Hugo Dignoes Ricart

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Education

MEng Chemical Engineering   September 2022 – Present
The University of British Columbia   *Vancouver, BC*

BASc Chemical Engineering (minor in Chemistry)   September 2016 – May 2021
The University of British Columbia   *Vancouver, BC*

Research Experience & Capstone

Mitacs Intern   September 2023 – Present
The University of British Columbia & Clean Seas   *Vancouver, Canada*

- **Subject:** Marine Shipping Decarbonization
- **Supervisor:** Drs. Amanda Giang and Simone Philpot (UBC Dept. of Mechanical Engineering & Institute for Resources, Environment, and Sustainability)
- Worked in an interdisciplinary team to advise the Canadian Coast Guard on decarbonizing their fleet using multiple proposed technologies
- Established the needs and desires of stakeholder through consultation and workshops, then designed performance metrics accordingly
- Applied systems thinking to consider how each technology interacts with each stakeholder and the environment

Student Researcher   October 2021 – Present
The University of British Columbia   *Vancouver, BC*

- **Subject:** Chemical Looping Oxidative Dehydrogenation of Propane
- **Supervisor:** Dr. Chester Upham (UBC Dept. of Chemical Engineering)
- Conducted a technoeconomic analysis of novel industrial process for the dehydrogrenation of propane
- Built and validated process simulations for conventional and novel dehydrogenation processes using AspenTech software and Python, and experimental data
- Performed CAPEX and OPEX calculations using CapCost and CatCost software, along with Aspen Plus models
- Evaluated the various process cases using discounted cash flow rate of return, as well as net present value and levelized cost of production

Capstone Project   August 2020 – May 2021
The University of British Columbia & FortisBC   *Vancouver, BC*

- **Production of Renewable Natural Gas: Methanation of CO_2 Using H_2 Obtained Through Water Electrolysis**
- Selected by a panel of industry leaders for the Design & Innovation Day Award
- Design of a Sabatier plant which takes CO2 and green hydrogen as inputs, and outputs hot water and natural gas suitable for direct injection into the FortisBC natural gas main
- Addresses several issue key issues of the energy transition:

- ⋆ Has the capability of storing vast amounts of renewable energy with efficiencies paralleling pumped hydro
- ⋆ Stored energy does not require costly new infrastructure, and can be transported reliably to rural communities
- ⋆ Can be operated with near net-zero carbon emissions over its lifecycle
- ⋆ Waste products (O_2 and water) can be recovered and sold
- Several breakeven scenarios were identified and the process is undergoing further investigation by FortisBC to determine feasibility
- A single plant was projected to eliminate 6000 tonnes of carbon equivalents per year

Undergraduate Research Assistant
The University of British Columbia

May 2017 – May 2018

Vancouver, Canada

- **Subject:** Measuring the Mechanical Properties of Neurospheres
- **Supervisor:** Dr. Vikramaditya G. Yadav (UBC Dept. of Chemical Engineering)
- Developed a low-cost device to accurately measure viscoelastic properties of stem cell-derived neural spheroids for chronic traumatic encephalopathy/Alzheimer's research
- Designed experimental procedures; collected and processed data
- Identified and remedied weaknesses and failures of early prototypes while reducing costs

Design Teams

Team Lead
UBC Agrobot

February 2023 – Present

Vancouver, BC

- ⋆ Led an interdisciplinary team in the design and logistics of a semi-autonomous hydroponic crop-growing operation
- ⋆ Applied process engineering principles to maximize resource efficiency
- ⋆ Collected data and executed bump tests to parameterize operating conditions for optimization
- ⋆ Leading various sustainability-focused initiatives on UBC's Vancouver campus
- ⋆ Collaboration with SEEDS analyzing food consumption patterns of UBC students
- ⋆ Small-scale biodiesel production in a department lab for use by the University Endowment Lands' water heaters

Member
Engineers for a Sustainable World

September 2022 – May 2023

Vancouver, BC

- ⋆ Leading various sustainability-focused initiatives on UBC's Vancouver campus
- ⋆ Collaboration with SEEDS analyzing food consumption (TBD)
- ⋆ Small-scale biodiesel production in a department lab (work began Dec 2022)

VP External
UBC Envision/AICHE Student Chapter

May 2018 - October 2018

Vancouver, BC

- ⋆ Represented the university as well as the regional student chapter of the American Institute of Chemical Engineers
- ⋆ Prepared a list of conferences, competitions, and funding opportunities for the upcoming year.
- ⋆ Functioned as primary contact for our sister chapter in Barcelona

Safety Officer
UBC Envision

May 2017 – May 2018

Vancouver, BC

- ⋆ Recognized, documented and advised on removal of hazards ‘
- ⋆ Conducted safety audits, managed chemical inventory, and ensured proper disposal of all waste
- ⋆ Trained new team members in workshop and lab safety
- ⋆ Reviewed and advised on development of Standard Operating Procedures
- ⋆ Negotiated and mediated agreements between design teams sharing labs and workshop space
- ⋆ Designed and built inventory system on Google Drive

Electrical Team Lead   September 2016 – May 2017
UBC ChemE Car   *Vancouver, BC*

- ⋆ Led team of 6 in design and building of circuit for small chemically powered car
- ⋆ Designed and improved sensing and control systems
- ⋆ Coordinated with two other teams to create empirical model of car speed and iodine clock reaction based on initial conditions

Other Experience

Teaching Assistant   Sept 2023 – May 2024
UBC   *Vancouver, BC*

- ⋆ Taught a tutorial section for LFS 250; Land, Food, and Community
- ⋆ Facilitated interdisciplinary discussion on food systems and the complexities that arise when considering government, social, and environmental factors
- ⋆ Provided feedback on tutorial participation and deliverables

Process Consultant   May 2023 – Aug 2023
Independent Contractor – Exaer Carbon   *Boulder, CO*

- ⋆ Ran a feasibility analysis on a proposed process coupling with the purpose of facilitating a patent application
- ⋆ Simulated a catalytic process using open-source software and code
- ⋆ Performed a sensitivity analysis to search for possible break-even conditions
- ⋆ Produced a class 5 technoeconomic model, along with a levelized cost of production

Teaching Assistant   January 2023 – May 2023
UBC   *Vancouver, BC*

- ⋆ Supervised the 400-level chemical engineering labs
- ⋆ Helped students design and run their experiments, advising on the safety, feasibility, and communication of results
- ⋆ Marked lab reports, presentations, and exams

Tutor   August 2020 – June 2021
Paper.edu   *Vancouver, BC*

- ⋆ Tutored several students in Math, Physics, Chemistry, Biology, and Spanish
- ⋆ Collaborated with other tutors and teachers to design strategies for particular students

Product Manager   May 2020 - August 2020
DECAP Research & Development   *Vancouver, BC*

- ⋆ Provided 3D-printable face shields during the early moths of the COVID-19 Pandemic
- ⋆ Consulted stakeholders to improve design without sacrificing safety

Volunteer Various
UBC Dept. of Chemical and Biological Engineering *Vancouver, BC*
- ⋆ Helped manage and attended various conferences hosted by UBC's CHBE and Biomedical Engineering departments, including CCEC 2022, CEEA 2018 and the GENESIS symposium (2018)

Conferences

Chemical and Biological Engineering Research Day 2023 – Presented *Propane Oxidative Dehydrogenation utilizing Liquid Metal Chemical Looping Catalysts* alongside Majd (Mark) Tabbara. **Note: this is a different presentation from the one below**

Canadian Chemical Engineering Conference 2022 – Supported Majd (Mark) Tabbara in his poster presentation *Propane Oxidative Dehydrogenation utilizing Liquid Metal Chemical Looping Catalysts*

Awards & Honors

Outstanding International Student
University of British Columbia *2016*

Design and Innovation Day Award – Industry's Choice
University of British Columbia *2021*

Specialized Skills and Certifications

Programming Languages: Python, MATLAB, Arduino, Ruby on Rails (certified)
Process Modelling: Aspen Plus, HYSYS, Energy Analyzer, Adsorption
Certifications:
- · All required certifications to work in any UBC chemical, biological lab, or engineering workshops are up to date.
- · WHMIS
- · Radiation Safety
- · Trained in lasercutting, 3D printer maintenance & basic workshop functions

Languages: English (native), Spanish (native), French (near-fluent), Catalan (proficient)