

## EDUCATION

**MD, PhD (BME)** **University of British Columbia** **2018 - Present**  
*Supervisors:* Prof. Robert Rohling & Dr. Christopher Ngan

**MASc (BME, Engineers in Scrubs)** **University of British Columbia** **2015 –2017**  
*Dissertation:* Intra-operative Ultrasound-based Augmented Reality for Laparoscopic Surgical Guidance  
*Supervisor:* Prof. Robert Rohling

**BASc (CPEN, Software Eng.)** **University of British Columbia** **2010 –2015**  
 Ranked top 5 in department; graduated with Distinction and Co-operative Education program.

## HONORS, AWARDS, AND ACHIEVEMENTS

1. *Faculty of Medicine Clinician Investigator Scholarship*, University of British Columbia **2019**
2. *2<sup>nd</sup> Place Best Poster Award*, Western Section of American Urology Association **2018**
3. *Best Paper Award*, Augmented Environments for Computer Assisted Interventions **2017**
4. *Best Paper Award*, 11<sup>th</sup> Annual Lorne D. Sullivan Urology Research Day **2017**
5. *Graduate Student Initiative Award*, University of British Columbia **2017**
6. *Rising Star Award*, University of British Columbia Faculty of Applied Science **2017**
7. *Faces of Today Recipient*, University of British Columbia Student Leadership Conference **2017**
8. *Engineers in Scrubs Travel Grant*, University of British Columbia **2016**
9. *First Place*, Rick Hansen Access Innovation Challenge **2016**
10. *Finalist, Award for Excellence in BME Innovation*, Medical Device Development Centre **2015**
11. *Engineers in Scrubs Research Fellowship*, University of British Columbia **2015**
12. *Alexander Graham Bell Canada Graduate Scholarship Recipient*, NSERC **2015**
13. *Dean's Honour List*, University of British Columbia **2011-2015**
14. *Margaret E. Barr Bigelow Memorial Scholarship*, University of British Columbia **2015**
15. *Trek Excellence Scholarship*, University of British Columbia **2014**
16. *Undergraduate Student Research Award*, NSERC **2014**
17. *Thomas Beeching Scholarship*, University of British Columbia **2014**
18. *T.E and M.E. Ladner Memorial Scholarship*, University of British Columbia **2014**
19. *Top 20 in Canada*, IEEE 24-Hour Programming Competition **2012**
20. *Academic Scholarship*, Belmont Connect Trade **2012**
21. *Engineering Entrance Scholarship*, Association of Engineers and Geoscientists BC **2010**
22. *Senior Award of Excellence*, South Delta Secondary School **2010**
23. *President's Entrance Scholarship*, University of British Columbia **2010**
24. *Education Award for Outstanding School and Community Involvement*, Envision Financial **2010**

## PROFESSIONAL EXPERIENCE

**Research Engineer** **University of British Columbia** **2018**  
 Developed an iOS app to record and quantify laboring women's shivering, showing positive correlation against clinician assessment. Released on the app store as "BCW Shivering App".  
 Used state-of-the-art neural networks to detect kidney stones, achieving a mean precision of  $0.70 \pm 0.10$ .  
 Developed two HoloLens prototype applications (3D spine modelling and a simulated operating room) in Unity  
 Mentored a Master's student in ultrasound image processing and experiment design for placenta segmentation  
 Coordinated 12 projects with 3 hospital departments (Urology, Anesthesia, and Maternal/Fetal Medicine).  
 Led the writing of 5 grants, receiving \$135,000 over two years.

<b>Co-Founder</b>	<b>92 Medical</b>	<b>2017 – 2018</b>
<p>Founded a venture that aimed to remove the guesswork from epidural and facet joint injections for anesthesiology. Accepted into entrepreneurship@UBC's accelerator program.</p> <p>Developed a needle guide for neuraxial anesthesia, achieving a 95% success rate and accuracy of 3.6 mm.</p> <p>Led the pre-clinical and feasibility validation, business development (incl. customer discovery and market research), and product development.</p>		
<b>Graduate Research Assistant</b>	<b>University of British Columbia</b>	<b>2015 – 2017</b>
<p>Led development on 3 ultrasound-based augmented reality systems for kidney cancer surgery, using C++, OpenCV and OpenGL, achieving a 50% improvement in healthy tissue removed in mock surgeries.</p> <p>Collaborated with industry and international academic groups (Northern Digital Inc &amp; Imperial College London).</p>		
<b>Software Development Intern</b>	<b>Safe Software</b>	<b>2013, 2015</b>
<p>Implemented a re-design of C++ modules interfacing with databases in adherence to a design specification as to improve user experience. Formats: PostgreSQL, PostGIS, Redshift, Oracle Object-Relational and Spatial</p>		
<b>Undergraduate Research Assistant</b>	<b>University of British Columbia</b>	<b>2014 – 2015</b>
<p>Software development for using a mini-projector and ultrasound probe with a surgical robot in order to enhance the surgical view during kidney cancer surgeries. In collaboration with Imperial College London.</p> <p>Developed computer programs to perform computer visions tasks including stereo correspondence, image noise filtering, feature detection and tracking and camera calibration.</p>		
<b>Software Developer Co-op</b>	<b>University of British Columbia</b>	<b>2012</b>
<p>Enhanced the functionality of a Perl daemon and fixed defects in ONTAP, a data management operating system</p>		

## **PUBLICATIONS AND PRESENTATIONS**

---

### **Works Submitted**

1. Schneider C, Singla R, Forbes C, Hetherington J, Cho A, Tang S, Rastin T, Hoyda T, Lan J, Ngan C. Quantitative Measurement of Tacrolimus-induced Tremor in Renal Transplant Recipients: A Prospective Feasibility Study. *Western Section of American Urological Association*. 2019 [abstract][in submission].
2. Khehra K, Stewart C, Cho A, Singla R, Ngan C. Patient Reported Outcomes From Renal Transplant Donors and Recipients: Initial Results From A Single Centre Study. *Western Section of American Urological Association*. 2019 [abstract] [in submission].
3. Singla R, Burlinson C, Honigmann S, Abolmaesumi P, Chau A, Rohling R. Accuracy of a Novel Needle Guide Design for Single Operator, Real-time Two-Dimensional Ultrasound-Guided Lumbar Intervertebral Needle Placement. *International Journal of Computer-assisted Radiology and Surgery*. 2019. [in submission].

### **Peer Reviewed**

4. Hu R, Singla R, Yan R, Mayer C, Rohling R. Acoustic Placenta Segmentation with a Convolutional Neural Network Weighted By Acoustic Shadow Detection. *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*. 2019. [in print]
5. Hu R, Singla R, Deeba F, Rohling R. Acoustic Shadow Detection: Study and Statistics of B-Mode and Radiofrequency Data. *Ultrasound in Medicine and Biology*. 2019. [journal].
6. Harriman DI, Singla R, Ngan C. The Resident Report Card: A Tool for Operative Feedback and Evaluation of Technical Skills. *The Journal of Surgical Research*. 2019. [journal]
7. Edgcumbe P, Singla R, Pratt P, Schneider C, Ngan C, Rohling R. Follow the light: projector-based augmented reality intracorporeal system for laparoscopic surgery. *Journal of Medical Imaging*. 2018 Feb;5(2):021216. [journal]
8. Singla R, Edgcumbe P, Pratt P, Ngan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *Healthcare technology letters*. 2017 Oct;4(5):204. [journal]

9. Singla R, Edgcumbe P, Pratt P, Ngan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *12<sup>th</sup> Annual Augmented Environments for Computer-Assisted Interventions (AE-CAI)*. 2017. [oral].
10. Edgcumbe P, Singla R, Pratt P, Schneider C, Ngan C, Rohling R. Augmented reality imaging for robot-assisted partial nephrectomy surgery. *International Conference on Medical Imaging and Virtual Reality*. 2016 Aug. [conference paper][oral]

### Non-Peer Reviewed

11. Voznyuk S, Mehdi H, Singla R, Rohling R, Gill M, Ngan C. An Interdisciplinary Approach to Preventing Retained Surgical Items With the Use of Augmented Reality. *Collaborating Across Borders VII Conference: Crossroads of Collaboration*. 2019. [abstract] [poster].
12. Hu R, Singla R, Yan R, Mayer C, Rohling R. Automated Placenta Segmentation with an Attention-Modified Convolutional Neural Network. *School of Biomedical Engineering 2<sup>nd</sup> Annual Symposium*. 2019. [abstract][poster]
13. Dawidek M, Singla R, Cho A, Ho L, Ngan C. Pilot: Clinical Comparison of An Audio-based Uroflowmetry App Against Conventional Uroflowmetry in Adults. *UBC Urology 13<sup>th</sup> Annual Lorne D. Sullivan Research Day* 2019. [abstract][oral]
14. Singla R, Lundeen C, Forbes C, Hogarth D, Ngan C. Update on renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy. *UBC Urology 13<sup>th</sup> Annual Lorne D. Sullivan Research Day* 2019. [abstract][oral]
15. Burden L, Khehra K, Singla R, Cho A, Ngan C. Surveying Sources of Anxiety in Family and Friends of Patients Undergoing Surgical Operations. *UBC Urology 13<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2019 [abstract] [poster].
16. Khehra K, Stewart C, Cho A, Singla R, Ngan C. Patient Reported Outcomes From Renal Transplant Donors and Recipients: Initial Results From A Single Centre Study. *UBC Urology 13<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2019 [abstract] [poster].
17. Singla R, Lundeen C, Forbes C, Hogarth D, Ngan C. Fluoroscopic targeting of renal calculi during extracorporeal shockwave lithotripsy using a machine learning algorithm. *American Urological Association*. 2019. [abstract][oral]
18. Honigmann S, Zhu YC, Singla R, Abolmaesumi P, Chau A, Rohling R. EpiGuide 2D: visibility assessment of a novel multi-channel out-of-plane needle guide for 2D point of care ultrasound. *SPIE Medical Imaging*. 2019. [conference paper][oral].<sup>1</sup>
19. Khehra K, Singla R, Cho A, Ngan C. Patient Reported Outcomes (PROs) from Renal Transplant Donors and Recipients: Initial Results from Single Centre. *Building the Future: Faculty of Medicine Research Trainee Day & Lecture Series*. 2019. [poster]
20. Khehra K, Singla R, Cho A, Ngan C. Patient Reported Outcomes (PROs) from Renal Transplant Donors and Recipients: Initial Results from Single Centre. *UBC Life Sciences Research Night*. 2018. [poster]
21. Singla R, Forbes C, Lundeen C, Ngan C. Renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy (ESWL). *Western Section of American Urology Association*. 2018. [abstract][poster]
22. Schneider C, Singla R, Hetherington J, Forbes C, Tang S, Lan J, Rohling R, Ngan C. Quantitative measurement of Tacrolimus-induced tremor in renal transplant recipients: a prospective feasibility study. *UBC Urology 12<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2018. [abstract][oral].
23. Singla R, Forbes C, Lundeen C, Ngan C. Automatic renal calculi localization in fluoroscopy for extracorporeal shockwave lithotripsy. *UBC Urology 12<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2018. [abstract][oral]
24. Singla R, Rohling R, Ngan C. HoloSurgeon: towards an augmented reality enhanced surgical warm-up method. *UBC Urology 12<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2018. [abstract][oral]

---

<sup>1</sup>Simon Honigmann received the “Image-Guided Procedures, Robotic Interventions, and Modeling Student Paper Award”, recognizing it as an outstanding paper in the area of surgical robotics and related topics

25. Burlinson C, Singla R, Honigmann S, Abolmaesumi P, Rohling R, Chau A. Single-operator, real-time ultrasound-guided neuraxial anaesthesia using a novel needle guide and 2D ultrasound. *European Society of Regional Anaesthesia and Pain Therapy*. 2018. [abstract][oral]
26. Burlinson C, Singla R, Honigmann S, Hetherington J, Abolmaesumi P, Rohling R, Chau A. Feasibility of 2D ultrasound guided, real-time, single operator, midline lumbar epidural placement using a novel needle guide. *Society of Obstetric Anesthesiology and Perinatology*. 2018. [abstract][poster]
27. Collins J, Gunka V, Taylor J, Singla R, Rohling R, Massey S. Assessment of shivering with a smartphone application in parturients undergoing cesarean delivery under epidural anesthesia. *Society of Obstetric Anesthesiology and Perinatology*. 2018. [abstract][poster]
28. Singla R, Egcombe P, Pratt P, Ngan C, Rohling R. Intuitive Intraoperative Ultrasound-based Augmented Reality For Robot-Assisted Laparoscopic Surgery. *UBC Urology 11<sup>th</sup> Annual Lorne D. Sullivan Research Day*. 2017. [abstract][oral]
29. Singla R, Hetherington J, Spiedel J, Arranguantei JPG, Nickmanesh R. Portable Video Goggles for Diagnosing Nystagmus. *Innovation in Health and Research Technologies Symposium*. 2016. [poster]

## PATENTS

1. Rohling R, Singla R, Honigmann S, Burlinson C, Hetherington J, Abolmaesumi P. *Apparatus, System, and Methods for Imaging a Medical Device in the Body*. US Provisional Patent No.: 62/666,260.

## INVITED PRESENTATIONS

- |   |             |
|---|-------------|
| 1. "The Future of Anesthesiology", Anesthesiology Resident Rounds at BC Women's Hospital    | <b>2017</b> |
| 2. "The Evolution of Laparoscopic Surgery", IHI Health Innovation for All, Vancouver, BC    | <b>2017</b> |
| 3. "Introduction to Ultrasound Imaging", EECE 544 Medical Imaging, UBC                      | <b>2016</b> |
| 4. "Introduction to Robotic Surgery", BMEG 500 Orientation to the Clinical Environment, UBC | <b>2016</b> |

## TEACHING EXPERIENCE

- |   |                    |
|---|--------------------|
| 1. Instructional Skills Workshop – workshop on effective instructional and teaching skills  | <b>2016</b>        |
| 2. Graduate Teaching Assistant – EECE 542 Computer-integrated Surgery and ELEC 442 Introduction to Robotics   | <b>2016</b>        |
| 3. Undergraduate Teaching Assistant – CPSC 261 Basics of Computer Systems; CPSC 259 Data Structures and Algorithms for Elec. Eng.; CPSC 260 Data Structures and Algorithms for Comp. Eng. | <b>2013 - 2015</b> |

## ACADEMIC SERVICE

- |  |             |
|--|-------------|
| 1. Reviewer. AE-CAI/MIAR/CARE Joint Workshop.  | <b>2019</b> |
| 2. Session Moderator. Faculty of Medicine Research Trainee Day.                                  | <b>2019</b> |
| 3. Reviewer. Intl. Journal for Computer Assisted Radiology and Surgery (IJCARs)                  | <b>2018</b> |
| 4. Reviewer. Intl. Information Processing for Computer-Assisted Interventions Conference (IPCAI) | <b>2017</b> |

## VOLUNTEER EXPERIENCE

<b>Founder</b>	<b>UBC AI in Medicine Club</b>	<b>2019 – Present</b>
Created a club focused on improving awareness of and exposure to artificial intelligence (AI) technology within healthcare for medical trainees given the increasing prevalence of AI.		

<b>Student Affairs Representative</b>	<b>University of British Columbia</b>	<b>2018 – Present</b>
Student advocate for medical student well-being and support in conjunction with faculty and staff, acting as a point-of-contact for questions and concerns related to the MD program or otherwise.		

<b>Junior Section Editor, Reviews</b>	<b>UBC Medical Journal</b>	<b>2018 - Present</b>
Responsible for facilitating the peer review process of student articles, eliciting faculty member reviews, and providing prompt and succinct revision requests to authors.		
<b>Vice President, Island Medical</b>	<b>University of British Columbia</b>	<b>2018 - 2019</b>
Elected class representative for a cohort of 32 medical students in the Island Medical Program. Introduced Piazza, a modern-day online discussion forum, as an educational tool for the MD program.		
<b>Co-Director</b>	<b>Hatching Health</b>	<b>2016 - 2017</b>
Led a team of 6 in logistics and execution of a 135-person medical technology hackathon, while fundraising \$25,000 to run the 3-day event.		
<b>Founder, Coordinator and Mentor</b>	<b>UBC Biomedical Eng. Connections</b>	<b>2016 – 2017</b>
Started a paired-student mentorship initiative to connect 27 undergraduate, new graduates and current graduate students together to promote a sense of community and support incoming students' queries.		
<b>Treasurer, Radio Host, Contributor</b>	<b>Sharing Science Radio</b>	<b>2015 – 2017</b>
Organized a bi-weekly science-themed radio show with news and interviews intended for the layperson. Select topics include medical imaging, salmon, deep sea exploration, and science education research.		
<b>Co-Founder and President</b>	<b>UBC Technology in Medicine Club</b>	<b>2014 –2015</b>
Led the club in facilitating 3 hands-on laparoscopic surgery workshops and med-tech seminars to educate medical and engineering students. Topics included: evolution of surgical technology, medical device collaboration, and e-Health technologies.		
<b>Software Lead</b>	<b>UBC Orbit</b>	<b>2013 - 2014</b>
Led a team of 4 developers to create software for a nano-satellite as part of the Canadian Satellite Design Challenge, a nation-wide competition.		
<b>Assistant Coach</b>	<b>South Delta Varsity Football Club</b>	<b>2010 –2015</b>
Led and taught over 80 teenagers on the techniques and game of American football on a weekly basis, leading to over 18 students receiving university scholarships.		
<b>Student Ambassador</b>	<b>UBC Biomedical Engineering Program</b>	<b>2016 –2017</b>
Engaged prospective UBC students through one-on-one conversations, lab and facility tours, and school fairs.		
<b>Representative</b>	<b>University of British Columbia</b>	<b>2014 –2016</b>
Represented the Department of Electrical and Computer Engineering and the Faculty of Applied Science at various mentorship and student recruitment events. Featured in the Department's promotional video.		
<b>Engineering Liaison</b>	<b>Global Health Conference @ UBC</b>	<b>2015 –2015</b>
Raised \$3000 towards the operating budget of the conference through sponsorship package creation and engagement with academic groups.		