

# Truong X. Nghiem

Intelligent Control Systems (ICONS) Laboratory  
School of Informatics, Computing, and Cyber Systems  
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- Main areas of expertise: machine learning, control, optimization, and computing for cyber-physical systems. Research develops the learning & control foundation of intelligent cyber-physical systems.
- Recipient of the NSF Faculty Early Career Development (CAREER) Award and Engineering Research Initiation (ERI) Award. Have secured over \$10.8M in funding, with \$2.32M under management.
- Have published over 50 peer-reviewed papers, cited 1278 times, h-index of 18, and i10-index of 29.

## Education

<b>Ph.D. Electrical &amp; Systems Engineering</b> , <i>University of Pennsylvania</i> , Philadelphia, USA	2012
<b>B.S. Electrical Engineering (Automatic Control)</b> , <i>Hanoi University of Technology</i> , Hanoi, Vietnam	2003

## Academic Positions

<b>Assistant Professor (Tenure-track)</b> , Northern Arizona University, USA School of Informatics, Computing, and Cyber Systems.	1/2018 – present
<b>Assistant Chair of Electrical &amp; Computer Engineering</b> , Northern Arizona University, USA School of Informatics, Computing, and Cyber Systems.	9/2022 – present
<b>Postdoc Researcher</b> , Electrical & Systems Eng., University of Pennsylvania, USA	6 – 12/2017
<b>Postdoc Scientist</b> , École Polytechnique Fédérale de Lausanne (EPFL), Switzerland	1/2015 – 6/2017
<b>Postdoc Researcher</b> , Electrical & Systems Eng., University of Pennsylvania, USA	10/2012 – 1/2015
<b>Lecturer</b> , Automatic Control Department, Hanoi University of Technology, Vietnam	9/2003 – 8/2005

## Selected Non-Academic Positions

<b>Co-founder &amp; Chief scientific officer</b> , Autonomous Ecology Inc., USA	10/2023 – present
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## Funding Experience

### SUMMARY

Total funded amount since 2018 is **\$10.8M (\$10.73M extramural)**, with **\$2.32M (\$2.3M extramural)** under my management. These amounts do not include fellowships awarded to my students.

### FUNDED PROJECTS

Project	Funder	Role	Amount	Duration
<i>CAREER: Composite Physics-Informed Learning of Dynamic Systems</i> Sole PI; NSF's Faculty Early Career Development Program (CAREER)	NSF	PI	\$492,470	7/2023 – 6/2028
<i>Cognitive Distributed Sensing in Congested Radio Frequency Environments</i> *DEVCOM Army Research Laboratory, FREEDOM program	ARL*	Co-PI	\$8,392,756	3/2023 – 2/2027
<i>ERI: Towards Data-driven Learning and Control of Building HVAC Systems</i> Sole PI; NSF's Engineering Research Initiation program (ERI)	NSF	PI	\$199,530	3/2022 – 2/2025

Project	Funder	Role	Amount	Duration
<i>Software for Physics-Informed Machine Learning of Complex Systems</i> *TRIF = Arizona state's Technology Research Initiative Fund	AZ TRIF*	PI	\$5,000	11/2023 – 8/2024
<i>Modeling and Prediction of Impact of Commercial Electric Vehicle Charging on SRP Grid</i> *SRP = Salt River Project utility company	SRP*	PI	\$64,427	7/2023 – 7/2024
<i>DISCOVER Distributed Sensing &amp; Computing Over Sparse Environments Platform</i> CCRI collaborative project with Navajo Tech University.	NSF	Co-PI	\$1,366,513	10/2021 – 9/2024
<i>Data Acquisition, Modeling, and Prediction of Charging Load Profiles of Commercial Electric Vehicles in SRP's Service Territory</i> *SRP = Salt River Project utility company	SRP*	PI	\$67,197	7/2022 – 7/2023
<i>Trends and Impact of Public and Workplace Charging Infrastructure in SRP Territory</i> *SRP = Salt River Project utility company	SRP*	Co-PI	\$69,600	7/2022 – 7/2023
<i>Occupancy-based HVAC Controls for Energy Savings in Academic Buildings</i> *TRIF = Arizona state's Technology Research Initiative Fund	AZ TRIF*	PI	\$5,000	2 – 6/2022
<i>Data Acquisition, Control and Charging of Drones</i> *TRIF = Arizona state's Technology Research Initiative Fund	AZ TRIF*	Co-PI	\$25,000	10/2020 – 6/2021
<i>Estimating occupancy density and ventilation quality for indoor health and safety during a pandemic</i> *TRIF = Arizona state's Technology Research Initiative Fund	AZ TRIF*	PI	\$5,000	10/2020 – 6/2021
<i>Data-driven Analytics of Building Utility Demand</i> *Supported by NAU Green Fund for sustainability	NAU*	PI	\$2,419	6 – 7/2020
<i>FF1RR: Flagstaff's F1/10 Robo-Racing</i> *Institute of Electrical and Electronics Engineers	IEEE*	PI	\$21,977	9/2019 – 7/2021
<i>Analysis on Impacts of Zero Net Energy Homes and Electric Vehicles on Distribution Grids</i> *SRP = Salt River Project utility company	SRP*	Co-PI	\$60,369	8/2018 – 5/2019
<i>Intelligent Control of Energy Storage for Smart Buildings and Grids</i> *European Research Council (ERC) Proof of Concept grant †Co-authored the proposal as a Postdoc	ERC*	PD <sup>†</sup>	€149,720	3/2017 – 8/2018
<i>Formal Reasoning Framework for Autonomous Vehicle Controls</i> *Funded by Toyota InfoTechnology Center (ITC) †Co-authored the proposal as a Postdoc	Toyota ITC*	PD <sup>†</sup>	\$120,000	7/2014 – 7/2017

## PROPOSALS UNDER REVIEW / IN PREPARATION

Project	Funder	Role	Amount	Year
<i>Collaborative Research: An Integrated Framework for Learning-Enabled and Communication-Aware Hierarchical Distributed Optimization</i> Collaborative project with Louisiana State University; Recommended for funding.	NSF	Lead PI	\$599,845 (3 years)	2023

Project	Funder	Role	Amount	Year
<i>Autonomous Scaleable UAV Exploration of Forest Carbon Dynamics, and Fire and Timber Management: The Clearwing Project</i> Submitted to USDA National Institute of Food and Agriculture.	USDA	Co-PI	\$299,937 (2 years)	2023
<i>Combining Formal, Static, and Dynamic Analysis to Verify and Validate Real-World Embedded Systems</i> Submitted to NSF CISE SHF Formal Methods in the Field – Track 1 program.	NSF	Co-PI	\$513,829 (3 years)	2024
<i>Collaborative Research: Autonomous Multi-scale Informative Path Planning of Heterogeneous Robotic Sensing Systems for Modeling Forest Micro-environments</i> To be submitted to NSF CPS program. Collaborative project with Texas A&M and University of Nevada at Reno.	NSF	PI (NAU)	\$1.2M (3 years)	2024

## Awards and Honors

<b>IEEE Senior Member</b>	2/2023
Elevated to the Senior Member rank at the Institute of Electrical and Electronics Engineers (IEEE), the highest grade for which IEEE members can apply.	
<b>NSF Faculty Early Career Development (CAREER) Award</b>	11/2022
The National Science Foundation's most prestigious awards in support of early-career faculty, for project "Composite Physics-Informed Learning of Dynamic Systems."	
<b>NSF Engineering Research Initiation (ERI) Award</b>	2/2022
Support new investigators to initiate research programs and advance careers as researchers, educators, and innovators.	
<b>Presentation Award at Arizona Student Energy Conference (AzSEC) 2019</b>	11/2019
Awarded for fast pitch talk titled "Data-driven Energy Demand Prediction and Analysis of Buildings."	
<b>Northern Arizona University's Presidential Fellowship (for my student)</b>	08/2019
Awarded to Ph.D. student Viet-Anh Le for Ph.D. study at NAU (4 years). Nominated by me.	
<b>Best Paper Award at the 2018 ACM/IEEE International Conference on Cyber Physical Systems (ICCPS), Porto, Portugal</b>	04/2018
For the paper "Learning and Control using Gaussian Processes: Towards bridging machine learning and controls for physical systems".	
<b>Fully funded participation in the Research Opportunities Week at Technische Universität München, Germany</b>	03/2014
Only 50 postdocs from around the world were invited with full financial support.	
<b>Vietnam Education Foundation (VEF) Fellowship</b>	2005 – 2012
Prestigious fellowship from the U.S. government for Ph.D. study at the University of Pennsylvania.	
<b>Best Demo Award at the 2012 ACM BuildSys Conference, Toronto, Canada</b>	11/2012
For the demonstration of the software tool MLE+ for building control co-simulation.	
<b>Second Prize in the Second National "Youth with Automation" Contest</b>	11/2003
Vietnam's national contest for young researchers in control and automation. Awarded by The Vietnam Science and Technology Association on Automation and the Ministry of Education and Training.	
<b>Outstanding Student Award (Hanoi People's Committee)</b>	08/2003
For outstanding academic performance among all college students in Hanoi City.	
<b>Dean's List at Hanoi University of Technology</b>	06/2003
Awarded by the Rector of Hanoi University of Technology for the best academic performance among approximately 5000 students of the graduating class.	

**Second Prize in “Student Research Contest”**

05/2003

Awarded by Hanoi University of Technology for excellent student research work.

**Excellent Student Scholarship for Five Consecutive Years**

1998 – 2003

Awarded by Hanoi University of Technology for academic excellence.

## Teaching

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### COURSE DEVELOPMENT

**Modern Control Systems (2021 – present)**

On-going development of a new graduate course at Northern Arizona University on modern control systems and techniques. Topics include: state-space control systems; introduction to optimal control (LQR); introduction to optimization; introduction to model predictive control and its practical applications. Hardware-based labs include a dual temperature control system and a self-balancing robot.

**Advanced Automatic Control (2021 – present)**

Graduate course co-convened with the undergraduate course Automatic Control. It has more advanced topics, assignments, and projects, compared with the undergraduate course. It aims to provide graduate students with basic knowledge and skills of feedback control theory for subsequent control courses.

**Introduction to Autonomous Driving (2020 – 2020)**

A special topic course for senior and graduate students at Northern Arizona University on the fundamental technologies of autonomous driving, using the F1/10 autonomous race car platform. The course is highly hands-on, using real F1/10 cars for learning and experiments. Topics include: robot operating system (ROS); fundamentals of vehicles; basic controls; sensors; mapping and localization; computer vision; planning.

**Automatic Control (2018 – present)**

Re-development of the basic automatic control course at Northern Arizona University, including: Creating the syllabus; Creating and updating all lectures; Creating assignments; Creating exams and a question bank; and Creating several series of simulation-based and hardware-based labs and projects, including a temperature control system lab.

**Digital Twins: Model Based Embedded Systems (2017)**

Co-developed a special topic graduate course on model-based design of embedded systems at the University of Pennsylvania.

- Topics: first-principle modeling of physical systems, system identification, timed automaton modeling, black-box modeling, co-simulation, formal verification, (metric) temporal logics, robustness of temporal logics, automated simulation-based testing, automatic code generation.
- The topics are taught using 3 case studies: modeling of buildings (*domain: energy systems*); modeling and verification of pacemakers (*domain: health-critical medical devices*); modeling, simulating, and testing autonomous cruise control systems (*domain: safety-critical automotive systems*).
- Was responsible for 2 modules: energy systems and safety-critical automotive systems.

**Green Buildings: Optimization and Adaptation (2011)**

Co-developed a graduate research seminar course at the University of Pennsylvania on energy-efficient building modeling, simulation, learning, optimization, and controls. Was responsible for: selecting the topics; selecting the relevant research papers; scheduling the presentations; preparing and delivering 3 lectures on building HVAC modeling and controls.

### TEACHING AT NORTHERN ARIZONA UNIVERSITY

**EE 599: Modern Control Systems**

Graduate course on modern control systems and techniques, including: state-space control systems; introduction to optimal control (LQR); introduction to optimization; introduction to model predictive control and its practical applications. Hardware-based projects: a dual temperature control system and a self-balancing robot.

- Spring 2023: 3 students; evaluation scores: 4.00/4.00 for overall course and 4.00/4.00 for instructor.
- Spring 2022: 12 students; evaluation scores: 3.53/4.00 for overall course and 3.50/4.00 for instructor.

### **EE 458: Automatic Control**

Undergraduate course on automatic control (modeling, analysis, and control design in the frequency domain).

- Fall 2023: 16 students; evaluation: pending.
- Fall 2022: 20 students; evaluation scores: 3.45/4.00 for overall course and 3.53/4.00 for instructor.
- Fall 2021: 14 students; evaluation scores: 3.63/4.00 for overall course and 3.67/4.00 for instructor.
- Fall 2020: course was adapted and delivered both in-person and remotely (HyFlex) due to COVID-19; 6 students; evaluation scores: 3.83/4.00 for overall course and 3.80/4.00 for instructor.
- Fall 2019: I designed and added a new hardware-based lab component (temperature control); 20 students; evaluation scores: 3.38/4.00 for overall course and 3.60/4.00 for instructor.
- Fall 2018: I developed and taught this course, including simulation-based projects, for the first time as a special-topic course EE 599; 18 students (undergraduate and graduate students in EE, CS, and ME); evaluation scores: 3.33/4.00 for overall course and 3.53/4.00 for instructor.

### **EE 558: Advanced Automatic Control**

Graduate course on automatic control (modeling, analysis, and control design in the frequency domain), co-convened with undergraduate course EE 458.

- Fall 2023: 2 students; evaluation: pending.
- Fall 2022: 8 students; evaluation scores: 3.40/4.00 for overall course and 3.37/4.00 for instructor.

### **EE 222: Intermediate Programming**

Undergraduate course on intermediate C programming for Electrical Engineering and Computer Science students.

- Spring 2021: course was delivered both in-person and remotely (HyFlex) using flipped classroom model due to COVID-19; 38 students; evaluation scores: 3.35/4.00 for overall course and 3.13/4.00 for instructor.

### **EE 499: Introduction to Autonomous Driving**

Special topic course that introduces autonomous driving (self-driving car) technology to students, based on the F1/10 autonomous race car platform.

- Spring 2020: developed and taught the course for the first time; course was in person in the first half then moved online using a car simulator in the second half of the semester due to COVID-19; 10 students; evaluation scores: 3.40/4.00 for overall course and 3.63/4.00 for instructor.

## **TEACHING AT THE UNIVERSITY OF PENNSYLVANIA**

### **ESE 680: Digital Twins: Model Based Embedded Systems**

Special topic graduate course on model-based design of embedded systems.

- Fall 2017: Co-developed and co-taught the course (2 modules on energy systems and safety-critical automotive systems); 12 students.

### **CIS 800: Green Buildings: Optimization and Adaptation**

Graduate research seminar course on energy-efficient building modeling, simulation, learning, optimization, and controls.

- Spring 2011: Co-organized the course with Prof. George Pappas and Prof. Ben Taskar; gave three lectures on building controls; about 15 students.

### **Guest lecturing**

- ESE 350 Embedded Systems (Spring 2014): gave 2 guest lectures on real-time embedded control systems.
- ESE 519 Real-Time Embedded Systems (Fall 2013): gave 2 guest lectures on real-time embedded control systems and mentored 1 student group project.

### **Teaching assistance**

- CIS 540 Principles of Embedded Computation (Fall 2009): assisted in developing the course materials on control theory and real-time control systems; teaching assistance.
- ESE 500 Linear Systems Theory (Fall 2007): teaching assistance.

## Mentoring and Advising

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### GRADUATE STUDENTS

#### Current

- Deep Trivedi (11/2022 – present): MS student in Electrical Engineering (Northern Arizona University); co-advised with Dr. Venkata Yaramasu.
- Juan Carlos Tique Rangel (1/2024 – present): MS student in Electrical Engineering (Northern Arizona University).
- Cody Beck (1/2024 – present): MS student in Computer Science (Northern Arizona University).
- Nam Nguyen (1/2024 – present): Ph.D. student in Informatics and Computing (Northern Arizona University).

#### Past

- Yifei Zhang (1 – 12/2023): graduate student in Informatics and Computing (Northern Arizona University).
- Yujian Huang (1/2022 – 5/2023): MS student in Electrical Engineering (Northern Arizona University); graduated; now Ph.D. student in Electrical Engineering at Arizona State University.
- Tung Nguyen (6/2022 – 5/2023): graduate student in Informatics (Northern Arizona University).
- Yiwei Zhang (8/2021 – 5/2022): MS student in Electrical Engineering (Northern Arizona University); graduated.
- Alyssa Stenberg (8 – 12/2021): MS student in Computer Science (Northern Arizona University); CS 685 Graduate Research; now software engineer at J. B. Hunt (data science).
- Liming Zheng (8/2021 – 5/2022): graduate student in Informatics (Northern Arizona University).
- Viet-Anh Le (8/2019 – 5/2021): MS student in Informatics (Northern Arizona University); now Ph.D. student in Mechanical Engineering at the University of Delaware.
- Trong-Doan Nguyen (8/2019 – 5/2021): MS student in Informatics (Northern Arizona University); past co-founder and robotics engineer at Beagle Technology Inc.; now co-founder and CTO of ROSTEK Automation Technology, co-founder and CEO of PrimitiveAI.
- Saade Victor (8 – 12/2016): MS student in Mechanical Engineering (EPFL - École Polytechnique Fédérale de Lausanne); master's thesis project.

### GRADUATE THESIS/DISSERTATION COMMITTEES

*Not including thesis/dissertation committees for my own students.*

#### Current

- Ai Zhang: Electrical Engineering PhD student; advisor: Dr. Venkata Yaramasu.
- Alexander Dahlmann: Electrical Engineering PhD student; advisor: Dr. Venkata Yaramasu.
- Liming Zheng: Electrical Engineering PhD student; advisor: Dr. Venkata Yaramasu.

#### Past

- Manuel Aguilar Rios: Electrical Engineering PhD student; advisor: Dr. Bertrand Cambou.
- Rajendra Shrestha: Mechanical Engineering Masters student; advisor: Dr. Thomas Acker.
- Kristiyan Milev: Electrical Engineering Masters student; advisor: Dr. Venkata Yaramasu.

### UNDERGRADUATE STUDENTS

#### Current

#### Past

- Cody Beck (1/2022 – 8/2023): Undergraduate student in Computer Science (NAU) working on robotics and machine learning.
- Isaiah Shipley (9/2022 – 6/2023): Undergraduate student in Electrical Engineering (NAU) working on drones and sensing; co-advised with Dr. Alexander Shenkin.
- Cole Catron (6 – 12/2022): Undergraduate student in Computer Science (NAU) working on robotics; Native American student supported by NSF Louis Stokes Alliances for Minority Participation (LSAMP) program.
- Jiaxin Liu (5 – 7/2022): Undergraduate student in Electrical Engineering (NAU); now a graduate student at University of Colorado - Boulder.
- Rogelio Cabrera Murguia (8 – 12/2021): Exchange undergraduate student in Mechatronics from Mexico.
- Daniel DiCarlo (8/2019 – 5/2020): Undergraduate student in Computer Science (NAU), funded by NAU's Interns-to-Scholars (I2S) program.



- Zhaolu Yang (8/2018 – 5/2019): Undergraduate student in Computer Science (NAU) working on machine learning for building energy systems; now a graduate student at Columbia University.
- Falon Ortega (3 – 8/2018): Undergraduate student in Electrical Engineering (NAU), partially funded by an NAU Hooper Undergraduate Research Award (HURA).
- Jack Garrard (3 – 8/2018): Undergraduate student in Computer Science (NAU).
- Ryan Hitt (3 – 8/2018): Undergraduate student in Electrical Engineering (NAU).
- Julia Mankoff (7 – 8/2017): Undergraduate student in Mechanical Engineering from Yale University participating in the Research Experience for Undergraduates (REU) program at the University of Pennsylvania.
- Derek Nong (6 – 12/2017): Undergraduate student in Electrical Engineering at the University of Pennsylvania; researched modeling and control for building energy systems.

## CAPSTONE PROJECTS

### Current

- Team “Inverted Pendulum” (Electrical Engineering, 9/2023 – present): develop a rotary inverted pendulum system, to be used in control and machine learning courses; students: Toa Barclay, Ethan Emrich, Chengyue Li.

### Past

- Team “Two Glasswings” (Electrical Engineering, 9/2022 – 5/2023): equip drones with 3D LiDARs and Intel RealSense depth cameras for safe navigation in forest understories; students: Isaiah Shipley, Adam Beckermann.
- Team “PV Prediction” (Electrical Engineering, 9/2022 – 5/2023): develop and test data-driven methods for short-term prediction of residential PV generation; students: Victor Santillan, Zhehong Wang, Jingze Fu.
- Team “Heart Monitoring” (Electrical Engineering, 9/2022 – 5/2023): develop a heart monitoring testbed and algorithms for selecting quality data for transmission; students: Zachary Price, Steven Provencio, Jacob Gardener.
- Team “Code Duckies” (Computer Science, 9/2021 – 5/2022): block-based visual programming tool for Duckietown robots (for middle school and high school students to learn programming autonomous robots); students: Anthony Simard, Ari Jaramillo, Daniel Rydberg, Chris Cisneros, Jacob Heslop.
- Team “Yellowtails” (Computer Science, 9/2019 – 5/2020): graphical user interface for F1/10 autonomous racing; students: Kyle Waston, Jordan Wright, Bowen Boyd, Hanyue Wang.
- Team “FF1RR” (Electrical and Computer Engineering, 9/2019 – 5/2020): Vehicle-2-Vehicle (V2V) communication for F1/10 autonomous race cars; students: Zhengjie Xuan, Cheng Che, Yawen Peng.
- Team “Compiled Hive” (Computer Science, 9/2018 – 5/2019): control and visualization for drone research; students: Gavin Valencia, Adam Witzel, Alexis Alvarez, Austin Corum.
- Team “SaveWatt” (Computer Science, 9/2018 – 5/2019): online dashboard for NAU energy systems; students: Ian Dale, Hyungi Choi, Madison Boman.
- Team “Zero Net Energy” (Electrical Engineering, 9/2018 – 5/2019): impact analysis of zero net energy homes on the Arizona distribution grid; students: Leah Wellman, Hasan Alsinafi, Hao Du, Alana Ann Keith.

## VISITORS

### Current

### Past

- Thi Tu Anh Do (2 – 8/2021): lecturer in the Department of Automatic Control at Hanoi University of Science and Technology.

## Patents

1. **System and method for feedback-guided test generation for Cyber-physical Systems using Monte-Carlo**
  - Inventors: Sriram Sankaranarayanan, Franjo Ivancic, Aarti Gupta, **Truong X. Nghiem**.
  - Assignees: NEC Laboratories America, Inc.
  - Patent number: US 8,374,840 B2.
  - Patent grant date: February 12, 2013.

## Publications

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**Summary:** 1278 citations, h-index 18, i10-index 29 as of 2/2024 on Google Scholar (<http://tinyurl.com/tnscholar>).

**Explanation of author order:** *If I am listed as the first author* (or corresponding author), then I was primarily responsible for conceiving the paper and research, and I wrote the paper with input (often minor) from my co-authors. *If I am listed as the last author*, then I typically played a significant role in the conception of the paper and research, supervising or leading the research study and paper development, and editing the manuscript (as would be typical if one of my students or post-docs was the lead author). *If I am listed as an intermediate author*, I typically helped to conceive/lead/supervise the research, wrote parts of the manuscript, and/or performed substantial edits.

### PREPRINTS

- [P1] T. L. Nguyen and **T. X. Nghiem**, “A Comparative Study of Physics-Informed Machine Learning Methods for Modeling HVAC Systems,” May 2023. <https://doi.org/10.36227/techrxiv.22720822.v1>.
- [P2] A. Duarte, **T. X. Nghiem**, and S. Wei, “On the Convergence of the Structural Estimation of Proximal Operator with Gaussian Processes (STEP-GP) Method with Adaptive Quantization for Communication-Efficient Distributed Optimization,” Nov. 2023. <https://doi.org/10.36227/techrxiv.24593196.v1>.

### JOURNAL PAPERS

- [J1] B. Nguyen, H. Nguyen, **T. X. Nghiem**, L. Nguyen, and T. Nguyen, “On Encrypted Consensus Protocol for Distributed Multi-Agent Systems,” *Under review (minor revision) at IEEE Transactions on Industrial Informatics*, 2023.
- [J2] A. Duarte, **T. X. Nghiem**, and S. Wei, “Optimal Querying for Communication-efficient ADMM using Gaussian Process Regression,” *Under review (minor revision) at Franklin Open*, 2023.
- [J3] A. Duarte, **T. X. Nghiem**, and S. Wei, “Communication-efficient ADMM using quantization-aware Gaussian process regression,” *Under review (minor revision) at EURO Journal on Computational Optimization*, 2023.
- [J4] L. Nguyen, D. K. Nguyen, **T. X. Nghiem**, and T. Nguyen, “Convolutional neural network regression for low-cost microalgal density estimation,” *Under review at IEEE Sensors Journal*, 2023.
- [J5] B. Nguyen, **T. X. Nghiem**, L. Nguyen, H. M. La, and T. Nguyen, “Connectivity-preserving distributed informative path planning for mobile robot networks,” *IEEE Robotics and Automation Letters*, vol. 9, pp. 2949–2956, Mar. 2024.
- [J6] L. Nguyen, D. K. Nguyen, T. Nguyen, B. Nguyen, and **T. X. Nghiem**, “Analysis of Microalgal Density Estimation by Using LASSO and Image Texture Features,” *Sensors*, vol. 23, p. 2543, Jan. 2023.
- [J7] V.-A. Le, L. Nguyen, and **T. X. Nghiem**, “Multi-Step Predictions for Adaptive Sampling in Mobile Robotic Sensor Networks using Proximal ADMM,” *IEEE Access*, vol. 10, pp. 64850–64861, 2022.
- [J8] L. Nguyen, D. K. Nguyen, **T. X. Nghiem**, and T. Nguyen, “Least square and Gaussian process for image based microalgal density estimation,” *Computers and Electronics in Agriculture*, vol. 193, p. 106678, Feb. 2022.
- [J9] V.-A. Le, L. Nguyen, and **T. X. Nghiem**, “ADMM-based Adaptive Sampling Strategy for Nonholonomic Mobile Robotic Sensor Networks,” *IEEE Sensors Journal*, 2021.
- [J10] Y. V. Pant, H. Abbas, K. Mohta, R. A. Quayle, **T. X. Nghiem**, J. Devietti, and R. Mangharam, “Anytime Computation and Control for Autonomous Systems,” *IEEE Transactions on Control Systems Technology*, pp. 1–12, 2020.
- [J11] W. Bernal, M. Behl, **T. X. Nghiem**, and R. Mangharam, “MLE+: A Tool for Integrated Design and Deployment of Energy Efficient Building Controls,” *SIGBED Rev.*, vol. 10, July 2013.
- [J12] **T. X. Nghiem**, G. J. Pappas, R. Alur, and A. Girard, “Time-triggered implementations of dynamic controllers,” *ACM Transactions in Embedded Computing Systems*, vol. 11, pp. 58:1–24, Aug. 2012.



- [J13] S. M. Hoang and **T. X. Nghiem**, “PLCs and the IEC 61131-3 standard (Part 2),” *Automation Today (Vietnamese)*, vol. 7, July 2004.
- [J14] S. M. Hoang and **T. X. Nghiem**, “PLCs and the IEC 61131-3 standard (Part 1),” *Automation Today (Vietnamese)*, vol. 5, May 2004.

## CONFERENCE PAPERS

- [C1] A. Duarte, **T. X. Nghiem**, and S. Wei, “Querying strategies for communication-efficient ADMM using Gaussian process regression,” in *Under Review at 2024 IEEE International Conference on Communication (ICC)*, 2023.
- [C2] **T. X. Nghiem**, T. Nguyen, B. Nguyen, and L. Nguyen, “Causal Deep Operator Networks for Data-Driven Modeling of Dynamical Systems,” in *IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, IEEE, 2023.
- [C3] R. Tumu, L. Lindemann, **T. X. Nghiem**, and R. Mangharam, “Physics Constrained Motion Prediction with Uncertainty Quantification,” in *IEEE Intelligent Vehicles Symposium (IV)*, 2023.
- [C4] B. Nguyen, **T. X. Nghiem**, L. Nguyen, A. T. Nguyen, and T. Nguyen, “Real-time distributed trajectory planning for mobile robots,” in *IFAC World Congress*, 2023.
- [C5] T. Nagy, A. Amine, **T. X. Nghiem**, Ugo Rosolia, Zirui Zang, and Rahul Mangharam, “Ensemble Gaussian Processes for Adaptive Autonomous Driving on Multi-friction Surfaces,” in *IFAC World Congress*, 2023.
- [C6] **T. X. Nghiem**, J. Drgona, C. Jones, Z. Nagy, R. Schwan, B. Dey, A. Chakrabarty, S. D. Cairano, J. A. Paulson, A. Carron, M. N. Zeilinger, W. S. Cortez, and D. L. Vrabie, “Physics-informed machine learning for modeling and control of dynamical systems,” in *American Control Conference (ACC)*, pp. 3735–3750, 2023.
- [C7] B. Nguyen, **T. X. Nghiem**, L. Nguyen, A. T. Nguyen, T. Nguyen, and M. Sookhak, “Distributed formation trajectory planning for multi-vehicle systems,” in *American Control Conference (ACC)*, pp. 1325–1330, 2023.
- [C8] B. T. Nguyen, **T. X. Nghiem**, L. Nguyen, T. T. Nguyen, and T. Nguyen, “Secure- and Privacy-Preserving Policies for Distributed Cooperative Control of Multiple Vehicle Systems,” in *SPIE Defense + Commercial Sensing (DCS23)*, International Society for Optics and Photonics (SPIE), Apr. 2023.
- [C9] T. T. Nguyen, Q. B. Phan, **T. X. Nghiem**, C. R. daCunha, M. Gowanlock, and B. Cambou, “A Video Surveillance-Based Face Image Security System using Post-Quantum Cryptography,” in *SPIE Defense + Commercial Sensing (DCS23)*, International Society for Optics and Photonics (SPIE), Apr. 2023.
- [C10] T. B. Nguyen, T. Nguyen, **T. X. Nghiem**, L. Nguyen, J. Baca, P. Rangel, and H.-K. Song, “Collision-free Minimum-time Trajectory Planning for Multiple Vehicles based on ADMM,” in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 13785–13790, 2022.
- [C11] V.-A. Le, L. Nguyen, and **T. X. Nghiem**, “An efficient adaptive sampling approach for mobile robotic sensor networks using proximal ADMM,” in *American Control Conference (ACC)*, 2021.
- [C12] V.-A. Le and **T. X. Nghiem**, “Distributed Experiment Design and Control for Multi-agent Systems with Gaussian Processes,” in *IEEE Conference on Decision and Control (CDC) 2021*, 2021.
- [C13] V.-A. Le and **T. X. Nghiem**, “A Receding Horizon Approach for Simultaneous Active Learning and Control using Gaussian Processes,” in *IEEE Conference on Control Technology and Applications (CCTA 2021)*, 2021.
- [C14] V.-A. Le and **T. X. Nghiem**, “Gaussian process based distributed model predictive control for multi-agent systems using sequential convex programming and ADMM,” in *IEEE Conference on Control Technology and Applications (CCTA 2020)*, 2020.

- [C15] **T. X. Nghiem**, A. Duarte, and S. Wei, “Learning-based Adaptive Quantization for Communication-efficient Distributed Optimization with ADMM,” in *Asilomar Conference on Signals, Systems, and Computers*, 2020.
- [C16] **T. X. Nghiem**, T.-D. Nguyen, and V.-A. Le, “Fast Gaussian Process based Model Predictive Control with Uncertainty Propagation,” in *Annual Allerton Conference on Communication, Control, and Computing*, (Illinois, USA), pp. 1052–1059, Sept. 2019.
- [C17] **T. X. Nghiem**, “Linearized Gaussian Processes for Fast Data-driven Model Predictive Control,” in *2019 American Control Conference (ACC)*, (Philadelphia, PA, USA), pp. 1629–1634, IEEE, July 2019.
- [C18] A. Jain, **T. X. Nghiem**, M. Morari, and R. Mangharam, “Learning and Control using Gaussian Processes: Towards bridging machine learning and controls for physical systems,” in *International Conference on Cyber-Physical Systems (ICCPs)*, (Porto, Portugal), Apr. 2018. **BEST PAPER AWARD**.
- [C19] A. Jain, D. Nong, **T. Nghiem**, and R. Mangharam, “Digital Twins for Efficient Modeling and Control of Buildings: An Integrated Solution with SCADA Systems,” in *2018 Building Performance Analysis Conference and SimBuild*, Sept. 2018.
- [C20] D. Nong, A. Jain, **T. Nghiem**, and R. Mangharam, “An integrated solution for whole building model predictive control,” in *2018 Building Performance Analysis Conference and SimBuild*, 2018.
- [C21] **T. X. Nghiem**, G. Stathopoulos, and C. Jones, “Learning Proximal Operators with Gaussian Processes,” in *Annual Allerton Conference on Communication, Control, and Computing*, (Illinois, USA), Oct. 2018.
- [C22] **T. X. Nghiem** and C. N. Jones, “Data-driven demand response modeling and control of buildings with Gaussian Processes,” in *2017 American Control Conference (ACC)*, pp. 2919–2924, May 2017.
- [C23] **T. X. Nghiem**, A. Bitlislioglu, T. Gorecki, F. A. Qureshi, and C. N. Jones, “OpenBuildNet Framework for Distributed Co-Simulation of Smart Energy Systems,” in *2016 14th International Conference on Control, Automation, Robotics and Vision (ICARCV)*, pp. 1–6, Nov. 2016.
- [C24] M. Behl, **T. X. Nghiem**, and R. Mangharam, “DR-Advisor: A Data Driven Demand Response Recommender System,” in *Proceedings of International Conference CISBAT 2015 Future Buildings and Districts Sustainability from Nano to Urban Scale*, Oct. 2015.
- [C25] W. Bernal, M. Behl, **T. X. Nghiem**, and R. Mangharam, “Campus-Wide Integrated Building Energy Simulation,” in *IBPSA International Building Simulation Conference (BS2015)*, Dec. 2015.
- [C26] I. Lympelopoulous, F. A. Qureshi, **T. X. Nghiem**, A. A. Khatir, and C. N. Jones, “Providing ancillary service with commercial buildings: The Swiss perspective,” in *International Symposium on Advanced Control of Chemical Processes (ADCHEM)*, June 2015.
- [C27] **T. X. Nghiem** and R. Mangharam, “Scalable Scheduling of Energy Control Systems,” in *Proceedings of the ACM & IEEE International Conference on Embedded Software (EMSOFT)*, pp. 137–146, Oct. 2015.
- [C28] Y. V. Pant, K. Mohta, H. Abbas, **T. X. Nghiem**, J. Devietti, and R. Mangharam, “Co-Design of Anytime Computation and Robust Control,” in *Proceedings of the IEEE Real-Time Systems Symposium (RTSS)*, Dec. 2015.
- [C29] M. Behl, **T. X. Nghiem**, and R. Mangharam, “IMpACT: Inverse Model Accuracy and Control Performance Toolbox for Buildings,” in *IEEE International Conference on Automation Science and Engineering (CASE)*, Aug. 2014.
- [C30] M. Behl, **T. X. Nghiem**, and R. Mangharam, “Model-IQ: Uncertainty Propagation from Sensing to Modeling and Control in Buildings,” in *International Conference on Cyber-Physical Systems (ICCPs)*, Apr. 2014.

- [C31] Y. V. Pant, **T. X. Nghiem**, and R. Mangharam, “Peak Power Reduction in Hybrid Energy Systems with Limited Load Forecasts,” in *Proceedings of the American Control Conference*, June 2014.
- [C32] **T. X. Nghiem**, G. J. Pappas, and R. Mangharam, “Event-based Green Scheduling of Radiant Systems in Buildings,” in *Proceedings of the American Control Conference (ACC)*, June 2013.
- [C33] M. Behl, **T. X. Nghiem**, and R. Mangharam, “Green Scheduling for Energy-Efficient Operation of Multiple Chiller Plants,” in *Proceedings of the IEEE Real-Time Systems Symposium (RTSS)*, pp. 195–204, Dec. 2012.
- [C34] W. Bernal, M. Behl, **T. X. Nghiem**, and R. Mangharam, “MLE+: A tool for integrated design and deployment of energy efficient building controls,” in *Proceedings of the 4th ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings (BuildSys’12)*, (Toronto, Ontario, Canada), pp. 123–130, ACM, Nov. 2012.
- [C35] **T. X. Nghiem**, M. Behl, G. J. Pappas, and R. Mangharam, “Green Scheduling for Radiant Systems in Buildings,” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, pp. 7577–7582, Dec. 2012.
- [C36] **T. X. Nghiem**, M. Behl, R. Mangharam, and G. J. Pappas, “Scalable Scheduling of Building Control Systems for Peak Demand Reduction,” in *Proceedings of the American Control Conference (ACC)*, pp. 3050–3055, June 2012.
- [C37] Z. Li, P.-C. Huang, A. K. Mok, **T. X. Nghiem**, M. Behl, G. J. Pappas, and R. Mangharam, “On the Feasibility of Linear Discrete-Time Systems of the Green Scheduling Problem,” in *Proceedings of the 32nd IEEE Real-Time Systems Symposium (RTSS)*, pp. 295–304, Nov. 2011.
- [C38] **T. X. Nghiem** and G. E. Fainekos, “Computing Schedules for Time-Triggered Control using Genetic Algorithms,” in *Proceedings of the 18th IFAC World Congress*, Aug. 2011.
- [C39] **T. X. Nghiem**, M. Behl, R. Mangharam, and G. J. Pappas, “Green Scheduling of Control Systems for Peak Demand Reduction,” in *Proceedings of the IEEE Conference on Decision and Control (CDC)*, pp. 5131–5136, Dec. 2011.
- [C40] **T. X. Nghiem**, M. Behl, G. J. Pappas, and R. Mangharam, “Green scheduling: Scheduling of control systems for peak power reduction,” in *Proceedings of International Green Computing Conference and Workshops (IGCC)*, pp. 1–8, July 2011.
- [C41] **T. X. Nghiem** and G. J. Pappas, “Receding-horizon supervisory control of green buildings,” in *Proceedings of the American Control Conference*, pp. 4416–4421, June 2011.
- [C42] **T. X. Nghiem**, S. Sankaranarayanan, G. Fainekos, F. Ivancic, A. Gupta, and G. J. Pappas, “Monte-Carlo techniques for falsification of temporal properties of non-linear hybrid systems,” in *Proceedings of the 13th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, (Stockholm, Sweden), pp. 211–220, Springer, Apr. 2010.
- [C43] **T. X. Nghiem**, G. J. Pappas, R. Alur, and A. Girard, “Time-triggered implementations of dynamic controllers,” in *Proceedings of the 6th ACM & IEEE International Conference on Embedded Software (EMSOFT)*, (Seoul, Korea), pp. 2–11, ACM, Oct. 2006.
- [C44] **T. X. Nghiem** and S. M. Hoang, “Real-Time and Interactive Simulation of Industrial Processes for Education and Research,” in *The 6th Vietnam Conference on Automation (VICA VI)*, 2005. In Vietnamese.

## ABSTRACTS AND WORKSHOP PAPERS

- [W1] **T. X. Nghiem**, A. Duarte, and S. Wei, “Learning-enabled Framework for Communication-efficient Distributed Optimization,” in *AAAI Conference on Artificial Intelligence (AAAI-24) Workshop on Learnable Optimization*, Feb. 2024.

- [W2] D. Nguyen, Z. Yang, and **T. X. Nghiem**, “Data-driven Energy Demand Prediction and Analysis of Buildings,” in *Annual Student Conference on Renewable Energy Science, Technology, and Policy at the Energy-Water-Food Nexus (AZSEC) 2019*, Nov. 2019. **BEST PRESENTATION AWARD.**
- [W3] V. Yaramasu, **T. X. Nghiem**, Kristiyan Milev, Leah Wellman, Alana Keith, Hao Du, Hasan Alsinafi, and J. Cordana, “Impacts of Zero Net Energy Homes on Distribution Grids,” in *Intelligent Building Operations Workshop*, (Boulder, CO), Aug. 2019. Abstract and presentation.
- [W4] B. Aksanli, A. S. Akyurek, M. Behl, M. Clark, A. Donze, P. Dutta, P. Lazik, M. Maasoumy, R. Mangharam, **T. X. Nghiem**, V. Raman, A. Rowe, A. Sangiovanni-Vincentelli, S. Seshia, T. S. Rosing, and J. Venkatesh, “Distributed Control of a Swarm of Buildings Connected to a Smart Grid: Demo Abstract,” in *Proceedings of the 1st ACM Conference on Embedded Systems for Energy-Efficient Buildings (BuildSys’14)*, (Memphis, Tennessee), pp. 172–173, ACM, Nov. 2014.
- [W5] Y. V. Pant, **T. X. Nghiem**, and R. Mangharam, “Knock NOx: Model-based Remote Diagnostics of a Diesel Exhaust Control System,” in *Work-in-Progress Proceedings of IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, pp. 17–20, Apr. 2013.
- [W6] W. Bernal, M. Behl, **T. Nghiem**, and R. Mangharam, “MLE+: Design and Deployment Integration for Energy-efficient Building Controls (Demo Abstract),” in *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings (BuildSys’12)*, (Toronto, Ontario, Canada), pp. 215–216, ACM, Nov. 2012. **BEST DEMO AWARD.**
- [W7] M. Behl, W. Bernal, **T. Nghiem**, M. Pajic, and R. Mangharam, “From Control to Scheduling: An Elastic Execution Model,” in *Proceedings of the 32nd IEEE Real-Time Systems Symposium (Work in Progress Session - RTSS11-WiP)*, 2010.

## TECHNICAL REPORTS AND OTHER PUBLICATIONS

- [O1] **T. X. Nghiem**, “Gaussian Process Derivative at Uncertain Input for SE Kernel,” technical Report, Northern Arizona University, June 2019.
- [O2] Yash Vardhan Pant, Houssam Abbas, Kartik Mohta, Rhudii A. Quaye, Truong X. Nghiem, Joseph Devietti, and Rahul Mangharam, “Technical Report: Anytime Computation and Control for Autonomous Systems,” Tech. Rep. UPenn-ESE-04-19, Department of Electrical and Systems Engineering, University of Pennsylvania, Apr. 2019.
- [O3] **T. X. Nghiem**, Y. V. Pant, and R. Mangharam, “Robust Model Predictive Control with Anytime Estimation,” Tech. Rep. ESE-UPenn-14-TR12, Department of Electrical and Systems Engineering, University of Pennsylvania, Dec. 2014.
- [O4] Y. V. Pant, **T. X. Nghiem**, and R. Mangharam, “Peak Power Control of Battery and Super-capacitor Energy Systems in Electric Vehicles,” tech. rep., Department of Electrical and Systems Engineering, University of Pennsylvania, Feb. 2014.
- [O5] M. Behl, **T. X. Nghiem**, and R. Mangharam, “Uncertainty Propagation from Sensing to Modeling and Control in Buildings,” tech. rep., University of Pennsylvania, Oct. 2013.
- [O6] **T. X. Nghiem**, *Green Scheduling of Control Systems*. PhD thesis, University of Pennsylvania, 2012.

## Selected Talks (since 2017)

- “Integrating Data and Physics for Effective Learning and Control of Cyber-Physical Systems.” Invited talk at the University of North Carolina at Charlotte. March, 2023.
- “Integrating Data and Physics for Effective Learning and Control of Cyber-Physical Systems.” Invited talk at Old Dominion University. March, 2023.

- “*Integrating Data and Physics for Effective Learning and Control of Cyber-Physical Systems.*” Invited talk at the Knight Foundation School of Computing and Information Sciences of Florida International University. March, 2023.
- “*Distributed Experiment Design and Control for Multi-agent Systems with Gaussian Processes.*” Presentation at IEEE Conference on Decision and Control (CDC) 2021. *Virtual.* December 13-17, 2021.
- “*A Receding Horizon Approach for Simultaneous Active Learning and Control using Gaussian Processes.*” Presentation at Conference on Control Technology and Applications (CCTA) 2021. *Virtual.* August 8-11, 2021.
- “*An efficient adaptive sampling approach for mobile robotic sensor networks using proximal ADMM.*” Presentation at American Control Conference (ACC) 2021. *Virtual.* May 25-28, 2021.
- “*Sustainable Buildings and Power Systems: Perspectives from Control, Optimization, and Machine Learning.*” Invited talk at the School of Sustainable Energy Engineering of Simon Fraser University (Canada). *Virtual.* February, 2021.
- “*Learning-based Adaptive Quantization for Communication-efficient Distributed Optimization with ADMM.*” Presentation at Asilomar Conference on Signals, Systems, and Computers 2020. *Virtual.* November 1-5, 2020.
- “*Advancing Computational Building Energy System Research: Perspectives from Controls, Optimization, and Machine Learning.*” Invited talk at the Lawrence Berkeley National Laboratory (LBNL) – Building Technology and Urban Systems Division. *Virtual.* September, 2020.
- “*Gaussian Process Based Distributed Model Predictive Control for Multi-agent Systems using Sequential Convex Programming and ADMM.*” Presentation at IEEE Conference on Control Technology and Applications (CCTA) 2020. *Virtual.* August, 2020.
- “*Fast Gaussian Process based Model Predictive Control with Uncertainty Propagation.*” Presentation at Annual Allerton Conference on Communication, Control, and Computing. *Monticello, IL, USA.* Sep 27, 2019.
- “*Linearized Gaussian Processes for Fast Data-driven Model Predictive Control.*” Presentation at American Control Conference 2019. *Philadelphia, PA, USA.* July, 2019.
- “*Safe and Efficient Learning-based Cyber Physical Systems*” Invited talk for INF 501 (Research Methods In Informatics And Computing) at Northern Arizona University. Nov 16, 2018.
- “*Safe and Efficient Learning-based Cyber Physical Systems*” Invited seminar at the College of Engineering, Informatics, and Applied Sciences (CEIAS) at Northern Arizona University. Nov 9, 2018.
- “*Learning Proximal Operators with Gaussian Processes.*” Presentation at Annual Allerton Conference on Communication, Control, and Computing. *Monticello, IL, USA.* Oct 4, 2018.
- “*How we flew crazyflies, and you can do it too.*” Invited talk at the Flagstaff Coding Camps 2018 (<https://www.flagstaffchamber.com/ready-setcode>). *Flagstaff, AZ, USA.* June 21, 2018.
- “*Control Meets Machine Learning: Taming Power Grid Volatility with Commercial Buildings.*” Invited seminar at the Department of Automatic Control, Hanoi University of Science and Technology (HUST). *Hanoi, Vietnam.* December 26, 2017.
- “*Data-driven Demand Response Modeling and Control of Buildings with Gaussian Processes.*” Presentation at American Control Conference 2017. *Seattle, WA, USA.* May 25, 2017.
- “*Control meets Machine Learning: Balancing the Grid with Commercial Buildings.*” Seminar at School of Informatics, Computing, and Cyber Systems, Northern Arizona University. *Flagstaff, AZ, USA.* March 24, 2017.
- “*Control meets Machine Learning: Balancing the Grid with Commercial Buildings.*” Seminar at Electrical Engineering department, University of South Carolina. *Columbia, SC, USA.* March 20, 2017.

## Media Coverage

1. “*How NAU is making self-driving cars safer and smarter*”: Article in *The NAU Review* featuring my research and my NSF CAREER project award. Link: <https://news.nau.edu/nghiem-machine-learning/>. July 24, 2023.
2. “*Seven ways NAU and SRP are helping build stronger utility systems in Arizona*”: Article in *The NAU Review* featuring two of my industry projects sponsored by the Salt River Project (SRP) utility company. Link: <https://news.nau.edu/srp-research/>. September 5, 2023.
3. “*Change for the Better*”: Article in the Fall 2018 issue of the *Arizona TechConnect* magazine featuring my smart city research. Link: [https://issuu.com/tcguy/docs/tc\\_nov18\\_final/16](https://issuu.com/tcguy/docs/tc_nov18_final/16). November 28, 2018.
4. “*Penn Engineers Win Award for Paper on AI for Smart Buildings*”: Article written by *Penn Engineering* about my best paper “*Learning and Control using Gaussian Processes: Towards bridging machine learning and controls*”

for physical systems” at ICCPS 2018. Link: <https://medium.com/penn-engineering/penn-engineers-win-award-for-paper-on-ai-for-smart-buildings-48d868352ad8>. May 7, 2018.

## Software Artifacts

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### openBuildNet (Lead Developer)

09/2014 – present

A co-simulation platform for large-scale distributed control and simulation of complex multi-agent cyber-physical energy systems. Links: <https://sites.google.com/site/buildnetproject/software> and <https://github.com/nxt-lab/openBuildNet>.

### MLE+ (Lead Developer)

2010 – present

A Matlab/Simulink toolbox for building energy simulation, analysis, optimization and control. It won the **Best Demo Award** at the 4th ACM BuildSys conference in 2012. MLE+ has been widely used in academic and industrial research projects, such as US DOE award DE-EE0003843 to Siemens, in which MLE+ was a key component. Link: <https://github.com/nxtruong/mle-legacy>.

### MLS2Sim (Lead Developer)

01 – 07/2014

A Matlab toolbox for interfacing with S<sup>2</sup>Sim and OpenDSS for large-scale, distributed co-simulation of loads on the grid and the smart grid. Link: <https://github.com/mlab/mls2sim>

### Automatic extraction of linear hybrid models from Simulink/Stateflow models

06 – 09/2008

Lead developer. This was an internal Matlab tool of NEC Laboratories America for automatic instrumentation & extraction of linear hybrid models from Simulink/Stateflow models.

### IEC 61131-3 Sequential Function Chart (SFC) Programming Software for Process Control

2002 – 2003

A visual programming software tool for SFC programming of automation systems, and a virtual machine for embedded control on industrial computers. This was an undergraduate senior project.

## Services

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### JOURNAL REVIEWER

- INFORMS Journal on Computing • IEEE Transactions on Automatic Control • IEEE Control Systems Magazine
- IEEE Transactions on Industrial Informatics • IEEE Transactions on Control Systems Technology • Systems & Control Letters • Applied Energy • IEEE Signal Processing Letters • Robotica • Energy & Buildings • Energy

### CONFERENCE REVIEWER

- IEEE Conference on Decision and Control (CDC) • American Control Conference (ACC) • IEEE Multi-conference on Systems and Control (MSC) • IEEE Conference on Control Technology and Applications (CCTA) • IFAC World Congress • European Control Conference (ECC) • ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) • IEEE International Conference on Systems, Man, and Cybernetics (SMC) • IEEE Real-Time Systems Symposium (RTSS) • International Conference on Information Processing in Sensor Networks (IPSN) • ACM Workshop On Embedded Systems For Energy-Efficiency In Buildings (BuildSys) • International Conference on Embedded Software (EMSOFT) • IEEE International Conference on Automation Science and Engineering (CASE) • International Symposium on Automated Technology for Verification and Analysis (ATVA) • International Conference on Computer Aided Verification (CAV) • European Conference on Wireless Sensor Networks (EWSN) • ACM International Conference on High Confidence Networked Systems (HiCoNS) • ACM/ESDA/IEEE Design Automation Conference (DAC) • Design, Automation & Test in Europe (DATE) • IFAC Conference on Analysis and Design of Hybrid Systems (ADHS) • Mediterranean Conference on Control and Automation (MED) • IEEE International Conference on Distributed Computing Systems (ICDCS) • International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)

### RESEARCH FUNDING PROPOSAL REVIEWER

- US National Science Foundation (NSF) Review Panels:
  - 2024: Pathways to Enable Open-Source Ecosystems (POSE) program.
  - 2022: Predictive Intelligence for Pandemic Prevention (PIPP) program.
  - 2021: Cyber-physical systems (CPS) program.



- 2019: Dynamics, Control and Systems Diagnostics (DCSD) program.
- The Research Council of Norway (RCN) grant program: 2015.
- The 2013 Kentucky Science and Engineering Foundation (KSEF) R&D Excellence Award.

#### **PROGRAM COMMITTEE, ORGANIZER, SESSION CHAIR, PANELIST**

- Publication Chair and member of the Technical Program Committee of the 2024 ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) in Hong Kong, May 2024. [Organizers list](#).
- Member of the Technical Committee of the 2022 Vietnamese Control and Robotics Workshop (VNCR 2022).
- Co-chair of the technical session “Model Predictive Control” at 2021 IEEE Conference on Control Technology and Applications (CCTA), August 2021.
- Co-chair of the technical session “Predictive Control for Nonlinear Systems II” at American Control Conference 2019, July 2019.
- Member of the Technical Program Committee of the UNcertainty in distribUted compuTing Systems (UNITS) track in the 2019 IEEE International Conference on Distributed Computing Systems (ICDCS 2019) in Dallas, Texas, USA.
- Panelist on the Artificial Intelligence (AI) panel “Accelerating into the Future” at the Flagstaff Festival of Science, September 2018.
- ACM & IEEE International Conference on Embedded Software (EMSOFT), *Amsterdam, The Netherlands*, 2015. Session Chair “Verification and Analysis of Hybrid Systems”

#### **INSTITUTIONAL AND ADMINISTRATIVE SERVICES**

- Member of Faculty Search Committee for Assistant Professor in Electrical and Computer Engineering – Embedded Systems at SICCS, NAU. Fall 2023 – Present.
- Chair of Faculty Search Committee for Assistant Professor of Practice in Electrical Engineering – CQUPT program at SICCS, NAU. Fall 2023.
- Member of the Graduate Admissions / PhD Student Recruitment Committee, School of Informatics, Computing, and Cyber Systems at NAU. Fall 2023 – Present.
- Assistant Chair of Electrical & Computer Engineering, School of Informatics, Computing, and Cyber Systems at NAU. Fall 2022 – Present.
- Chair of the Electrical Engineering Curriculum Committee of the School of Informatics, Computing, and Cyber Systems at NAU. Fall 2022 – Spring 2023.
- Member of Faculty Search Committees for Assistant Professor of Practice (1) and Assistant Professors of Teaching (2) in Electrical Engineering at SICCS, NAU. Spring 2022 – Fall 2022.
- Member of the Electrical Engineering Graduate Admission Committee at NAU. Spring 2022.
- Co-chair of the Electrical Engineering Curriculum Committee of the School of Informatics, Computing, and Cyber Systems at NAU. Fall 2021.
- Member of the Faculty Status Committee / Annual Review Committee (FSC/ARC) of the School of Informatics, Computing, and Cyber Systems at NAU. From Fall 2021 – Spring 2022.
- Member of the University Graduate Committee (UGC). From Fall 2019 – present.
- Member of the Connection Committee of the School of Informatics, Computing, and Cyber Systems at NAU. From Fall 2019 – present.
- Member of the Faculty Status Committee / Annual Review Committee (FSC/ARC) of the School of Informatics, Computing, and Cyber Systems at NAU. From Fall 2018 – Spring 2019.
- Member of the Academic Integrity Board of the College of Engineering, Informatics, and Applied Science (CEIAS). From Fall 2018 – Spring 2019.
- Member of the NAU Energy Action Team (Spring 2018 – present), which develops university-wide sustainability policies and projects to reduce the carbon footprint and improve energy efficiency of the campus.
  - Developed student projects related to energy efficiency and sustainability.
  - Co-authored proposals for the NAU Carbon Action Plan, to reduce carbon footprint, and the NAU Energy Revolving Fund (NERF), to support sustainability projects.
- Faculty co-organizer of the Graduate Seminar Series of the School of Informatics, Computing, and Cyber Systems at NAU. From Spring 2018 – present.

- Member of the Graduate Affairs Committee of the School of Informatics, Computing, and Cyber Systems at NAU. From Spring 2018 – present.
- Referee for the NAU Undergraduate Research And Design Symposium (UGRADS) in Spring 2018.
- Organizer of the *2016 Research Day* of the Automatic Control Laboratory at EPFL: a two-day research workshop for lab members in Leysin, Switzerland (September 2016).
- Organizer of the seminar series of the Automatic Control Laboratory at EPFL in Fall 2016 and Spring 2017: 7–8 speakers in each semester.

## Outreach and Diversity, Equity & Inclusion Activities

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### **A representative of Northern Arizona University with the National Graduate Education for Minorities (GEM) Consortium** 2021 – Present

I have been one of the representatives of Northern Arizona University at the National GEM Consortium, whose mission is to enhance the value of the nation's human capital by increasing the participation of underrepresented groups (African Americans, American Indians, and Hispanic Americans) at the master's and doctoral levels in engineering and science.

### **Flagstaff Coding Camps 2018 for school children** 06/21/2018

Gave a talk on the research, applications, and future of drones: "How we flew crazyflies, and you can do it too."  
Link: <https://www.flagstaffchamber.com/ready-setcode>

### **VEFFA Vietnam Book Drive Project** 2008-2009

Served on the core committee, in strategy and logistics, of the Vietnam Book Drive project of VEFFA (Vietnam Education Foundation Fellows and Alumni Association). Campaigned for donations of English textbooks in science and technology from the United States of America to universities in Vietnam, to improve Vietnamese students' access to updated knowledge and improve the quality of college education in Vietnam.

## Professional Memberships

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- **IEEE Senior Member** 2023–Present; IEEE Member 2013–2022; IEEE Graduate Student Member 2007–2012.
- IEEE Control Systems Society Member 2009–Present.
- IEEE Computer Society Member 2022–Present.
- Member of the IEEE Technical Committee on Cyber-Physical Systems 2018–Present.
- ACM Member 2016–Present.
- ESIG (Energy Systems Integration Group) member 2019–Present.
- ASHRAE Student Member 2010–2011.