Javal Vyas

javalvyas2000@gmail.com | +44-7570639610 | linkedin | github

Education

Imperial College London — London, UK
Ph.D. Candidate in Chemical Engineering — Sept 2024- Dec 2027

Carnegie Mellon University – Carnegie Institute of Technology — Pittsburgh, USA
Master of Science in AI Engineering in Chemical Engineering | CGPA: 3.99/4 — Aug 2022 - Dec 2023

Experience

- **Optimization and Machine Learning Researcher (Multi-agent AI systems)** — London, UK
  Ph.D. Student advised by Prof. Mehmet Mercangoz — Sept 2024 – Present
  - Developed a multi-agent AI framework integrating reprompting architecture for self-correcting strategies, leveraging LLMs to perform control tasks with varying complexity on both physical systems and digital twins.
  - Evaluation of the effectiveness of the framework in binary and continuous decision making tasks, including collaborative scenarios, demonstrating its scalability and adaptability to advanced automation and optimization challenges.
- **Engineer 2** — Pittsburgh, USA
  KeyLogic — Jan 2024 – Aug 2024
  - **Optimized data workflows and analytical modeling:** Developed and implemented robust data validation, error-checking, and visualization tools to enhance data integrity for process optimization. Improved computational efficiency of analytical models by integrating machine learning surrogates, achieving a 40% reduction in computation time for creating schedules.

Publications

J. Vyas, M. Mercangoz, 'Autonomous Industrial Control using an Agentic Framework with Large Language Models", *Paper submitted to DYCOPS-25* (preprint - https://arxiv.org/abs/2411.05904).

J. Vyas, C. D. Laird, I. E. Grossmann, R. M. Lima, I. Harjunkoski, M. Guintoli, J. Poland, 'Optimization model and algorithms for the Unit Commitment problem", *Paper submitted to ESCAPE-35*.

D. Ovalle, **J. Vyas**, C.D. Laird, I.E. Grossmann, 'Using Machine Learning Surrogates to Bridge Different Time-scales for Optimization of Plant Scheduling and Supply Chain Under Disruptions", *Computer Aided Chemical Engineering (Vol. 53, pp. 1489-1494, 2024). Elsevier.* .

M. A. Zamarripa, E. Shamlou, **J. Vyas**, T. Arnold, P. Tominac, M. H. Shellman, and M. Drouven, "An update on project pareto - new capabilities in doe's produced water optimization framework," *In proceedings of FOCAPD 2024*.

Presentations and Lectures

- D. Ovalle, **J. Vyas**, C.D. Laird, I.E. Grossmann, 'Using Machine Learning Surrogates to Bridge Different Time-scales for Optimization of Plant Scheduling and Supply Chain Under Disruptions' *presented at ESCAPE-PSE 2024*

Awards

- **Best Poster Award**: ChEMSA Research Forum — 2023

Skills

- **Languages:** Python, Julia, Matlab, C++, Git/Github, Gurobi, GAMS
- **Packages:** Pyomo, CrewAI, Pytorch, TensforFlow, NetworkX, OMLT, Scipy, Numpy, Pandas, Sklearn, OpenCV
- **General Coding:** Linux, Python Package Development, Open-source Contributions (3 packages)