**Education**

**Queen’s University (**Expected) May 2023

* Doctor of Medicine (In Progress)

**The University of British Columbia**  May 2019

* Master of Applied Science, Biomedical Engineering (GPA: 91%)

Thesis: *Automatic Analysis of the Placenta in Ultrasound (Thesis Grade: 95%)*

**The University of British Columbia** May 2016

* Bachelor of Applied Science, Engineering Physics (Electrical and Computer Specialization)
* Minor in Honours Mathematics

**Technical Skills**

**Programming and Software:**

C, C++, C#, Java, MATLAB, Python, Jupyter, Bash, SolidWorks, Lumerical, Git, Mercurial

**Electrical and Mechanical:**

Digital logic, signal processing, Fourier spectral analysis, circuit simulation, information theory, CNC and manual machining, rapid prototyping (3D printing, laser cutting, waterjet)

**Mathematics & Physics:**

Machine learning, computer vision, statistical modelling, differential error analysis, linear programming, partial differential analysis, statistical mechanics, optics, electrodynamics

**Indexed Publications**

**Journal Papers**

1. **Hu, R.,** Singla, R., Deeba, F. & Rohling, R. N. (2019). Acoustic Shadow Detection: Study and Statistics of B-Mode and Radiofrequency Data. Ultrasound in Medicine & Biology, 45(8), 2248-2257.
2. Fan, K., **Hu, R.,** Singla, R. (2020). Introductory machine learning for medical students: A pilot. Medical Education, 54(11), 1042-1043.
3. Jayatilleka, H., Murray, K., Guillén-Torres, M. Á., Caverley, M., **Hu, R**., Jaeger, N. A. F., Chrostowski, L., & Shekhar, S. (2015). Wavelength tuning and stabilization of microring filters using silicon in-resonator photoconductive heaters. Optics Express, 23(19), 25084-25097.

**Conference Papers**

1. **Hu, R.,** Singla, R., Yan, R., Mayer, C., & Rohling, R. N. (2019). Automated Placenta Segmentation with a Convolutional Neural Network Weighted by Acoustic Shadow Detection. IEEE Engineering in Medicine and Biology Society (EMBC), 6718-6723.
2. Deeba, F., **Hu, R.,** Terry, J., Pugash, D., Hutcheon, J. A., Mayer, C., Salcudean, S, & Rohling, R. (2019). A Spatially Weighted Regularization Method for Attenuation Coefficient Estimation. In 2019 IEEE International Ultrasonics Symposium (IUS), 2023-2026.
3. Ma, M., Murray, K., Ye, M., Lin, S., Wang, Y., Lu, Z., Yun, H., **Hu, R.,** Jaeger, N. A. F., & Chrostowski, L. (2016). Silicon photonic polarization receiver with automated stabilization for arbitrary input polarizations. CLEO: Science and Innovations, 4-8.

**Non-Indexed Conference Oral and Poster Presentations**

* **Hu, Z\*.**, **Hu, R\*.,** Singla, R., Yan, R., Rohling, R. N., and Mayer, C. Automated AI-based risk stratification of placental disease from ultrasound imaging with an convolutional neural network system. UBC Radiology Research Day, Poster and Oral Presentation. 2021.

**\*Joint first author**

* + *Winner of Canada Diagnostic Centre’s best poster award*
* (Accepted) Crête, S., Campbell, N., **Hu, R.,** Peoples, J., Yan, M., Olding, T., Tyryshkin, K., Simpson, A., and Ynoe de Moraes, F. Time-dependent machine learning prediction model to estimate survival time of brain metastases with MRI radiomics. European Society for Radiotherapy and Oncology Congress. 2021.
* **Hu, R.,** Chen, I., Beaulieu, K., Zhang, Y., Reyngold, M., Simpson A. An Artificial Intelligence Model to Predict Survival of Liver Metastases Patients. Queen’s Medical Student Research Showcase, Oral Presentation. 2020.
  + *Winner of Dr. Albert Clark award for excellence in medical student research*
* **Hu, R.,** Mathur, P., El-Hariri, H., Wyss, J., Danaei, P., Parhar, H., Prisman, E., Anderson, D. W. A Low-Cost Variable Frequency Vibration Device to Assist Speech Generation for Laryngectomy Patients. UBC Department of Surgery Research Day, Oral Presentation. 2018.
  + *Winner of top plenary award at the 2018 UBC Department of Surgery Research Day*

**Recent Technical Projects**

More past projects can be seen online <http://ricky-hu.github.io/projects>

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| --- | --- | --- |
| **Project** | **Supervisor(s)** | **Contribution** |
| AI Survival Prediction of Liver Metastases Patients from CT Radiomics | Dr. Amber Simpson  Dr. Marsha Reyngold  Dr. Paul Romesser | Programmed AI prediction algorithm, mathematically characterized tumors in liver CT with radiation oncologists |
| AI Prediction of Placental Disease from Fetal Ultrasound | Dr. Robert Rohling, Dr. Chantal Mayer | Programmed AI image analysis algorithm, led and designed clinical study |
| Elastography Analysis of Placental Tissue | Dr. Denise Pugash, Dr. Robert Rohling, Dr. Chantal Mayer Dr. Jefferson Terry | Assisted in running ultrasound scans and building elastography vibration apparatus |
| Acoustic Shadow Detection from Ultrasound Physics | Dr. Robert Rohling | Develop math from ultrasound phsyics, programmed detection algorithm, led and designed clinical study |
| Low-Cost Voice-Assist Device for Laryngectomy Patients | Dr. Donald Anderson, Dr. Harman Parhar | Designed electronics, designed and 3D-printed mechanical model, developed vibrational math model |
| Automated Placenta Segmentation from Ultrasound | Dr. Robert Rohling, Dr. Chantal Mayer | Programmed neural network to extract fetal anatomy from scans, led and designed clinical study |
| Photonic Resonance Controller | Dr. Lukas Chrostowksi | Designed, programmed, and fabricated laser resonance stabilizer circuit |
| Cell Phone Microscope Design | Dr. Stephen Poon | 3D printed universal cell-phone mount and microscopy electronics |

**Selected Extracurricular Activities**

**Co-Founder and Instructor**  Kingston, ON

Artificial Intelligence for Medical Students Workshop Jan 2019 – Present

* Created AI workshop (running 3 times, is ongoing) having 200+ medical students registered, teaching AI concepts and custom-made medical AI programming examples.
* Created and maintained website to deliver content and recordings (<http://ubcaimed.github.io>)

**Senior Scout Leader** Richmond, BC

3rd Richmond Scout Troop Sep 2010 - Present

* Trained 300+ scouts aged 5-20 in outdoor survival, leadership, and communication from leading 150+ workshops, 30+ camping trips, and fundraising $40,000+ for youth programs.
* Earned 7 national awards for service, promoted to head leader of advanced skills.

**Water Rescue Head Instructor and Sailing Instructor**  Vancouver, BC

Scouts Canada Jun 2010 - Present

* Led team of 6 rescuers (head since 2017) to pilot watercaft and recover sailors in distress, overseeing safety of 150+ sailors and designing protocols for complex storm conditions.

**Other Extracurricular Activities**

* Senior Executive**,** Innovation in Medicine Interest Group (Sept 2019 – Present)
* Hackathon Competitor, NW Hacks and Hatching Health (March 2016 – March 2019)
* Startup Co-Venturer, Entrepreneurship@UBC Startup Accelerator (Sept 2018 – May 2019)
* Executive, UBC Biomedical Engineering Graduate Association (Sept 2017 – May 2019)
* Webmaster, UBC Engineering Undergraduate Society (Sept 2013 – May 2015)

**Academic Honours and Awards**

* Canada Diagnostic Centre’s Poster Contest Best Poster Award 2021
* Queen’s University Basmajian Research Scholar 2021
* Queen’s School of Medicine Dr. Albert Clark Award for

Excellence in Medical Student Research 2020

* UBC Chung Surgery Research Day Top Plenary Talk Award 2018
* UBC Biomedical Engineering Symposium Best Poster Award 2018
* UBC Faculty of Applied Science Graduate Student Award 2018
* UBC School of Biomedical Engineering Graduate Student Initiative Award 2018
* Sun Rise Rotary Club Scholarship 2012
* UBC President’s Entrance Scholarship 2011

**Non-Academic Honours and Awards**

* Scouts Canada Certificate of Commendation 2017, 2018, 2019
* Duke of Edinburgh’s Award – Gold Level 2017
* Scouts Canada Bar to Good Service 2017
* Scouts Canada Medal of Good Service 2013
* Scouts Canada Medal of the Maple 2013
* Queen’s Venturer Award 2010

**Work Experience**

**Robotics and Control Laboratory, UBC** Vancouver, BC

Graduate Research Assistant Aug 2017 – Aug 2019

* Designed and led 2 clinical studies on humans to develop algorithms to computer tissue properties for automatic detection of disease, resulting in 2 first author publications.

**MDA Systems Ltd.** Richmond, BC

Software Engineer Aug 2016 – April 2017

* Developed algorithms and system integration software for image processing, geodetic mapping, and earth ellipsoid modelling from satellite ephemeris and optical imagery data.

**Pacific Institute of Mathematical Sciences** Vancouver, BC

Data Science Engineer May 2016 – Aug 2016

* Programmed 15 prototypes of data analytics software using a fully remote python kernel on a web browser, such as an image recognition interface from a user-input image.

**Photonics Research Group, UBC**  Vancouver, BC

Research Assistant May 2015 – Sep 2015

* Designed and implemented a microcontroller photocurrent stabilization system to maximize signal power output of a photonic chip, co-authored in two publications for contributions.

**Spot Solutions Ltd.** Vancouver, BC

Software Development Intern May 2014 – Dec 2014

* Programmed C# applications in an Agile environment to monitor real time sensors by processing data to a database through SQL procedures and a C# (.NET) framework.

**NORAM Engineering and Constructors** Vancouver, BC

Research Engineering Intern Jan 2013 – Apr 2013

* Planned, executed, and analyzed chemical yield experiments, utilizing MATLAB signal processing algorithms to filter chemical reactor thermoconductivity data.