

Electrical Engineering Ph.D. candidate with a Chemical Engineering background, eager to apply expertise in signal processing, control, and machine learning alongside a comprehensive understanding of process engineering to challenging problems in the industry.

Education

MS and Ph.D. in Electrical Engineering 2020-Present

Stanford University, advised by Prof. Sanjay Lall

Working on augmenting control algorithms with machine learning while preserving safety and stability guarantees; coursework depth area signal processing, control, and optimization

BA and MEng in Chemical Engineering (via Engineering) 2015-2019

University of Cambridge (Pembroke College)

As part of the Master's researched application of Robust Model Predictive Control to improve safety and efficiency of exothermic batch processes under the supervision of Vassilios S. Vassiliadis; graduated with 1st Class with Distinction (top of the class)

Research Experience

Undergraduate Researcher Summer 2017

Adsorption & Advanced Materials Group, University of Cambridge (Cambridge, UK)

Developed search criteria for identifying metal-organic frameworks with desired structures in Cambridge Structural Database.

Summer Undergraduate Research Fellow Summer 2018

Turbulent Flow Oriented Research in Combustion and Energy Group, California Institute of Technology (Pasadena, CA, USA)

Investigated the impact of acoustics on laminar flames for various fuels and frequencies through direct numerical simulations with detailed chemistry. Presented findings at CalTech Summer Seminar Day and contributed to the submission to the 17th International Conference on Numerical Combustion.

Industry Experience

Systems Analytics Engineer Intern Summer 2022

Actionable Insight Accelerator (Alx) Team, Applied Materials (Santa Clara, CA, USA)

Engineered fault detection algorithms for a new advanced data analytics product. Utilized historical process data to identify key features, ensuring robust algorithm performance. Implemented algorithms in Python and contributed to data pipeline development for on-tool integration.

Advanced Development Intern Summer 2023

Film and Scatterometry Technology (FaST) Division, KLA Corp. (Milpitas, CA, USA)

Developed a MATLAB GUI prototype for the Axion Tool to execute an innovative algorithm for the inverse problem. Enhanced algorithm accuracy by 2x and reduced runtime by 3x through optimizing signal processing and regression components.

Skills

Programming languages and engineering tools

Python (NumPy, SciPy, Pandas, scikit-learn, PyTorch, CVXPY), Git, MATLAB (Simulink), Robot Operating System (ROS), AutoCAD, Microsoft Visio, Ansys Fluent, Honeywell's UniSim, Microsoft Office Suite (Word, Excel, PowerPoint).

Publications

Kanavalau, A., Masters, R., Kähm, W. & Vassiliadis, V. V. (2019), 'Robust thermal stability for batch process intensification with model predictive control', *Computers & Chemical Engineering* **130**, 106574.

Kanavalau, A., Lall, S. (2022), 'Thermal runaway avoidance using Hamilton-Jacobi reachability and model predictive control', *Computers & Chemical Engineering* **157**, 107605.