Cheng (Barry) Chen

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RESEARCH INTEREST

- Data Analytics and Machine Learning
- Advanced Process Control and Optimization
- Biotechnology and Medical Innovation
- Sustainable Energy

EDUCATION

Bachelor of Engineering & Management, Chemical Engineering & Management (Co-Op) **2017 – 2023**

McMaster University, Hamilton ON

- Enrolled in a unique 5-year program designed to provide engineering students with a business aptitude

RESEARCH EXPERIENCE

Research Assistant, McMaster University, Hamilton ON **2022 – Present**

Supervisor: *Prof. Shelir Ebrahimi*

- Developed open-access experiential learning modules focusing on design thinking and engineering improvisation
- Designed activity-based learning tools promoting an interactive and engaging learning environment

Undergraduate Thesis Student, McMaster University, Hamilton ON **2022 – Present**

Supervisor: *Prof. Prashant Mhaskar*

- Researched offset-free approach for MPC, actor-critic method, and issues with the DDPG algorithm
- Prepared written term paper and oral presentation for the undergraduate thesis symposium

Research Assistant, McMaster University, Hamilton ON **2022**

Supervisor: *Prof. Prashant Mhaskar*

- Troubleshot significant performance discrepancy between MPC controllers in MATLAB m-file and Simulink file
- Solved continuous setpoints tracking issue in the Simulink reinforcement learning environment by integrating SDI data access method into local reset function

PROFESSIONAL EXPERIENCE

Technical Services Coordinator, Thermo Fisher Scientific, Mississauga ON **2021 – 2022**

- Facilitated manufacturing readiness by reducing group's overdue items by 25% in tight timelines
- Ensured the material specifications align with the latest requirements by communicating with business/project managers and clients in time
- Strived for right first time when maintaining multiple data indices and drafting documents complying with SOP and GMP requirements
- Earned Intensity Achieve, Integrity Inspire, and Involvement Inspire awards (4000+ points) for great teamwork, efficiency, and dedication

PROJECTS

Optimization in Chemical Engineering 2023

- Cooperated in a team of 3 to explore real-world optimization applications and solve the problem using GAMS
- Designed a supply chain network and created mixed integer linear programming and mixed integer nonlinear programming formulations

Chemical Engineering Capstone 2022 – 2023

- Collaborated in a group of 4 to develop an optimization tool for GPS-X to find the best possible wastewater treatment plant design partnered with Hatch Hydromantis
- Developed a Python script based on the NSGA-II algorithm to optimize the WWTP design by minimizing economic costs and environmental impact
- Awarded as the Best Industrial Application at the Expo Day

Engineering & Management Capstone 2021

- Joined a multi-disciplinary team of 6 to tackle the resource allocation problem of Aecon's ESMSA team
- Reviewed the existing status of ESMSA team using business model canvas and researched current market solutions to compare the solutions qualitatively and quantitatively in the integration and cost-benefit aspect
- Maximized added value by proposing to extend the current construction management software license to incorporate the affiliated labour management software

Machine Learning in Python 2020 – 2021

- Initiated a self-directed learning project about various machine learning topics
- Learned 20+ techniques of regression, classification, clustering, deep neural networks, natural language processing, dimensionality reduction, and decision making
- Coded a stacked LSTM model making one-step and multi-step forecasting to solve the stock price prediction problem in the COMAP math modeling contest

Big Data Methods & Modelling 2021

- Collaborated in a group of 3 to work on Melbourne rainfall dataset to understand the correlations within variables and create a rainfall prediction model
- Identified positive/negative relationships among variables and lowered the dimensions from 15 to 7 while keeping 90% of the original information using PCA
- Improved prediction accuracy by 48% using logistic regression to predict rainfall likelihood instead of using neural networks to predict the rainfall quantity

Chemical Process Synthesis & Simulation 2019

- Collaborated in a team of 4 to develop an innovative process that transforms waste plastics into ethylene and other valuable byproducts
- Participated in designing a feasible chemical process and drawing a diagram using Lucidchart
- Achieved 99% ethylene purity while emitting 78% less greenhouse gases than traditional process
- Analyzed the life cycle inventory, supply chain, and the environmental impact using openLCA

SKILLS

Laboratory

- WHMIS Trained
- Experienced with general chemistry, polymers, wastewater treatment, fluid circuit, distillation column, heated tanks

Software

- Proficient in Microsoft Office Suite, MATLAB, Simulink
- Experienced with GAMS, Autodesk Inventor, Aspen Plus, Power BI, AutoCAD, openLCA, Minitab

Programming

- Proficient in MATLAB
- Experienced with Python, GAMS, VBA, HTML, CSS, SQL

CERTIFICATION

- Lean Six Sigma Black Belt

MEMBERSHIP

Summer Student, McMaster Advanced Control Consortium **2022**

REFERENCES

Dr. Prashant Mhaskar (Professor)
Department of Chemical Engineering, McMaster University
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Dr. Jake Nease (Assistant Professor and Undergraduate Associate Chair)
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