Cheng (Barry) Chen

LinkedIn: linkedin.com/in/barryatwork • Phone: +1 (647) 676 2854 • Email: chenc106@mcmaster.ca
Website: barryf710.github.io

RESEARCH INTEREST

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

EDUCATION

Master of Engineering, Chemical Engineering & Applied Chemistry 2023 – Present
University of Toronto, Toronto ON

Bachelor of Engineering & Management, Chemical Engineering & Management (Co-Op) 2017 – 2023
McMaster University, Hamilton ON

RESEARCH EXPERIENCE

Undergraduate Thesis Student, McMaster University, Hamilton ON 2022 – 2023
Supervisor: *Prof. Prashant Mhaskar*

- Researched offset-free approach for MPC, actor-critic method, and issues with the DDPG algorithm
- Conducted case studies on SISO and MIMO systems and proposed potential improvements for future work
- Prepared written term paper and oral presentation for the undergraduate thesis symposium

Research Assistant, McMaster University, Hamilton ON 2022 – 2023
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

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 Formulation & Solution **2023**

- Cooperated in a team of 3 to explore real-world optimization applications in supply chain management
- Designed a dynamic supply chain network and formulated mixed integer linear/nonlinear programming models
- Performed case studies on biodiesel supply and solved the problem using GAMS

Chemical Engineering Capstone **2022 – 2023**

- Collaborated in a group of 4 to develop an optimization tool for Hatch Hydromantis to find the best possible wastewater treatment plant design using GPS-X
- 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 McMaster Engineering Capstone 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, Python
- Experienced with GAMS, VBA, HTML, CSS, SQL

CERTIFICATION

- Lean Six Sigma Black Belt

MEMBERSHIP

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