**CURRICULUM VITAE**

**Ricky G. Hu**

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**Research Interests**

Artificial intelligence in medical imaging, segmentation and classification with neural networks, spatial reconstruction for image-guided surgery, surgical robotic systems, mathematical modelling of human physiology, rapid electrical and mechanical prototyping, biomedical applications of photonics, and engineering education in medicine.

**Education**

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

* Medical Student

**The University of British Columbia**  May 2019

* MASc. Biomedical Engineering

Thesis: *Automatic Analysis of the Placenta in Ultrasound*

GPA: 91%; Thesis Grade: 95%

**The University of British Columbia** May 2016

* BASc. 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, Target Process.

**Electrical and Mechanical:**

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

**Mathematics & Physics:**

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

**Publications (Indexed Publications Only)**

**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-based 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. In 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 6718-6723.

*(Also orally presented)*

1. 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.
2. 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.

**Non-Indexed Oral and Poster Presentations**

* 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 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. Poster and Oral Presentation. 2018.
  + *Winner of top plenary talk at the 2018 UBC Department of Surgery Chung Research Day*
  + *Winner of best poster award at 2018 UBC Biomedical Engineering Symposium*
* Hu, R., and Saha, R. A Multi-Channel Resonance Stabilization Controller for Photonic Devices. UBC Engineering Physics Fair, Poster Presentation, 2016.

**Professional Experience**

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

Graduate Research Assistant Aug 2017 – Present

* 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. Investigated non-invasive elastography methods to detect stiffness of tissue correlated with placental diseases in a third clinical study.

**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 applications such as military surveillance.

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

Data Science Intern May 2016 – Aug 2016

* Developed numerous prototypes of data analytics software using a fully remote python kernel on a web browser, such as an image recognition interface for a user-input image or displaying custom points of interest on OpenStreetMap.

**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 my contributions.
* Designed and simulated new geometries of photonic filters, programming finite difference simulations to optimize design parameters for maximum energy storage,

**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.

**Academic Honours and Awards**

* UBC Faculty of Applied Science Graduate Student Award Award 2018
* UBC School of Biomedical Engineeirng Graduate Student Initiative Award 2018
* UBC Dean’s Honour List 2011-2012, 2014-2016
* Sun Rise Rotary Club Scholarship 2012
* UBC President’s Entrance Scholarship 2011

**Non-Academic Honours and Awards**

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