

Javal Vyas

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Education

Imperial College London <i>Ph.D. Candidate in Chemical Engineering</i>	London, UK Sept 2024- Dec 2027
Carnegie Mellon University – Carnegie Institute of Technology <i>Master of Science in AI Engineering in Chemical Engineering CGPA: 3.99/4</i>	Pittsburgh, USA Aug 2022 - Dec 2023

Experience

Optimization and Machine Learning Researcher (Multi-agent AI systems) <i>Ph.D. Student advised by Prof. Mehmet Mercangoz</i>	London, UK Sept 2024 – Present
<ul style="list-style-type: none">Engineered agent-based systems where LLMs drive real-time reasoning, fault handling, and safe control actions in both simulated and physical environments.Pioneered the use of LLMs for dynamic planning and finite state machine traversal, enabling intelligent recovery from faults with digital twin validation.	
Engineer 2 <i>KeyLogic</i>	Pittsburgh, USA Jan 2024 – Aug 2024
<ul style="list-style-type: none">Architected advanced data validation pipelines, error-checking mechanisms, and dynamic visualization tools to ensure data accuracy and integrity.Integrated machine learning surrogates to improve computational efficiency of optimization models, reducing schedule generation time by 40%.	

Selected Publications

J. Vyas, M. Gill, A. Markaj, F. Gehlhoff, M. Mercangoz, "Towards Autonomous Fault Management in Process Plants: Leveraging LLM Agents and Digital Twins", *Paper under preparation*.

J. Vyas, M. Mercangoz, "Autonomous Industrial Control using an Agentic Framework with Large Language Models", *Paper accepted at DYCOPS-25 (preprint)*.

J. Vyas, C. D. Laird, I. E. Grossmann, R. M. Lima, I. Harjunkski, M. Guintoli, J. Poland, "Optimization model and algorithms for the Unit Commitment problem", *Paper accepted at 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.*

Presentations and Lectures

- J. Vyas**, M. Mercangoz, 'Autonomous Industrial Control using an Agentic Framework with Large Language Models' *presented at AIChE - Spring Meeting 2025*
- 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:** LangChain, LangGraph, CrewAI, Pytorch, TensorFlow, Huggingface, Pyomo, OMLT, Sklearn,
- General Coding:** Linux, Python Package Development, Open-source Contributions (3 packages)