

Zoé Victoria Lord

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EDUCATION AND TRAINING

Doctorate of Philosophy in Chemistry

Queen's University [Sep 2022 – Current]

Country: Canada | **Field(s) of study:** Chemical Engineering ; Chemistry | **Final grade:** GPA: 4.3 (A+) | **Thesis:** An Investigation of Cognitive Load in Virtual Reality Chemistry Learning Environments

Links: <https://www.queensu.ca/artsci/news/passion-mentorship-and-research-excellence> | <https://tinyurl.com/3xan4pk8>

My research applies machine learning algorithms to predict cognitive load of users in virtual reality environments. Cognitive load is physiologically captured using fNIRS wearables to monitor cortical hemodynamics and eye-tracking technologies to measure visual attention.

Bioastronautics Certificate with Concentration in EVA Suit Evaluation

International Institute for Astronautical Sciences [Mar 2023 – Current]

Country: United States | **Field(s) of study:** EVA Suit Evaluation

Bachelors of Science in Chemistry (Minor in Biology)

Concordia University [Sep 2019 – May 2022]

Country: Canada | **Field(s) of study:** Chemistry ; Biology | **Final grade:** Degree Honors with Distinction | **Thesis:** Stabilization of CsPbBr₃ Nanocrystals in the Presence of Soy Lecithin as a Capping Agent Using Microwave-Assisted Solvothermal Synthesis

Bachelors of Science in Behavioral Neuroscience

Concordia University [Sep 2016 – Aug 2019]

Country: Canada | **Field(s) of study:** Neuroscience ; Psychology

Private Pilot License

Global Training Flight Solutions [Sep 2022 – Current]

Open Water Scuba Diver

PADI [Feb 2023 – Jul 2023]

First Aid Responder (Standard First Aid and CPR/AED Level A)

Concordia University & CNESST [Aug 2022 – Current]

WORK EXPERIENCE

Research Assistant and Team Lead

Concordia University [May 2022 – Aug 2023]

Link: <https://www.space.com/parabolic-flight-canada-weightless-student-science>

Research assistant in Dr. Kadem's Laboratory of Cardiovascular Fluid Dynamics, within the Department of Mechanical, Industrial, and Aerospace Engineering. Led a team of undergraduate students to engineer a new class of cardio-pulmonary resuscitation (CPR) manikins as a testing platform to optimize CPR procedures for human spaceflight missions using 3D-printed technologies and cardiovascular mechanics. This testing platform accurately gauges simulated blood pressure and cerebral blood flow through a fiber optic pressure transducer. The research study was selected by SEDS-Canada as a winning candidate for the 2023 Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge to fly the payload on parabolic flight with the National Research Council of Canada (NRC) and the Canadian Space Agency (CSA).

Graduate Teaching Assistant

Queen's University [Sep 2022 – Current]

Supervising students in the teaching laboratory and provided strategic guidance in analytical methods to ensure their success in retrieval of synthetic product. Directing the following teaching laboratories: General Chemistry I, Organic Chemistry I, Organic Chemistry II, and Principles of Chemical Reactivity.

Hackathon Coordinator and Host

Queen's University [Jan 2024 – Feb 2024]

Organized the Next Generation Medical Simulation Hackathon at the Clinical Simulation Centre and Ingenuity Labs Research Institute. This event aimed to encourage innovation in medical simulation technologies, where the hackathon challenged student teams on enhancing professional skills and competencies in real-world healthcare scenarios. The role involved overseeing the entire event logistics, including organizing the registration system and publicizing the event to attract students across all academic disciplines at Queen's and York University. Designed a comprehensive sponsorship package and successfully secured funding from UP360 and Laerdal Inc. Critical milestones of the event organization process involved drafting detailed schedules, coordinating with the Faculty of Arts and Science for promotional activities, and ensuring the availability of necessary resources for student teams. Hosted in-person events and collaborated with hackathon organizers to ensure that the medical simulation tour proceeded smoothly. Additionally, the role required engaging with contestants and sponsors to provide a platform for networking and knowledge exchange.

Laboratory Stock Keeper

Concordia University [Sep 2020 – May 2022]

Prepared chemical materials and solutions using various analytical techniques. Directed the following teaching laboratories: Organic Chemistry III (Organic Reactions), Organic Chemistry IV (Organic Structure and Stereochemistry), and Biochemistry III (Advanced Laboratories in Biochemistry).

DIGITAL SKILLS

C# / Python / MATLAB / IBM SPSS Statistics / Machine Learning / Neural Networks & Deep Learning / Virtual Reality (VR) / Mixed Reality (XR) / Unity Engine / SolidWorks / Git / Data Management & Analysis / draw.io (Diagramming Tool) / Microsoft Excel / OxySoft & Fieldtrip (fNIRS) / VR Eye-Tracking / Electrocardiography (ECG) / Galvanic Skin Response (GSR)

Soft Skills

Fluently Bilingual (English & French) / Problem-Solving / Adaptability / Persevering / Receptive to Feedback / Time Management / Attention to Detail / Active Listening / Team Collaborator

HONOURS AND AWARDS

[Aug 2024] Canadian Space Agency

Canadian Space Agency (CSA) Grant Award for International Astronautical Congress (IAC) 2024 Participation Recipient of the CSA grant award and selected as one of CSA's International Space Education Board (ISEB) students to attend the IAC 2024, alongside students supported by JAXA, ESA, NASA, and other ISEB member space agencies.

[Dec 2022] SEDS-Canada

Winning Candidate for Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge 2023 – Mission Specialist and Team Lead Selected by SEDS-Canada as one of four projects nationwide to engineer a payload for parabolic flight in the 2023 Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge with the National Research Council of Canada (NRC) and the Canadian Space Agency (CSA). This award promoted the development of a research payload for a high-fidelity cardiopulmonary resuscitation (CPR) manikin optimized for space environments.

Link: <https://www.space.com/parabolic-flight-canada-weightless-student-science>

[Nov 2021] SEDS-Canada

Winning Candidate for Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge 2022 – Backup Mission Specialist Selected by SEDS-Canada as one of four projects nationwide to engineer a payload for parabolic flight in the 2022 Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge with the National Research Council of Canada (NRC) and the Canadian Space Agency (CSA). This award promoted the development of a research payload to investigate the effects of micro- and hyper-gravity on the expression of stress-related STRE genes in human cells.

[Sep 2024] Queen's University

Friends in Chemistry Award for Excellence in Teaching Nomination

[Jun 2023] Canadian Society for Chemistry

'1st Place' Graduate Student Poster at Canadian Society for Chemistry Conference

[May 2022] Concordia University

'1st Place' at Student Leadership Conference

[May 2022] Concordia University

'Most Liked Poster' at Student Leadership Conference

[Jun 2013] Saint Thomas High School

Computer Technology Award

CONFERENCES AND SEMINARS

[Oct 2024] Milan

Oral Presentation at the International Astronautical Congress (IAC 2024) Presenting my research titled: Ergonomic Evaluation of Extravehicular Activity (EVA) Systems on Musculoskeletal Strain and Fatigue during Extended Lunar Surface EVAs for the Space Life Science session named: Life Support, Habitats and EVA Systems.

Link: <https://iafastro.directory/iac/paper/id/86069/abstract-pdf/IAC-24,A1,7,4,x86069.brief.pdf?2024-03-26.17:16:15>

[Oct 2024] Milan

Oral Presentation at the International Astronautical Congress (IAC 2024) Presenting my research titled: The Pursuit for a "Gold Standard" Cardiopulmonary Resuscitation (CPR) Method for Human Spaceflight: A Novel CPR Testing Platform for the Space Life Science session named: Medical Care for Humans in Space.

Link: <https://iafastro.directory/iac/paper/id/86302/abstract-pdf/IAC-24,A1,3,6,x86302.brief.pdf?2024-03-28.08:18:55>

[Oct 2024] Annapolis

Guest Speaker at United States Naval Academy

[Oct 2023] Las Vegas

Finalist for Humans in Space Challenge at the ASCEND Conference hosted by AIAA

[Jan 2023] Montreal

Guest Speaker at the Canadian Space Conference hosted by SEDS-Canada

[Oct 2023] Kingston

Research Poster at the Robotics and AI Symposium

[Jun 2023] Vancouver

Research Poster at the Canadian Society for Chemistry Conference

[May 2022] Montreal

Research Poster at the Student Leadership Conference

PROJECTS

[Feb 2024 – Current]

Ergonomic Evaluation of Extravehicular Activity (EVA) Systems on Musculoskeletal Strain and Fatigue during Extended Lunar Surface EVAs Conducting research on the ergonomic evaluation of Extravehicular Activity (EVA) systems, focusing on musculoskeletal strain and fatigue during extended lunar surface EVAs. The study, conducted at the International Institute for Astronautical Science (IIAS)'s Gravity-Offset Laboratory at the Florida Institute of Technology, aims to assess the physical demands, non-ergonomic working conditions, and restrictive mobility faced by EVA astronauts. Utilizing an electromechanical system that mimics reduced gravity conditions, astronaut trainees engage in tasks such as collecting soil samples and navigating uneven terrain while equipped with sensors to monitor muscle activation, heart rate variability, and physiological stress. The findings aim to identify high-risk movements and postures to support the development of target interventions for muscle rehabilitation and performance optimization for long-duration spaceflight missions.

[Jan 2022 – May 2022]

Undergraduate Honors Thesis: Stabilization of CsPbBr₃ Nanocrystals in the Presence of Soy Lecithin as a Capping Agent Using Microwave-Assisted Solvothermal Synthesis Completed a research project in Dr. Majewski's Solar Energy Conversion Group to examine the stabilization of cesium lead halide perovskite nanocrystals (CsPbX₃, X = Cl, Br, and I) under ambient conditions through the presence of lecithin capping groups. Microwave-assisted solvothermal methods were experimented to replace conventional hot-injection methods that require harsh reaction conditions and high energetic demands. Promising

nanocrystals were further isolated and characterized by X-Ray Powder Diffraction, alongside UV/VIS, Photoluminescence, and ATR-IR Spectroscopic techniques. Thus, my independent study aspired to optimize the existing synthesis of cesium lead halide nanocrystals in order to enhance its stability under ambient conditions while supporting a greener and more sustainable approach. Additionally competed in the Research Poster Competition at the Student Leadership Conference and won '1st Place' along with 'Most Liked Poster'.

VOLUNTEERING

[Oct 2021 – Oct 2022] Montreal

Co-Lead Data and Biotechnology Scientist in Space Health Division at Space Concordia Project manager of two space engineering payloads to design and test innovative biomedical devices and gene expression for microgravity environments. The first project, CPRad, aimed to improve the efficiency and outcomes of cardiopulmonary resuscitation (CPR) in space by using an assistant device that can provide real-time feedback on the force, depth, and rate of compressions applied during CPR. The second project, MICRO2, used a microfluidic platform to investigate the effects of micro- and hyper-gravity on the expression of stress-related STRE genes in human cells and was further analyzed through PCR bioanalytical testing. Our team's work on MICRO2 was recognized by SEDS-Canada as a winning candidate for the 2022 Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge for parabolic flight with the National Research Council of Canada (NRC) and the Canadian Space Agency (CSA).

[May 2024] Kingston

Volunteer Assistant for Medical Wilderness Simulation at Queen's University Assisted in a restricted resource acute medicine exercise for Queen's Emergency Medicine and Resuscitative Education Department, in collaboration with Canadian Armed Forces Search and Rescue, Special Operations, and Emergency Medicine residents.

[Jan 2022 – Current] Kingston

VR Classroom Initiative Coordinator and Educator Volunteer at Mars Society of Canada Leading the VR Classroom Initiative and closely working with industry partners to immerse youth in an interactive exploration of space. Currently modifying existing VR games from an English to French UI and acting as an educator volunteer at the Mars Explorer Program by visiting Canadian elementary schools in the classroom to conduct lesson plans designed to teach young learners about Mars. Equally administering the Mars Educator Program by connecting with Canadian elementary schools to deliver interactive learning modules at the classroom-level.

[Aug 2022 – Aug 2023] Montreal

Concordia Emergency Response Teammember (CERT) at Concordia University Acted as a first responder at Concordia University to assist in evacuations and other emergencies that may occur on campus. This course prepared staff members of Concordia University for emergencies and usage of medical equipment.

[Dec 2021 – May 2022] Montreal

VP of Academic Affairs for Chemistry and Biochemistry Department at Concordia University Assisted as a liaison between students-and-professors in the Chemistry and Biochemistry Department. Produced an academic podcast series highlighting various professors in the Chemistry and Biochemistry Department and their diverse research groups housed at Concordia University with the aspiration to inspire student's CHEM419/450 research projects by introducing them to a principal investigator that compliments their skillset and interests.

Link: <https://www.youtube.com/watch?v=YVphJZj-sdE&feature=youtu.be>

[May 2015 – Aug 2016] Montreal

Patient Care Volunteer (400+ Volunteer Hours) at the Lakeshore General Hospital Provided support for volunteer services and auxiliary programs within the hospital. Completed the Caregiver Workshop to enhance positive interactions with geriatric patients. Assisted in ambulation care and oral feeding (while additionally delivering and preparing meals) for patients incapable of performing these daily living functions. Supported nurses and medical staff with feedback to improve the safety, well-being, and care of patients. Displayed a cheerful, friendly, and compassionate demeanor to enrich patient's mood.

[Jan 2016] Montreal

Voluntary Medical Assistant at the Centre Médical Brunswick / Brunswick Medical Center Worked alongside Dr. Dardashti at the Walk-In Clinic to assess and treat patients. Assisted with medical instruments, suture removal, and injections to facilitate the physician's medical consultation. Contributed feedback when recording medical history, vital statistics, and test results in patient's health records.