Candice J. X. Ip

Curriculum Vitae

CONTACT INFORMATION

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EDUCATION

The University of British Columbia (UBC) Vancouver, BC
MSc, Physics Sep 2020 - Present

- Thesis Topic: Quantative MRI using Luminal Water Imaging for Clinical Prostate Cancer Detection
- Relevant Coursework: Nuclear Magnetic Resonance Imaging, Radiological Imaging, Visual Computing, Quantum Mechanics

The University of British Columbia (UBC) Vancouver, BC
BASc, Engineering Physics, Minor in Commerce Sep 2013 - May 2018

- Graduation with Dean's Honour List
- Relevant Coursework: Linear Circuits, Signal and systems, Systems and Control, Electronic Circuits, Digital Systems and Microcomputuers, Applied Partial Differential Equations, Variational and Approximate Methods, Optics, Electromagnetic Theory

Eidgenössische Technische Hochschule Zürich (ETHZ) Zurich, Switzerland
Exchange Student (Mechanical and Process Engineering) Sep 2016 - Feb 2016

- Studied graduate level courses during an exchange semester during my BASc
- Relevant Coursework: Quantitative Flow Visualization, Plasmonics, and Radiation Heat Transfer

RESEARCH

MRI Research Lab, UBC Vancouver, BC
MSc Student advised by Dr. Piotr Kozlowski Sep 2020 - Present

Developing computer vision algorithms for quantitative MRI analysis of prostate tissue using novel Luminal Water Imaging (LWI) technique.

- Currently writing Python and MATLAB code to analyze multiexponential T2 signal for multiparametric mapping of quantitative properties and cancer probabilities
- Implemented and tested U-NET architectures to automatically segment the prostate gland from its surrounding regions in MR T2 echo images

Nanoplasmonics Laboratory, University of Victoria Victoria, BC
Undergraduate Researcher advised by Dr. Reuven Gordon May 2017 - Aug 2017

Awarded an NSERC Research Award to research optical tweezing techniques for egg-white protein analysis and co-authored to two peer-reviewed publications.

- Developed MATLAB code using autocorrelation and standard deviation analyses on Brownian motion signals to characterize and identify proteins based on molecular mass
- Assisted in the design of double-nanoholes aperatures (DNH) and characterized its degradation and efficacy through SEM and protein trapping ability

RREACH Lab, UBC Vancouver, BC
Undergraduate Researcher advised by Dr. Machiel Van der Loos May 2016 - Aug 2016

Awarded an Undergraduate Student Research Award Fellowship for conducting clinical studies and successfully developed a pediatric "smart" mattress prototype.

- Designed, produced, and tested SleepSmartV2, the lab's first digital sensor prototype to measure temperature and motion in real time using a PIC18F4550 microcontroller programmed in C and interfaced with LabVIEW and MATLAB
- Conducted human research trials with SleepSmartV1 under the guidelines of the Research Ethics Board of Canada

Atomically Resolved Dynamics, Max Planck Institute for the Structure and Dynamics of Matter — Hamburg, Germany
Undergraduate Researcher advised by Dr. Wesley Robertson — Jan 2015 - Apr 2015
Developed software and hardware for laser and mass spectrometry research and contributed to a peer-reviewed journal publication.
- Implemented MATLAB and LabVIEW software algorithms to develop an auto-alignment system for high-throughput sampling with an achieved alignment accuracy of 3.7μm

Teaching Assistance at UBC

Physics 401: Electromagnetic Theory — Spring 2021
Topics: Maxwell's Theory, Wave propagation in dielectrics, conductors and plasmas, wave guides, radiation, antennae, and special relativity

Physics 100: Introductory Physics — Fall 2020
Topics: Kinematics, force, energy, momentum, use of graphs and vectors in physics; thermal energy, heat transfer, and electricity

Work Experience

Stōkō — Vancouver, BC
Engineering Physicist & Mechanical Designer — Oct 2018 - July 2020
Brought mechanical, research, and imaging expertise to design, develop, and test the Stoko K1 knee brace from prototype to production.
- Independently developed the proprietary 3D imaging system software to inform and combine biomechanics to the design of the knee brace
- Supervised two engineering interns and collaborated in designing and developing an automated test jig to determine and confirm the mechanical efficacy of the brace
- Developed and conducted pilot studies together with physiotherapists under the guidelines of Research Ethics Board of Canada

Dynamic Optics — Port Coquitlam, BC
Project Coordinator & Mechanical Engineer — Jun 2020 - Oct 2020
Managed mechanical designs, optimized the optical and fluid subsystems, and coordinated among key industry stakeholders for the HyDRA optical mirror polisher project.
- Developed preliminary designs for optical metrology systems using both commercial and experimental interferometry systems
- Supervised mechanical engineering co-op students on the design of HyDRA force plates and safety systems surrounding a KUKA robot

International Student Summer Programs — Victoria, BC
Student Assistant — Summers of 2011-2013
Assisted with teaching English to Japanese students during Summer exchange programs.

Badminton Coach — Victoria, BC
Coach — 2009 - 2013
Taught badminton to youths aged 7-18 for various badminton programs.

Peer-Reviewed Publications

N. Hachohen, **C. J. X. Ip**, and R. Gordon. "Analysis of Egg White Protein Composition with Double Nanohole Optical Tweezers". *ACS Omega*. 2018, 3, 5, 5266-5272. doi.org/10.1021/acsomega.8b00651.
My contributions: aided in performing analysis and manuscript writing.

N. Hachohen, **C. J. X. Ip**, G. K. Laxminarayana, T. S. DeWolfe, and R. Gordon. "Nanohole optical tweezers in heterogeneous mixture analysis". *Proc. SPIE 10347, Optical Trapping and Optical Micromanipulation XIV 103470F*, 2017. doi.org/10.1117/12.2273358.
My contributions: aided in performing analysis and manuscript writing.

W. D. Robertson, L. R. Porto, **C. J. X. Ip**, M. K. T. Nantel, F. Tellkamp, Y. Lu, and R. J. D. Miller. "Note: A simple image processing based fiducial auto-alignment method for sample registration." *Rev. Sci. Instrum.* 2015, 86. 086105. doi.org/10.1063/1.4929408.
My contributions: aided in performing experiments, development of instrumentation, and manuscript writing.

Honours & Awards

Dean's Honour List	2018
NSERC Undergraduate Student Research Award	2017
2nd Place at UBC Senior Design Competition	2017
Engineers in Scrubs Undergraduate Student Research Award Fellowship	2016
Applied Science Coordinated Inernational Exchange Award	2016
1st Place at UBC Senior Design Competition	2015
District Dogward Authority Award Scholarship	2013
Carol Lobb Award (Athletics, Good Academic Standing, & Contribution to Community)	2013
Athletic Director's Merit Award	2013

Professional Development

DeepLearining.AI: Neural Networks and Deep Learning Course	Jun 2021
Stanford d.School: Research as Design Pop-Out Course, attendee	May 2019
BC Tech Summit, company representative & attendee	Mar 2019
Laser Safety Training	May 2017
Workplace Hazardous Materials Information System Training (WHIMIS)	May 2017
Innovation in Health and Research Technologies Symposium, attendee	Jun 2016
Tri-Council Policy Statement: Course on Research Ethics	May 2016

Outreach

The (un)Scientific Method, founding member — Dec 2020 - Present
A new female-led podcast by graduate students at UBC with the goal of increasing science literacy in out community through sharing the unique stories and research perspectives of young STEM researchers

Physics and Astronomy Outreach, volunteer — Fall 2020 - Present
Volunteering to teach physics workshops to various audiences, including those from underrepresented demographics in STEM i.e. girls and Indigenous youth

Women in Science, mentor — Fall 2020 - Present
Mentoring an undergraduate female student in applied science on academic and career goals

Physics Circle, volunteer — Fall 2020 - Spring 2021
Organizing physics sessions consisting of a guest lecturer and a worksheet for interested high school students every other week

STEM Mentoring Cafe, volunteer — Fall 2019
Participated in mentoring events as part of Open Science Network for high school students to discuss with STEM professionals andlearn about various scientific fields

Shad International, project mentor — July 2019
Mentored a diverse team of high school students involved in the Shad Program on a project about solving problems in food security, water management, and waste

VEX & First Robotics, volunteer — Spring 2018 - Spring 2019
Volunteered as a robotics judge for several high school VEX and FIRST Robotics competitions

Engineering Physics Student Association, graduate representative — Sep 2017 - May 2018
Organized and supported the graduating class of Engineering Phyics to meet graduation requirements and raised funds to for professional development events

Engineering Physics Student Mentorship Program, mentor — Sep 2017 - May 2018
Mentored a group of younger Engineering Physics students and coordinated weekly activities and events

Engineering Physics Student Association, events coordinator — Sep 2015 - May 2017
Organized and raised funds through sponsorships from the university and private companies for successful networking and social events for students, faculty, and alumni

St. Michael's Outdoor Leadership Program, leader — Sep 2011 - Jun 2013
Guided several outdoor trips for high school students, such as a five-day sea kayaking trip around the Gulf Islands

Technical Projects

Optics Experiments — Spring 2018
Conducted experiments for an optics course: characterization of the HeNe Laser spectrum and mode-control, understanding Fourier optics, and building a Micheleson Interferometer

Experimental Physics — Fall 2017
Conducted and reported on experiments for an experimental physics course: NMR pulse sequencing, measuring material properties through acoustic impedance, and analysis of samples using gamma ray spectroscopy

Electrical Impedance Tomography — Fall 2017
Implemented a solution to an inverse problem in MATLAB to image anomalies within a region given its boundary measurements for an applied maths course (github)

Senior Design Engineering Robot Competitions — Fall 2015 - Fall 2017
Developed autonomous robots for various university competitions (github)

Simulating Radiative Heat Transfer — Fall 2016
Implemented Monte-Carlo Methods in MATLAB to solve net energy transfers of varying surfaces and compared solutions to the analytical "Radiosity" method

UBC Formula Electric, Student Team — Fall 2014 - Fall 2016
Developed PCB circuitry and 3D printed waterproof casing for the Tractive System Active Light and designed breaking disks and hydraulics for the braking system

Autonomous Robot for Object Retrieval — Fall 2014 - Fall 2016
Designed, prototyped, and developed a fully autonomous robot in a team of four with my focuses on software and electrical systems (website)

UBC Orbit, Student Team — Fall 2014 - Fall 2016
Designed a vacuum system components and researched satellite payload mechanisms

Interests

Played badminton for 14+ years, ranking top in Canada for Women's Doubles and Mixed Doubles and invited to the Pan American Games in 2011 in Guadalajara. Enjoys photography (recently into black and white film), ice cream recipe development, and the outdoors for hiking.