electrical and Computer Engineering (ECE) at Virginia Tech has grown in size and hosts more than 80 tenured and tenure-track faculty members; 1,400 undergraduate students; and 600 PhD and MSc students. It has also been achieving top academic rankings: #12 globally and #9 nationally according to Shanghai Rankings, and recently got promoted to #16 by the US News & World Report System. According to the US NSF report on total research NSF expenditures per institution, Virginia Tech ranks 7th. Among other points of pride, the ECE department hosts 31 IEEE Fellows, 5 members in the National Academy of Engineering, 24 NSF CAREER awardees and 7 Young Investigator awards by the Department of Defense. Our department offers high-quality research and education programs in areas complementary to the advertised position, including power electronics, wireless communications and cyber-physical systems, optimization, and machine learning.

Location, location, location

Our ECE department is sited at two campuses: one in Blacksburg, Virginia, and a second one in the Greater Washington, DC metro area. We are particularly excited that the construction of our new **Innovation Campus** in Alexandria, Virginia (30-min drive from the White House) will be completed by 2022. This campus will be co-hosting Virginia Tech and Headquarter #2 of Amazon. VT will have more than 40 faculty with a primary focus on research areas such as smart cities and infrastructures, quantum computing, machine learning, and cyber-security.