Hugo Dignoes Ricart

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Research Interests

Low-cost air quality sensing; air pollution exposure in community spaces; sensor calibration and uncertainty; wildfire plume chemistry and source apportionment; reactive transport and chemical kinetics; environmental monitoring; public communication of environmental data; decision support for sustainability and decarbonization.

Education

PhD in Mechanical Engineering September 2024 – Present
The University of British Columbia *Vancouver, BC*
Supervisor: Naomi Zimmerman

MEng in Chemical Engineering September 2022 – May 2024
The University of British Columbia *Vancouver, BC*

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

Research Experience

Graduate Researcher September 2024 – Present
The University of British Columbia *Vancouver, BC*
Project: Community Cleaner Air Spaces in British Columbia
Supervisor: Naomi Zimmerman (Department of Mechanical Engineering)

- Conduct research on air quality in community spaces such as libraries, recreation centres, and places of worship, with a focus on measurement, interpretation, and public communication.
- Develop and apply machine-learning calibration approaches for low-cost air quality sensors measuring multiple pollutants.
- Design data processing and dissemination workflows for near-real-time communication of air quality information through a public-facing dashboard and third-party chatbot platform.

Mitacs Intern September 2023 – April 2024
The University of British Columbia & Clear Seas *Vancouver, BC*
Project: Marine Shipping Decarbonization
Supervisors: Amanda Giang and Simone Philpot

- Contributed to an interdisciplinary research project examining decarbonization pathways for the Canadian Coast Guard fleet.
- Participated in stakeholder consultation and structured decision-making workshops to identify priorities, evaluation criteria, and performance metrics.
- Applied systems thinking and cross-impact balance analysis to develop scenarios for the adoption of marine decarbonization technologies.
- Integrated qualitative and quantitative evidence to support comparative assessment of potential transition pathways.

Student Researcher October 2021 – March 2024
The University of British Columbia *Vancouver, BC*
Project: Chemical Looping Oxidative Dehydrogenation of Propane
Supervisor: Chester Upham (Department of Chemical and Biological Engineering)

- Conducted a technoeconomic analysis of novel propane dehydrogenation processes.
- Built and validated process simulations for conventional and alternative process configurations using AspenTech software and Python, informed by literature and experimental data.
- Performed CAPEX and OPEX estimation using CapCost, CatCost, and Aspen Plus models.
- Evaluated process cases using discounted cash flow rate of return, net present value, and levelized cost of production.

Peer-Reviewed Publications

- Tabbara, M., Zong, Z., **Ricart, H. D.**, Chifra, S., & Upham, C. (2024). Propane oxidative dehydrogenation catalyzed by molten metal alloys. *Catalysis Science & Technology*.

Conference Presentations

- **Ricart, H. D.**, Webber, C., Traboulay, K., Semler, T., Peterson, E., & Zimmerman, N. (2026). *Making Sense of Air Sensors: A Three-Pronged Approach to Publicly Sharing Air Quality Data.* Oral presentation accepted for the Air Sensors International Conference (ASIC) 2026, Los Angeles, California.
- Webber, C., **Ricart, H. D.**, Kumar, A., Peterson, E., Salo, L., & Zimmerman, N. (2026). *Influence of Building Characteristics on Indoor Air Quality in Community Clean Air Spaces.* Poster presentation accepted for the Air Sensors International Conference (ASIC) 2026, Los Angeles, California.
- Philpot, S., Liu, Z., **Ricart, H. D.**, Kaufmann, C., Satterfield, T., & Giang, A. (2024). *Decision Support for Zero-Impact Marine Shipping.* Presented at the INFORMS Annual Meeting, Seattle, Washington, October 20–23, 2024.
- Philpot, S., **Ricart, H. D.**, Liu, Z., Satterfield, T., & Giang, A. (2023). *Cross-impacts balance analysis of marine shipping environmental futures.* Poster presented at the American Geophysical Union (AGU) Fall Meeting, San Francisco, California, December 11–15, 2023.

Awards and Honours

Graduate Award in Population Health and Engineering 2025
The University of British Columbia

Design and Innovation Day Award 2021
The University of British Columbia

Outstanding International Student 2016
The University of British Columbia

Teaching Experience

Teaching Assistant 2022 – Present
The University of British Columbia *Vancouver, BC*

- CHBE 464 – Chemical and Biological Engineering Laboratory (2023, 2024, 2025, 2026)

- ENVE 203 – Environmental Engineering and Sustainability (2024, 2025, 2026)
- ENVE 201 – Technical Communications for Environmental Engineering (2024)
- LFS 250 – Land, Food, and Community (2023, 2024)

Tutor August 2014 – Present
Tutorbright, HY Academy, Paper.edu, and Freelance *Vancouver, BC*

- Tutor high school and undergraduate students in Physics and Chemistry.

Leadership and Service

President October 2024 – Present
UBC Sailing Club *Vancouver, BC*

- Provide executive leadership for Canada's largest not-for-profit sailing club, guiding operations and long-term planning, and managing over $400k in assets.
- Oversee budgeting, volunteer coordination, and act as a liaison between the university, student union, and sailing community.
- Advance initiatives related to accessibility, safety, and long-term sustainability of club programs and assets.

Volunteer Rescue Responder April 2025 – Present
Jericho Rescue *Vancouver, BC*

- Support marine safety and emergency response operations in Burrard Inlet as part of a volunteer rescue team.
- Assist the Jericho Rescue team in responding to on-water incidents.
- Operate in time-sensitive situations requiring teamwork, situational awareness, and sound judgment.

Outreach and Knowledge Mobilization

Mitacs Intern – Knowledge Mobilization September 2025 – Present
The University of British Columbia & Clear Seas *Vancouver, BC*
Project: Canadian Marine Shipping Risk Forum
Supervisors: Meghan Mathieson (Clear Seas)

- Coordinated a webinar series connecting researchers, government, and industry stakeholders to facilitate knowledge exchange on marine shipping risk and environmental futures.
- Managed logistics, speaker outreach, and session design to support translation of research findings for non-academic audiences.

Professional Experience

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

- Conducted a feasibility analysis of a proposed process coupling strategy in support of a patent application.
- Simulated a catalytic process using open-source tools and custom Python scripts.
- Performed sensitivity analyses to identify potential break-even conditions.

- Produced a Class 5 technoeconomic model and levelized cost estimate.

Research Methods and Technical Skills

- **Programming and analysis:** Python, R
- **Environmental data and sensing:** low-cost air quality sensors, remote sensor calibration, dashboard and data pipeline development
- **Process modelling and engineering economics:** Aspen Plus, AspenTech tools, CapCost, CatCost, technoeconomic analysis
- **Languages:** English, Spanish, French, Catalan