Multiple funded Graduate Research Assistant (GRA) positions @ University of Vermont, Burlington, VT

in the areas of power and energy systems & optimization and control

Are you mathematically curious? Do you want to be part of a highly collaborative and motivated team of researchers and solve real-world engineering problems? Do you have or are you soon completing a BS or MS in electrical engineering or a related field and are you wondering, “What’s next?”

If so, join us in Vermont! We are recruiting multiple PhD students to join the **Next-gen Energy Systems Team of Vermont (NEST-VT),** which includes 20 graduate researchers, post-docs, and faculty in both **Electrical Engineering (EE)** and **Civil & Environmental Engineering (CEE)** programs who work on power/energy systems at the University of Vermont (UVM). With the support of multiple funding agencies and internal investments, we are actively recruiting multiple highly creative, motivated, and curious graduate students across a set of exciting research opportunities and projects. These opportunities span all areas of energy systems and optimization with applications to sustainable, autonomous, and resilient power and energy systems. As part of a small, but mighty team, you will have a chance to impact critical areas of automation and sustainability. The GRA positions are fully funded 12-month positions for up to 4 years and include possible internship opportunities with world-class collaborators at national laboratories, academia, and industry. The expected start date is Fall 2025. **Underrepresented groups are strongly encouraged to apply.**

About UVM: The University of Vermont (UVM), founded in 1791, is a public land-grant university and is the state of Vermont’s flagship research university with an enrollment of about 12,000 students. The campus is located in the beautiful Burlington, Vermont, about 90 miles south of Montreal in Canada. Burlington is often rated as the best small city in America for quality of living, and features year-round outdoor recreation and cultural events. Leveraging its strong connections with local utility companies and progressive industry partners, UVM is building off many years of momentum generated by the power and energy system research groups at UVM and embarking on the ambitious goal of building up a new energy & autonomy research center, which launched Fall 2024 (*CREATE: the Center for Resilient Energy and Autonomous Technologies in Engineering*).

Recommended background: an applicant should clearly *demonstrate* effective communication skills (written/verbal/visual), an ability to work independently in a larger team, and experience *with* ≥ *2 o*f following:

- Mathematical analysis (e.g., numerical methods, logic, dynamics, stochastic processes, learning)
- Power and energy systems (e.g., AC load flow, OPF, load modeling, microgrids, power cycles, or DERs)
- Building and thermofluid systems (e.g., HVAC/R, district energy, or thermal storage)
- Control systems (e.g., classical and modern control, stability analysis, or predictive control)

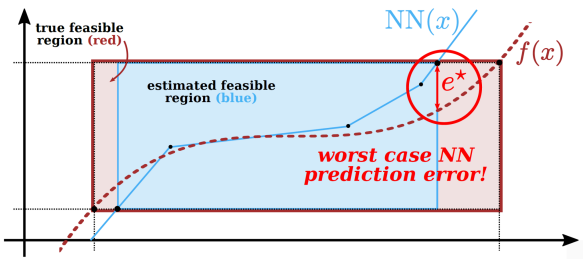
To apply: We encourage you to reach out to us via email (see contact info below). Please use email subject header containing **#Fall2025** and include the following:

1. A concise statement about your research interests/experiences
2. Describe which collaborative opportunity (see below) is of interest and why
3. Your CV and unofficial transcripts along with any language scores.

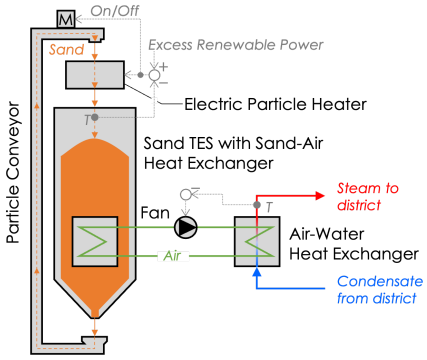
For international applicants whose language of instruction was not officially English, your **IELTS/TOEFL/DuoLingo score ≥ 7.0/100/120 to qualify. Please include your language score in your email.**
To formally apply, please follow the application instructions here and check out the EE graduate program FAQ or the CEE graduate program FAQ.

Overview of funded, collaborative research opportunities with NEST-VT faculty:

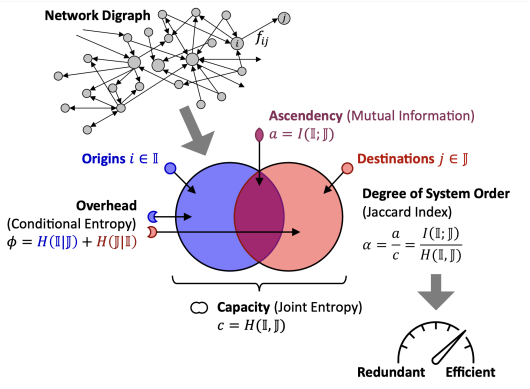
Project opportunity #1: **Machine Learning Performance Verification for Power and Energy Application.** The "safety critical" nature of the power and energy sectors has prevented the wide scale adoption of machine learning (ML) in these fields, despite ML's proposed benefits. To overcome this hurdle, this project seeks to develop strategies for rigorously computing worst-case performance guarantees for the ML models used in power and energy applications. Students working on this project will help develop optimization-based techniques which probe NN-based models in order to discover (i) regions of model inaccuracy, (ii) adversarial inputs which engender misclassifications, and (iii) inputs leading to surprising (yet accurate) predictions. *Key skills: Machine Learning, Convex Optimization, Power Systems*



Project opportunity #2: Silica sand thermal energy storage to decarbonize electricity and heating systems. Silica sand is an abundant, low-cost, and efficient storage medium for a variety of applications, including concentrated solar power, power production, and heating in buildings and industrial settings. However, sand-based TES technology is at an infancy, and numerous research opportunities remain, ranging from the development of novel sand-to-X heat exchangers to the co-design of complete energy systems and controls. Interested students can apply experimental and/or computational methods with this project to advance equipment, physical systems, and/or controls for sustainable long-duration energy storage. Key skills: Thermodynamics, Fluid Dynamics, Computational modeling (CFD, CAD), Power cycles.



Project opportunity #3: Bio-inspired resilient operation schemas for multi-energy hubs. Energy systems are transitioning towards clean, dynamic, interconnected, and distributed networks with multiple resource types (i.e., energy hubs). Through this transition, engineered energy systems are becoming more akin to natural ecosystems, which operate as complex adaptive systems where energy is regenerative, cyclical, distributed, diverse, and life-friendly. At this complex system level, there are untapped opportunities to learn from nature to translate resilient and sustainable energy operational principles from ecosystems to energy hubs. This project is to develop and evaluate operational schemas for energy hubs based on food (i.e., energy)



exchange processes found in natural ecosystems. Students working on this project will advance ecological network theory and apply computational methods that integrate novel controls with dynamic energy system models. Key skills: Modelica modeling, Python programming, Graph theory, Exergy analysis.

If you have any questions, we encourage you to contact us!

Mads R. Almassalkhi, Email: malmassa@uvm.edu
L. Richard Fisher Associate Professor in Electrical Engineering @ University of Vermont
Graduate Program Director in Electrical Engineering @ UVM
Chief Scientist @ Pacific Northwest National Laboratory (PNNL; Joint appointment)
Website | LinkedIn | Google Scholar

Amrit Pandey, Email: amritanshu.pandey@uvm.edu
Assistant Professor in Electrical Engineering @ University of Vermont
Adjunct Professor in Engineering and Public Policy @ Carnegie Mellon University
Website | LinkedIn | Google Scholar

Samuel Chevalier, Email: schevali@uvm.edu
Assistant Professor in Electrical Engineering @ University of Vermont
Website | LinkedIn | Google Scholar

Kathryn Hinkelman, Email: kathryn.hinkelman@uvm.edu
Assistant Professor in Civil and Environmental Engineering @ University of Vermont
Website | LinkedIn | Google Scholar