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)

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.

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