Samuel Chevalier

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Primary Research Objectives

- design industry-aware **optimization** & **control** strategies for renewable-based power grids
- build **trustworthy machine learning** tools for safety-critical engineering applications
- develop **data-driven modeling** techniques for the power & energy sectors

Education

- **Massachusetts Institute of Technology (MIT)** — Cambridge, MA
  Doctor of Philosophy (PhD) in Mechanical Engineering — *Aug. 2016 - Feb. 2021*
  - **Thesis:** *Inference, Estimation, and Prediction for Stable Operation of Modern Power Systems*
  - **Supervisors**: Luca Daniel (advisor), Kotysta Turitsyn (co-advisor) and Petr Vorobev

- **University of Vermont (UVM)** — Burlington, VT
  Master of Science (MS) in Electrical Engineering — *June 2015 - Aug. 2016*
  - **Thesis:** *Using Real Time Statistical Data to Improve Voltage Stability in Power Systems*
  - **Supervisor**: Paul Hines (advisor)

- **University of Vermont (UVM)** — Burlington, VT
  Bachelor of Science (BS) in Electrical Engineering — *Aug. 2011 - June 2015*
  - Graduated *Magna Cum Laude* with 3.94/4.00 GPA; Minor in Mathematics

Professional Appointments and Positions

- **Assistant Professor (*Tenure Track*)** — Burlington, Vermont
  Electrical and Biomedical Engineering Department at UVM — *Sept. 2023 - Present*

- **Postdoctoral Researcher: Electric Power Systems Group** — Lyngby, Denmark
  Wind and Energy Systems Department at DTU — *Feb. 2021 - Aug. 2023*
  - Funded as a Marie Curie postdoctoral fellow in DTU's Center for Electric Power and Energy
  - Developed optimization-based tools for generating machine learning performance guarantees
  - Used neural networks to learn and replace intractable constraints in optimization problems

- **Graduate Research Assistant: Computational Prototyping Group** — Cambridge, MA
  EECS Department at MIT — *Jan. 2019 - Jan. 2021*
  - Applied uncertainty quantification and model order reduction to complex power systems
  - Developed power system state estimation and dynamical inference solvers
  - Advised by Dr. Luca Daniel

- **Graduate Research Assistant: Energy, Controls and Mechanics Group** — Cambridge, MA
  Mechanical Engineering Department at MIT — *Aug. 2016 - Dec. 2018*
  - Investigated the propagation of forced oscillations in electrical power system networks
  - Characterized the stability of various energy networks (e.g. natural gas pipeline systems, microgrids) using novel simulation and energy function analysis techniques
  - Advised by Dr. Kostya Turitsyn

- **Graduate Resident Advisor (GRA)** — Cambridge, MA
  Live-in Mentor for Undergraduates at MIT — *Aug. 2017 - Jan. 2021*
  - Supported 40 undergraduate students as a live-in resource on a residential hall

- Resolved interpersonal conflict, built community, and acted as a mental health resource

- **Research Assistant: Energy and Complexity Research Group** Burlington, VT
  Electrical Engineering Department at UVM *Jan 2014 - Aug. 2016*
  - Explored the statistical warning signs of voltage instability in transmission networks
  - Constructed reactive power controller which used PMU data statistics as a feedback signal
  - Performed data sanitation and organization in a DOE-sponsored demand response study
  - Advised by Dr. Paul Hines

- **LORD Microstrain** Williston, VT
  Electrical Engineering Intern *Summer 2013 and 2014*
  - Developed software in LabVIEW for calibrating wireless sensor nodes and networks
  - Performed sensor prototype assembly and wireless packet transmission testing

Professional Volunteering and Service

- **IEEE Green Mountain Section Power and Energy Society Chapter Volunteer** *2023-Present*
  - Chapter Chair (2025)
  - Chapter Secretary (2024)

- **Academic Reviewer** *2015-Present*
  - IEEE Transactions on Power Systems (TPWRS)
  - IEEE Transactions on Smart Grid (TSG)
  - Transactions on Control of Network Systems (TCNS)
  - IEEE Power and Energy Society General Meeting (PESGM)
  - IEEE Power Engineering Letters
  - IEEE Control System Letters
  - Power Systems Computation Conference (PSCC)
  - Journal of Modern Power Systems and Clean Energy (MPCE)
  - IEEE Transactions on Components, Packaging and Manufacturing Technology
  - IET Generation, Transmission & Distribution
  - American Control Conference (ACC)

Teaching Experience

- **Machine Learning (CS 3540/CS 5540/CMPE 5990/CSYS 5990)** Burlington, VT
  Instructor for mixed Grad and Undergrad-level Machine Learning Course (1x) *S25*
  - *Course topics:* Optimization methods, linear algebra, maximum likelihood estimation (MLE), maximum A Posteriori (MAP), K-Means, PCA/SVD, linear + nonlinear + logistic regression, SINDy, Support Vector Machines (SVMs), decision trees, random forests, Neural Networks (NNs), advanced NN architectures
  - *Instructor Evaluation:*

- **Circuits II (EE2135)** Burlington, VT
  Instructor for Sophomore-level AC Circuits Course (1x) *S24*
  - *Course topics:* AC Circuits, KVL, KCL, Thevenin, Norton, complex power, 3-phase circuits, filter design, Laplace and Fourier, s-domian analysis, transfer functions
  - *Instructor Evaluation:* 4.18/5

- **Electric Energy System Analysis (EE5310)** Burlington, VT
  Instructor for PhD/MS-level power engineering course (1x) *F23*
  - *Course topics:* numerical methods, economic dispatch, optimization, power flow solver techniques, network modeling, graph theory
  - *Instructor Evaluation:* 4.64/5

- **Introduction to Electric Power Systems (31730)** Lyngby, Denmark
  Co-Instructor for MS-level course with 70+ students (2x) *F21, F22*
  - *Course topics:* power flows, transformers, transmission line modeling, symmetrical faults
  - Student evaluation grade: 4.8/5.0 (F21)

- **Introduction to Electrical Energy Systems (EE113)** Burlington, VT
  Graduate/Undergraduate Teaching Assistant (3x) *S14, S15, S16*
  - *Course topics:* complex power, phasors, generators and motors (synchronous and induction)
  - Facilitated 10 power lab exercises related to power, electrical generators and non-ideal transformers
- **Linear Circuit Analysis Lab 1 (EE81)** Burlington, VT
  Graduate Teaching Assistant (1x) *F15*
  - *Course topics:* RLC components, op-Amps, digital-to-analog converters, RLC transient response
  - Facilitated circuit lab exercises using oscilloscopes, passive RLC components, and op-Amps

Academic Mentorship of Students

Formal Thesis Supervision

- **Mr. Eren Tekeler** (UVM). PhD supervisor. 2024-Present.
  - Thesis topic: Machine Learning Verification.
- **Ms. Saba Rafiei** (UVM). PhD supervisor. 2023-Present.
  - Thesis topic: GPU Accelerated Model Verification and Optimization.
- **Mr. Omid Mokhtari** (UVM). Primary PhD supervisor (Co-supervisor: Mads Almassalkhi). 2023-Present.
  - Thesis topic: Network compression and nodal aggregation.
- **Mr. Muhammad Adeel Arif** (UVM). MS Project supervisor. 2023-2025.
  - Thesis topic: Machine Learning and Power System Dynamics.
- **Mr. Valdemar Søgaard** (DTU). MSc thesis co-supervisor (with Jalal Kazempour, Yannick Werner). 2023.
  - Thesis: "Neural network constrained gas flow optimization model."
- **Mr. Matias Kühnau** (DTU). MSc thesis co-supervisor (with MINES Paris). 2023.
  - Thesis: "Resilient prescriptive analytics against missing data for power systems applications."
- **Mr. Eric Planas Parra** (DTU). MSc thesis co-supervisor (Konrad Sundsgaard, Kutay Bölat, and Guangya Yang). 2023.
  - Thesis: "Data enrichment strategies for AI based reliability assessment of distribution grid components."
- **Mr. Esben Møller Madsen** (DTU). MSc thesis co-supervisor (with Siemens Mobility). 2023.
  - Thesis: "Analysis, testing and dimensioning of the Siemens Sitras PCI inverter for regenerative breaking power recovery in the power supply system of the Danish S-tog in Copenhagen."
- **Mr. Kristoffer Erbo Kjær** (DTU). BS thesis supervisor. 2023.
  - Thesis: "Designing an adaptive electromagnetic transient simulation solver."
- **Mr. Emil Priess Nielsen** (DTU). BS thesis supervisor. 2023.
  - Thesis: "Analysis of prosumer energy solutions through mathematical optimization."
- **Mr. Markus Hvid Monin** (DTU). BS thesis co-supervisor (with Haris Ziras).
  - Thesis: "Opportunities for Distributed Slack Power Flow Modelling in Power System Operation."
- **Mr. Sulav Ghimire** (Skoltech). External MSc thesis reviewer.
  - Thesis: "Dynamics and Stability of Inverter Dominated Low Inertia Power Grids."

Project or Study Supervision

- **Mr. Duncan Starkenburg** (UVM). Research Experience for Undergraduates (REU) Supervisor. 2024-Present.
  - Project topic: Importing ONNX Machine Learning models into the Julia language for performance verification. Simulating data-driven power system models.
- **Mr. Jack Colby** (UVM). Research Experience for Undergraduates (REU) Supervisor. 2023-Present.
  - Project topic: Modeling, simulation, and optimization of renewable-saturated power systems using the Julia programming language.
- **Mr. Ignasi Ventura Nadal** (DTU). Special Project Supervisor. 2022-2023.
  - Project topic: Optimization-based data collection from nonlinear power flow models. Two resulting publications: C10., C6..

Funded Projects

- **"CAREER: Performance Verification of ML Models Used in Power Systems"** Burlington, VT
  Award size: $500,000 *Awarded: April, 2025*
  - **Project PI**
  - This NSF CAREER project designs algorithms and computational tools which rigorously verify the performance of Machine Learning (ML) models built for use in electric power systems. The project will bring transformative change by giving power system engineers the next-generational computational tools they will need to guarantee that ML models cannot have disastrous impacts on the grid (e.g., cause blackouts). This will be achieved by fusing recent advances from the fields of ML verification and power system optimization, thus capturing the organic connection between the scalable verification approaches emerging from the ML community, and the secure and optimal operation of large-scale power systems.

- **"Flexible Optimization for Reliable Elec. & Sustainable Transition (FOREST)"** Burlington, VT
  Award size: $300,000 *Awarded: Dec, 2025*
  - **Project Co-PI**
  - This project develops data orchestration and computational capabilities to evaluate and quantify deferment potential for Vermont Electric Coop and other VT utilities under various scenarios of grid flexibility. To that end, the project will build a novel distribution grid optimization tool, Grid-FlexO, to optimize over thousands of future DU scenarios, a capability no commercial tool supports today.

- **"System Optimization and LiDAR for Vermont Energy Resilience (SOLVER)"** Burlington, VT
  Award size: $300,000 *Awarded: March, 2024*
  - **Project PI**
  - This project uses 2023 Q1 LiDAR, collected for the entire state of Vermont, to bolster state-wide electrical distribution grid models. These updated models will provide distribution grid operators with highly accurate topological representations of their rural service territories, allowing them to the analyze the resilience of their networks in the face of climate change driven electrification efforts. Specifically, this project will deliver (i) categorized lists of the most-at-risk electrical infrastructure elements in Vermont, (ii) enhanced distribution grid models, (iii) a combined transmission and distribution simulation platform to analyzing these models, and (iv) simulation-based analysis of the most disastrous climate-driven contingencies, as identified from the LiDAR data.

- **"TRUST-ML: An Optimization-based Platform for Building Trust in ML Models"** Lyngby, Denmark
  Award size: €230,774 *Awarded: June, 2022*
  - Awarded a two year Marie Skłodowska-Curie Postdoctoral Fellowship for my project "TRUST-ML", which proposed using convex optimization tools for building trust in machine learning models used in power system applications; proposal evaluation score: 100/100.
  - Project supervisors: Spyros Chatzivasileiadis (DTU), Shie Mannor (Technion), Erling Andersen (MOSEK), and Edoardo Simioni (Ørsted)
  - Project number 101066991 — TRUST-ML (HORIZON-MSCA-2021-PF-01-01)

- **"Stability and Control of DC Microgrid System"** Cambridge, MA
  Award size: $20,000 *Awarded: Feb, 2020*
  - Co-author of this $20,000 travel grant, along with PIs Luca Daniel and Pekik Argo Dahono
  - Selected for funding by the MIT Indonesia Seed Fund. The grant was submitted with Indonesian collaborators for developing and testing decentralized microgrid control strategies for islanded DC microgrid networks.

- **"PMU Data Analytics Platform for Load Model and Oscillation Source ID"** Cambridge, MA
  Award size: $150,000 *Awarded: March, 2017*
  - Co-author of this $150,000 research grant, along with PIs Kostya Turitsyn and Luca Daniel
  - Selected for funding by the MIT Energy Initiative Seed Fund. The grant funding subsequently supported my research on forced oscillations and model identification for multiple years.

Journal Publications [*Under Review]

J1. *E. Jong, **S. Chevalier**, S. Chatzivasileiadis, and S. Mannor. "Dual Pricing to Prioritize Renewable Energy and Consumer Preferences in Electricity Markets." **Submitted** to PNAS Nexus, 2024. Under Review. ArXiv e-print: 2409.18766.

J2. *__S. Chevalier__ and S. Chatzivasileiadis, "Global Performance Guarantees for Neural Network Models of AC Power Flow." **Submitted** to IEEE Transactions on Neural Network and Learning Systems, 2024. ArXiv e-print: 2211.07125v2.

J3. __S. Chevalier__, "A Parallelized, Adam-Based Solver for Reserve and Security Constrained AC Unit Commitment." Electric Power Systems Research 235 (2024), via PSCC: 110685. ArXiv e-print: 2310.06650.

J4. P. Ellinas, __S. Chevalier__, and S. Chatzivasileiadis, "A hybrid quantum–classical algorithm for mixed-integer optimization in power systems." Electric Power Systems Research 235 (2024): 110835.

J5. A. Pandey, M.R. Almassalkhi, and __S. Chevalier__, "Large-Scale Grid Optimization: the Workhorse of Future Grid Computations." Current Sustainable/Renewable Energy Reports 10, 139–153 (2023). https://doi.org/10.1007/s40518-023-00213-6.

J6. A. Kody†, __S. Chevalier__†, S. Chatzivasileiadis, and D. Molzahn, "Modeling the AC power flow equations with optimally compact neural networks: Application to unit commitment," Electric Power Systems Research, vol. 213, p. 108282, 2022. ArXiv e-print: 2110.11269. († denotes equal contribution).

J7. N. Müller, __S. Chevalier__, C. Heinrich, K. Heussen, and C. Ziras, "Uncertainty quantification in LV state estimation under high shares of flexible resources," Electric Power Systems Research, vol. 212, p. 108479, 2022. ArXiv e-print: 2110.04174.

J8. __S. Chevalier__, L. Schenato and L. Daniel, "Accelerated Probabilistic Power Flow in Electrical Distribution Networks via Model Order Reduction and Neumann Series Expansion," in IEEE Transactions on Power Systems, 2021, doi: 10.1109/TPWRS.2021.3120911.

J9. __S. Chevalier__, F. M. Ibanez, K. Cavanagh, K. Turitsyn, L. Daniel and P. Vorobev, "Network Topology Invariant Stability Certificates for DC Microgrids with Arbitrary Load Dynamics," in IEEE Transactions on Power Systems, 2021, doi: 10.1109/TPWRS.2021.3110803.

J10. __S. Chevalier__ and D. Wu, "Dynamic Linepack Depletion Models for Natural Gas Pipeline Networks," in Applied Mathematical Modelling, vol. 94, pp. 169-186, 2021, doi: 10.1016/j.apm.2020.12.022

J11. T. Bradde, __S. Chevalier__, M. De Stefano, S. Grivet-Talocia, and L. Daniel, "Handling Initial Conditions in Vector Fitting for Real Time Modeling of Power System Dynamics," in Energies, vol. 14, no. 14, 2021, doi: 10.3390/en14092471

J12. __S. Chevalier__, P. Vorobev and K. Turitsyn, "A Passivity Interpretation of Energy-Based Forced Oscillation Source Location Methods," in IEEE Transactions on Power Systems, vol. 35, no. 5, pp. 3588-3602, Sept. 2020, doi: 10.1109/TPWRS.2020.2973070.

J13. D. Wu, P. Vorobev, __S. Chevalier__ and K. Turitsyn, "Modulated Oscillations of Synchronous Machine Nonlinear Dynamics With Saturation," in IEEE Transactions on Power Systems, vol. 35, no. 4, pp. 2915-2925, July 2020, doi: 10.1109/TPWRS.2019.2958707.

J14. __S. Chevalier__, P. Vorobev and K. Turitsyn, "A Bayesian Approach to Forced Oscillation Source Location Given Uncertain Generator Parameters," in IEEE Transactions on Power Systems, vol. 34, no. 2, pp. 1641-1649, March 2019, doi: 10.1109/TPWRS.2018.2879222.

J15. __S. Chevalier__, P. Vorobev and K. Turitsyn, "Using Effective Generator Impedance for Forced Oscillation Source Location," in IEEE Transactions on Power Systems, vol. 33, no. 6, pp. 6264-6277, Nov. 2018, doi: 10.1109/TPWRS.2018.2834229.

J16. __S. Chevalier__ and P. D. H. Hines, "Mitigating the Risk of Voltage Collapse Using Statistical Measures From PMU Data," in IEEE Transactions on Power Systems, vol. 34, no. 1, pp. 120-128, Jan. 2019, doi: 10.1109/TPWRS.2018.2866484.

Conference Publications [*Under Review]

C1. *O. Mokhtari, __S. Chevalier__, and Mads Almassalkhi, "Enhancing Scalability of Optimal Kron-based Reduction of Networks (Opti-KRON) via Decomposition with Community Detection." **Submitted** to HICSS 2025. ArXiv e-print: 2407.02679.

C2. *__S. Chevalier__, D. Starkenburg, and K. Dvijotham, "Achieving the Tightest Relaxation of Sigmoids for Formal Verification." **Submitted** to the 2025 Association for the Advancement of Artificial Intelligence (AAAI) Conference. ArXiv e-print: 2408.10491.

C3. S. Rafiei and __S. Chevalier__, "GPU-Accelerated DCOPF using Gradient-Based Optimization." Accepted for publication at the 2024 Hawaii International Conference on System Sciences (HICSS). ArXiv e-print: 2406.13191.

C4. __S. Chevalier__ and R. B. Parker, "Towards Perturbation-Induced Static Pivoting on GPU-Based Linear Solvers," 2024 IEEE Power & Energy Society General Meeting (PESGM), Seattle, WA, USA, 2024, pp. 1-5, doi: 10.1109/PESGM51994.2024.10689118. ArXiv e-print: 2311.11833.

C5. __S. Chevalier__, I. Murzakhanov, and S, Chatzivasileiadis, "GPU-Accelerated Verification of Machine Learning Models for Power Systems." **Accepted** for publication at the 2024 Hawaii International Conference on System Sciences. ArXiv e-print: 2306.10617. **Best paper award.**

C6. I. Nadal and __S. Chevalier__, "Scalable Bilevel Optimization for Generating Maximally Representative OPF Datasets." **Accepted** at the 2023 IEEE PES Innovative Smart Grid Technologies Conference - Europe (ISGT Europe). ArXiv e-print: 2304.10912.

C7. M. Kuhnau, A. Stratigakos, S. Camal, __S. Chevalier__, and G. Kariniotakis, "Resilient Feature-driven Trading of Renewable Energy with Missing Data." **Accepted** at the 2023 IEEE PES Innovative Smart Grid Technologies Conference - Europe (ISGT Europe). HAL e-print: hal-04104548.

C8. V. Dvorkin, __S. Chevalier__ and S. Chatzivasileiadis, "Emission-Aware Optimization of Gas Networks: Input-Convex Neural Network Approach," **Accepted** at the 2022 NeurIPS ClimateAI workshop. ArXiv e-print: 2209.08645.

C9. __S. Chevalier__ and M. R. Almassalkhi, "Towards Optimal Kron-based Reduction Of Networks (Opti-KRON) for the Electric Power Grid," 2022 IEEE 61st Conference on Decision and Control (CDC), Cancun, Mexico, 2022, pp. 5713-5718, doi: 10.1109/CDC51059.2022.9992730. ArXiv e-print: 2204.05554.

C10. I. Nadal and __S. Chevalier__, "Optimization-Based Exploration of the Feasible Power Flow Space for Rapid Data Collection," 2022 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), pp. 347-352. IEEE, 2022. ArXiv e-print: 2206.12214. **Best Paper Award.**

C11. J. Stiasny, __S. Chevalier__, R. Nellikkath, B. Sævarsson, and S. Chatzivasileiadis, "Closing the Loop: A Framework for Trustworthy Machine Learning in Power Systems," at the 2022 Bulk Power Systems Dynamics and Control Symposia (IREP). ArXiv e-print: 2203.07505.

C12. __S. Chevalier__, J. Stiasny, and S. Chatzivasileiadis, "Accelerating Dynamical System Simulations with Contracting and Physics-Projected Neural-Newton Solvers," in Proceedings of The 4th Annual Learning for Dynamics and Control Conference, Jun. 2022, vol. 168, pp. 803–816. ArXiv e-print: 2106.02543.

C13. J. Stiasny, __S. Chevalier__, and S. Chatzivasileiadis, "Learning without Data: Physics-Informed Neural Networks for Fast Time-Domain Simulation," in 2021 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), 2021, pp. 438–443. ArXiv e-print: 2106.15987.

C14. __S. Chevalier__, L. Schenato, and L. Daniel, "Accelerated Probabilistic State Estimation in Distribution Grids via Model Order Reduction," in 2021 IEEE Power & Energy Society General Meeting (PESGM), 2021, pp. 1–5. ArXiv e-print: 2011.05397.

C15. A. Mikhalev, A. Emchinov, __S. Chevalier__, Y. Maximov and P. Vorobev, "A Bayesian Framework for Power System Components Identification," 2020 IEEE Power & Energy Society General Meeting (PESGM), Montreal, QC, Canada, 2020, pp. 1-5, doi: 10.1109/PESGM41954.2020.9281790.

C16. __S. Chevalier__, P. Vorobev, K. Turitsyn, B. Wang and S. Maslennikov, "Using Passivity Theory to Interpret the Dissipating Energy Flow Method," 2019 IEEE Power & Energy Society General Meeting (PESGM), Atlanta, GA, USA, 2019, pp. 1-5, doi: 10.1109/PESGM40551.2019.8974116.

C17. P. Vorobev, __S. Chevalier__ and K. Turitsyn, "Decentralized stability rules for microgrids," 2019 American Control Conference (ACC), Philadelphia, PA, USA, 2019, pp. 2596-2601, doi: 10.23919/ACC.2019.8815214.

C18. **S. Chevalier** and P. D. H. Hines, "Identifying system-wide early warning signs of instability in stochastic power systems," 2016 IEEE Power and Energy Society General Meeting (PESGM), Boston, MA, 2016, pp. 1-5, doi: 10.1109/PESGM.2016.7741815.

Theses

T1. **S. Chevalier**, "Inference, estimation, and prediction for stable operation of modern electric power systems. PhD Dissertation. Massachusetts Institute of Technology, 2021.

T2. **S. Chevalier**, "Using real time statistical data to improve long term voltage stability in stochastic power systems." MS Dissertation. University of Vermont, 2016.

Conferences, Workshops, and Seminars

October, 2024 — **UIUC ECE** *(Invited Guest Lecture)*
Delivered the lecture "From NP-Complete to NP-Hard: Exploiting Mathematical Synergies between Electric Power Grid Operation and ML Verification"

June, 2024 — **Power Systems Computation Conference (PSCC)** *(Invited Tutorial + Presentation)*
Delivered a single-track tutorial titled, "Trustworthy AI and Machine Learning Verification for Power Systems". Also, presented our conference paper J3.

April, 2024 — **North American SynchroPhasor Initiative (NASPI)** *(Poster Presentation)*
Attended NASPI in Salt City and poster-presented our work "Accelerating Dynamic Simulations via Contracting and Physics-Projected Neural-Newton Solvers" from C12.

January, 2024 — **Hawaii International Conference on System Sciences (HICSS)** *(Conference Talk)*
Presented our work on GPU accelerated ML verification for power systems C5. Best Paper!

October, 2023 — **INFORMS** *(Presenter: Phoenix Convention Center)*
Presented on my Grid Optimization (GO) Challenge solver J3.

May, 2023 — **Network of European Data Scientists (NeEDS)** *(Invited seminar presenter at the Copenhagen Business School)*
Presented on Global Performance Guarantees for NN Models of AC Power Flow J2.

March, 2023 — **ETH Power System Lab** *(Invited Presenter at Group Meeting)*
Presented on Global Performance Guarantees for NN Models of AC Power Flow J2.

October, 2022 — **HVDC Colloquium** *(Participant: DTU)*
Attended one day of the annual European HVDC colloquium hosted at DTU Risø campus.

June, 2022 — **Power Systems Computation Conference (PSCC)** *(Participant & Presenter: U. Porto)*
Presented our conference paper on Unit Commitment J6.

June, 2022 — **Learning 4 Dynamics and Control (L4DC)** *(Participant & Presenter: Stanford)*
Presented (poster) our conference paper on neural-Newton solvers C12..

October, 2021 — **INFORMS** *(Session Organizer and Participant: Virtual)*
Co-organized and co-hosted a two-part INFORMS session, entitled, "Managing Uncertainty and Scarcity in Energy Systems: Parts I and II."

September, 2021 — **DTU Teaching Lab: Module 1** *(Participant: Lyngby, Denmark)*
Intensive week-long teaching workshop. Topics: inductive teaching, student-focused teaching, alignment of learning objective and learning activities. Workshop culminated with mock lecture and 40 minutes of professional feedback.

September, 2021 — **NREL's Resilient Autonomous Energy Systems** *(Participant: Virtual)*
Selected to attend the two-day workshop hosted by NREL.

July, 2021 — **Power and Energy Society GM** *(Participant & Presenter: Virtual)*
Virtually presented our PESGM conference publication on state estimation C14.

December, 2020 **Invited Talk: Los Alamos National Lab** *(Virtual Presentation)*
Delivered a talk at the LANL Advanced Network Science Initiative seminar series. Talk title: "Tales from Numerical Linear Algebra: Accelerating Probabilistic Power Flow in Electrical Distribution Networks."

November, 2020 **Invited Talk: UVM EBE Graduate Seminar Series** *(Virtual Presentation)*
Delivered a talk at the UVM Electrical and Biomedical Engineering (EBE) graduate seminar series. Talk title: "Tales from Numerical Linear Algebra: Accelerating Probabilistic Power Flow in Electrical Distribution Networks."

August, 2019 **Power and Energy Society GM** *(Participant & Presenter: Atlanta, GA)*
Presented (poster) my conference paper C16. Presented (verbal) my journal paper J14.

December, 2018 **Invited Talk: Skoltech Center for Energy Science and Technology** *(Moscow, Russia)*
Delivered a talk entitled, "Locating the Sources of Forced Oscillations in Power Grids."

August, 2018 **Power and Energy Society GM** *(Participant: Portland, OR)*
Attended half-day tutorial workshops on (i) modeling doubly-fed induction generators and controllers for wind turbine applications and (ii) power quality considerations for distributed resource integration.

January, 2017 **Los Alamos Grid Science School** *(Participant & Presenter: Santa Fe, NM)*
Selected to attend the week-long LANL grid science school. Presented my MS work (poster presentation) on the statistical signs of voltage collapse.

July, 2016 **Power and Energy Society GM** *(Participant & Presenter: Boston, MA)*
Presented a poster on my conference paper C18. Attended a full-day industry-focused workshop regarding forced oscillations in transmission systems.

Relevant Skills

- **Programming Tools:** MATLAB, Python, Julia, PyTorch, Flux, PowerModels.jl, optimization solvers (Gurobi, MOSEK, CVXPY, IPOPT, etc.), C, PowerWorld, Power System Analysis Toolbox (PSAT), OpenDSS, MATPower, LabVIEW, PSpice, Arduino, LaTeX, PSS/E (novice)
- **Mathematical Tools:** linear algebra, differential equations, inverse problem theory, Bayesian inversion, power system and circuit analysis, applied optimization, control theory, mechanical dynamics, electromagnetics, model order reduction, numerical simulation, statistics, stochastic processes, uncertainty quantification, neural networks, machine learning
- **Interpersonal Skills:** Strong written and oral communication skills; active listening skills; trained in Restorative Practices (RP); extensive coaching and mentoring experiences in a diversity of contexts

Honors and Awards

⋆ Volunteer of the Year (2024) for the Power & Energy Society (PES) chapter of the IEEE Green Mountain Section
⋆ Young Professional Engineer of the Year (2023) for the Power & Energy Society (PES) chapter of the IEEE Green Mountain Section
⋆ Best paper at the 2024 Hawaii International Conference on System Sciences; awarded for paper C5.
⋆ Best student paper award at the IEEE Smart Grid Comm 2022 Conference; awarded for paper C10.
⋆ America East Presidential Scholar Recipient (2015)
⋆ Senior Electrical Engineering Award: Atwater-Kent Award for Excellence of Judgment and Understanding of the Principles of Electrical Engineering (2015)
⋆ Elected Captain: UVM Varsity (Division 1) Track & Field Team (2014-2015)
⋆ Tau Beta Pi Honor Society Inductee (2014)
⋆ American Public Power Association Scholarship (2014)
⋆ Recipient of the Richard A. Swenson Endowed Scholarship (2013 - 2014)
⋆ Sophomore Electrical Engineering Award: Excellence and Greatest Promise (2013)
⋆ Recipient of the Vermont Scholar's Award Scholarship (2011-2014)

Other Leadership Activities

- **Veritas' Graduate School Mentorship Program** — Cambridge, MA
  Mentor for Undergraduate Students — *2020-2021*
  - Actively mentored and prepared undergraduate students from top US schools (Yale, UC Berkeley, Duke, etc.) for applying to PhD programs
- **Electricity Student Research Group** — Cambridge, MA
  Weekly Research Luncheon Organizer — *2017-2019*
  - Organized and facilitated a weekly research luncheon through the MIT Energy Initiative
- **MIT's Graduate Association of Mechanical Engineers (GAME)** — Cambridge, MA
  Student Council Officer — *2017-2019*
  - Organized departmental athletic (intramural sports) and social activities
- **UVM Track & Field** — Burlington, VT
  Athletic Team Member & Captain — *2011-2015*
  - Four year member of the UVM NCAA Division 1 Varsity Track Team (Pole Vault)
  - Elected team captain senior year