Elvis Eugene

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Chemical Engineer: Advanced Data Analytics, Process Optimisation, and Detailed Engineering Design

- 13 years' experience as a chemical engineer and well versed in advanced data analytics via machine learning, process modelling, simulations, mathematical optimisation, and statistical inference.
- Background in detailed engineering design, plant construction, commissioning, and troubleshooting.
- Adept at blending academic research insights with industrial innovation to enhance value via scalable, impactful solutions.

Key Skills

P&IDs and PFDs	Data Analytics	Python Programming
Process Optimisation	Machine Learning	Data Visualization
Construction & Commissioning	Statistical Inference	Simulation & Modelling

Professional Experience

Pfizer Inc., Groton, Connecticut, USA **July 2022 – June 2025**
Senior Scientist, Computational Process Design and Optimisation
Drove computational initiatives for the process engineering of active pharmaceutical ingredient (API) synthesis across laboratory and manufacturing environments.

- Leveraged data via dynamic models using first principles and machine learning to scale-up API synthesis from laboratory to manufacturing resulting in 20% faster timelines.
- Defined advanced temperature control strategies based on data analytics with nonlinear and mixed integer programming to limit impurities below 1.5% during commercial manufacturing.
- Commissioned a prototype continuous reactor utilising data driven insights for troubleshooting and risk aversion which enabled 30% faster deployment.
- Accelerated process design using innovations in data science via Bayesian optimization, physics informed-machine learning, and mathematical programming.

Dowling Lab, University of Notre Dame, Notre Dame, Indiana, USA **August 2017 – April 2022**
Research Assistant
Led four projects from concept to completion, delivering innovation in data-driven process engineering for the multiscale design of cutting-edge sustainable technologies.

- Created a novel framework for data-driven decision-making under uncertainty using Bayesian statistical models which use machine learning to determine unknown process dynamics, reducing data requirements at least 50%.
- Designed novel flowsheets and filter fabrication techniques by analysing data from 1000s of optimised designs to use membranes for lithium-ion battery recycling, accelerating workflows by 5x
- Grew the group from four to 15+ members and mentored the team to win two grants and publish four articles.
- Proposed integrated vision of data science to revolutionize molecular-to-systems engineering.

Simon India Limited, New Delhi, India **September 2012 – May 2017**
Senior Process Engineer
Drove process engineering and optimisation for industrial projects as the Engineering, Procurement, and Construction (EPC) consultant for large-scale chemical plants, ensuring on-time delivery of process enhancement and revenue growth.

- Designed (detailed engineering), supervised construction, and commissioned a 2000 metric ton per day sulphuric acid plant with heat recovery system and captive power plant, the first of its kind in India.
- Collaborated with project management to increase project revenue by 17% through contract change-orders.

- Ensured safety compliance as a member of the hazard and operability (HAZOP) studies team for three plants.
- Certified quality compliance for subcontracted units like turbine driven pumps and distributed control systems (DCS).
- Delivered design documents such as P&IDs, PFDs, equipment and instrumentation specifications, and control logics within stipulated deadlines.
- Calculated line hydraulics, equipment sizes, and mass and energy balances for the main plant and offsite utilities.
- Partnered with customers through technical discussions and site visits to build long-term relationships which lead to winning additional contracts.

Education

Doctor of Philosophy, Ph.D., Chemical Engineering Minor: **Computational Science**
Master of Science, M.S., Chemical Engineering
University of Notre Dame, Notre Dame, Indiana, USA

Bachelor of Engineering, B. E., Chemical Engineering
Ramaiah Institute of Technology, Bengaluru, Karnataka, India

Selected Publications

- **Elvis A. Eugene**, Kyla Jones, Xian Gao, Jialu Wang, and Alexander W. Dowling. Learning and Optimization Under Epistemic Uncertainty with Bayesian Hybrid Models. Computers & Chemical Engineering, 179, 108430 (2023).
- Noah P. Wamble, **Elvis A. Eugene**, William A. Phillip, and Alexander W. Dowling. *Optimal Diafiltration Membrane Cascades Enable Green Recycling of Spent Lithium-Ion Batteries.* ACS Sustainable Chemistry & Engineering, 10, 37, 12207-12225 (2022).
- **Elvis A. Eugene**, William A. Philip, and Alexander W. Dowling. *Data Science-Enabled Molecular-to-Systems Engineering for Sustainable Water Treatment.* Current Opinion in Chemical Engineering, 26, 122-130 (2019).

Selected Honors and Awards

- Best Poster Award, Notre Dame Chemical and Biomolecular Engineering Graduate Student Organisation (CBEGSO) Research Symposium 2021
- Notre Dame Learning Outstanding Graduate Student Teacher Award 2020
- The Patrick and Jana Eiler's Graduate Student Fellowship for Energy Related Research 2020

Leadership and Outreach

Session Chair, Modelling & Data analytics, Pfizer Chemistry Connect 2024
Volunteer, Rise Against Hunger, Groton, CT 2023
Session Chair, Modelling & Data analytics, Pfizer Chemistry Connect 2023
Volunteer, Rise Against Hunger 2022
Tutor, Robinson Community Learning Centre 2021
Session Chair, Decision-making for Industrial Process Systems, AIChE Spring Meeting 2020
Chair, Academic Affairs Committee, Notre Dame Graduate Student Government 2019
President, Research Symposium Committee, Chemical Engineering Graduate Student Organisation 2018
Secretary, Research Symposium Committee, Chemical Engineering Graduate Student Organisation 2017