CURRICULUM VITAE

Ricky Hu
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Education

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

- Medical Student

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. In CLEO: Science and Innovations, 4-8.

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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 Seminar, 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

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

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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 Vancouver, BC & 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 watercraft 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

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- 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.