

EDUCATION

MD/PhD (Biomedical Engineering) **University of British Columbia** **2018 - Present**

Dissertation: Intelligent Renal Ultrasound: Multiparametric Ultrasound Imaging for Chronic Kidney Disease

Supervisors: Prof. Robert Rohling & Dr. Christopher Ngan

MASc (Biomedical Engineering) **University of British Columbia** **2015 –2017**

Dissertation: Intra-operative Ultrasound-based Augmented Reality for Laparoscopic Surgical Guidance

Supervisor: Prof. Robert Rohling

BASc (Computer Engineering) **University of British Columbia** **2010 –2015**

Ranked top 5 in department; graduated with Distinction and Co-operative Education program.

Specialization: Software Engineering. *CGPA:* 4.0

PROFESSIONAL EXPERIENCE

Research Engineer **University of British Columbia** **2018**

- Developed an iOS app to record and quantify laboring women's shivering. Released as "BCW Shivering App".
- Used state-of-the-art neural networks to detect kidney stones, achieving a mean precision of 0.70 ± 0.10 .
- Developed two HoloLens prototype apps (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.

Co-Founder **92 Medical** **2017 – 2018**

- Founded a venture that focused on ultrasound navigation guidance for epidural and facet joint injections for anesthesiology.
- Accepted into entrepreneurship@UBC's accelerator program
- Developed a needle guide for neuraxial anesthesia, achieving a 95% success rate and accuracy of 3.6 mm.
- Led the pre-clinical and feasibility validation, business development (incl. customer discovery and market research), and product development.

Graduate Research Assistant **University of British Columbia** **2015 – 2017**

- 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.
- Collaborated with industry and international academic groups (Northern Digital Inc & Imperial College London).

Undergraduate Research Assistant **University of British Columbia** **2014– 2015**

- 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.
- Developed computer programs to perform computer vision tasks including stereo correspondence, image noise filtering, feature detection and tracking and camera calibration.

Software Development Intern **Safe Software** **2013, 2015**

- Implemented a re-design of C++ modules for with 5 different database formats to improve user experience.

Software Developer Co-op	NetApp Inc.	2012
• Enhanced a Perl daemon and fixed defects in ONTAP, a data management operating system		

TEACHING EXPERIENCE

1. <i>Near Peer Tutors Coordinator</i> – created a pilot project with senior students teaching junior students in gross anatomy and neuroanatomy labs in undergraduate medical education	2019 - 2020
2. <i>Session Facilitator</i> – organized and ran a province-wide student-led session on physical activity as part of the undergraduate medical curriculum	2019
3. <i>Instructional Skills Workshop</i> – workshop on effective instructional and teaching skills	2016
4. <i>Graduate Teaching Assistant</i> – EECE 542 Computer-integrated Surgery and ELEC 442 Introduction to Robotics	2016
5. <i>Undergraduate Teaching Assistant</i> – CPSC 261 Basics of Comp. Systems; CPSC 259 Data Structures and Algorithms for Elec. Eng.; CPSC 260 Data Structures and Algorithms for Comp. Eng.	2013-2015

ACADEMIC SERVICE

1. <i>Moderator</i> . UBC Dept. of Medicine “Data Science & Health – Engineer’s Perspective” Workshop	2020
<i>Reviewer</i> . Canadian Conference on Medical Education (CCME)	2020
2. <i>Reviewer</i> . Augmented Environments for Computer Assisted Interventions (AE-CAI) Workshop at Medical Image Computing and Computer-assisted Interventions (MICCAI)	2019 - 2020
3. <i>Reviewer</i> . Conf. on Neural Information Processing Systems (NeurIPS)	2020
4. <i>Reviewer</i> . MICCAI	2020
5. <i>Reviewer</i> . Assoc. for Computing Machinery Conf. on Health, Inference and Learning (CHIL)	2020
6. <i>Reviewer</i> . Intl. Journal for Computer Assisted Radiology and Surgery (IJCARs)	2018, 2020
7. <i>Reviewer</i> . Machine Learning for Health (ML4H) Workshop at NeurIPS.	2019, 2020
8. <i>Session Moderator</i> . Faculty of Medicine Research Trainee Day.	2019
9. <i>Reviewer</i> . Intl. Information Processing for Computer-Assisted Interventions Conf. (IPCAI)	2018

HONORS, AWARDS, AND ACHIEVEMENTS

1. <i>Student Leadership Award</i> , UBC Medical Alumni Association (\$500)	2020
2. <i>Vanier Canada Graduate Scholarship</i> , NSERC – ranked 1 st nationally (\$50,000/year x 3)	2020
3. <i>Four Year Fellowship</i> , UBC (\$18,200/year x 4, in title only)	2020
4. <i>Nominee for President’s Student Leader Recognition Event</i> , UBC	2020
5. <i>BC MEDTECH Graduate Award</i> , School of Biomedical Engineering (\$1,450)	2019
6. <i>Excellent Reviewer Recognition (top 5%)</i> , ML4H Workshop at NeurIPS	2019
7. <i>Graduate Support Initiative</i> , School of Biomedical Engineering (\$4,000)	2019
8. <i>Graduate Award</i> , UBC Faculty of Medicine (\$7,800)	2019
9. <i>Clinician Investigator Scholarship</i> , UBC Faculty of Medicine (\$26,000)	2019
10. <i>2nd Place Best Poster Award</i> , Western Section of American Urology Association	2018
11. <i>Best Paper</i> , Augmented Environments for Computer Assisted Interventions (\$250)	2017
12. <i>Best Paper</i> , 11 th Annual Lorne D. Sullivan Urology Research Day (\$250)	2017
13. <i>Graduate Student Initiative Award</i> , University of British Columbia (\$500)	2017
14. <i>Rising Star Award</i> , University of British Columbia Faculty of Applied Science	2017
15. <i>Faces of Today Recipient</i> , University of British Columbia Student Leadership Conference	2017
16. <i>Engineers in Scrubs Travel Grant</i> , University of British Columbia (\$1000)	2016
17. <i>First Place</i> , Rick Hansen Access Innovation Challenge	2016
18. <i>Finalist, Award for Excellence in BME Innovation</i> , Medical Device Development Centre	2015
11. <i>Engineers in Scrubs Research Fellowship</i> , University of British Columbia (\$18,000)	2015
12. <i>Alexander Graham Bell Canada Graduate Scholarship</i> , NSERC (\$17,500)	2015

13. <i>Dean's Honour List</i> , University of British Columbia	2011- 2015
14. <i>Margaret E. Barr Bigelow Memorial Scholarship</i> , University of British Columbia (\$400)	2015
15. <i>Trek Excellence Scholarship</i> , University of British Columbia (\$750)	2014
16. <i>Undergraduate Student Research Award</i> , NSERC (\$4,500)	2014
17. <i>Thomas Beeching Scholarship</i> , University of British Columbia (\$500)	2014
18. <i>T.E and M.E. Ladner Memorial Scholarship</i> , University of British Columbia (\$950)	2014
19. <i>Top 20 in Canada</i> , IEEE 24-Hour Programming Competition	2012
20. <i>Academic Scholarship</i> , Belmont Connect Trade (\$4,000)	2012
21. <i>Engineering Entrance Scholarship</i> , Association of Engineers and Geoscientists BC (\$2,500)	2010
22. <i>Senior Award of Excellence</i> , South Delta Secondary School	2010
23. <i>President's Entrance Scholarship</i> , University of British Columbia (\$2,500)	2010
24. <i>Outstanding School and Community Involvement Award</i> , Envision Financial (\$2,000)	2010

PUBLICATIONS AND PRESENTATIONS

Peer-Reviewed Journal Publications

1. Fan K, Hu R, and **Singla R**. Introductory Machine Learning for Medical Students: A Pilot. *Medical Education – Really Good Stuff*. November 2020.
2. **Singla R**, Burlinson C, Honigmann S, Abolmaesumi P, Chau A, Rohling R. Interdisciplinary Development and Evaluation of a Novel Needle Guide For Ultrasound-Guided Lumbar Epidural Placement. *BMJ Innovations*. October 2020.
3. 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 Aug 1;45(8):2248-57.
4. Harriman DI, **Singla R**, Nguan C. The Resident Report Card: A Tool for Operative Feedback and Evaluation of Technical Skills. *The Journal of Surgical Research*. 2019 Jul 1;239:261-8.
5. Edgcumbe P, **Singla R**, Pratt P, Schneider C, Nguan C, Rohling R. Follow the light: projector-based augmented reality intracorporeal system for laparoscopic surgery. *Journal of Medical Imaging*. 2018 Feb;5(2):021216.
6. **Singla R**, Edgcumbe P, Pratt P, Nguan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *Healthcare technology letters*. 2017 Nov 16;4(5):204-9.

Peer-Reviewed Conference Publications (with Oral Presentations)

1. Hu R, **Singla R**, Yan R, Mayer C, Rohling R. Acoustic 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 (EMBS)* 2019 Jul 23 (pp.6718-6723). IEEE. Berlin, Germany.
2. 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. In *SPIE Medical Imaging 2019: Image-guided Procedures, Robotic Interventions and Modelling* 2019 Mar 8 (Vol. 10951, p. 109510K.) International Society for Optics and Photonics. San Diego, USA.
3. **Singla R**, Edgcumbe P, Pratt P, Nguan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *12th Annual Augmented Environments for Computer-Assisted Interventions (AE-CAI)*. 2017 Sep. Quebec City, Canada.
4. Edgcumbe P, **Singla R**[†], Pratt P, Schneider C, Nguan C, Rohling R. Augmented reality imaging for robot-assisted partial nephrectomy surgery. In *International Conference on Medical Imaging and Virtual Reality*. 2016 Aug 24. (pp.139-150). Bern, Switzerland.

Conference Abstracts (with Oral Presentations)

^{*}S. Honigmann received the "Image-Guided Procedures, Robotic Interventions, and Modeling Student Paper Award" as an outstanding paper in the area of surgical robotics and related topics

[†] Indicates joint first authorship

1. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. Addressing Perioperative Stress and Anxiety of Patient Supporters Through a Novel, Online Communications Platform: PatientLink. *Building the Future: Faculty of Medicine Research Trainee Day and Lecture Series*. 2020. Vancouver, Canada.[‡]
2. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: A Novel Application to Address Stress and Anxiety in Patient Supporters During Surgical Operations. *Northwest Urological Society's 66th Annual Conference*. 2020. Vancouver, Canada.
3. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes From Renal Transplant Recipients: Initial Results From A Single Centre Study. *Northwest Urological Society's 66th Annual Conference*. 2020. Vancouver, Canada.
4. **Singla R**, Lundeen C, Forbes C, Hogarth D, Nguan C. Fluoroscopic targeting of renal calculi during extracorporeal shockwave lithotripsy using a machine learning algorithm. *American Urological Association*. 2019. Chicago, USA.
5. Dawidek M, **Singla R**, Cho A, Ho L, Nguan C. Pilot: Clinical Comparison of An Audio-based Uroflowmetry App Against Conventional Uroflowmetry in Adults. *UBC Urology 13th Annual Lorne D. Sullivan Research Day*. 2019. Vancouver, Canada.
6. **Singla R**, Lundeen C, Forbes C, Hogarth D, Nguan C. Update on renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy. *UBC Urology 13th Annual Lorne D. Sullivan Research Day*. 2019. Vancouver, Canada.
7. **Singla R**, Forbes C, Lundeen C, Nguan C. Automatic renal calculi localization in fluoroscopy for extracorporeal shockwave lithotripsy. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
8. **Singla R**, Rohling R, Nguan C. HoloSurgeon: towards an augmented reality enhanced surgical warm-up method. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
9. Schneider C, **Singla R**, Hetherington J, Forbes C, Tang S, Lan J, Rohling R, Nguan C. Quantitative measurement of Tacrolimus-induced tremor in renal transplant recipients: a prospective feasibility study. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
10. Burlinson C, **Singla R**, Honigsmann 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. Dublin, Ireland.
11. **Singla R**, Edgcumbe P, Pratt P, Nguan C, Rohling R. Intuitive Intraoperative Ultrasound-based Augmented Reality for Robot-Assisted Laparoscopic Surgery. *UBC Urology 11th Annual Lorne D. Sullivan Research Day*. 2017. Vancouver, Canada.

Conference Abstracts (with Poster Presentations)

1. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: a novel application to address stress and anxiety in patient supporters during surgical operation. Canadian Urological Association Conference. 2020. Victoria, Canada.
2. Davey C, Lyman K, **Singla R**, Harriman D, Nguan C. "Baseline Measurements of Physical Function and Frailty in Pre-Transplantation End Stage Renal Disease Patient". Canadian Urological Association Conference. 2020. Victoria, Canada.
3. Dawidek M, **Singla R**, Spooner L, Nguan C. Clinical Validation of an Audio-based Uroflowmetry App in Adult Males. Canadian Urological Association Conference. 2020. Victoria, B.C.
4. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient reported outcomes from renal transplant recipients: initial results from a single centre study. Canadian Urological Association Conference. 2020. Victoria, B.C.
5. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: A Novel Application to Address Stress and Anxiety in Patient Supporters During Surgical Operations. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.

[‡] L. Burden received the "Best Presentation" award as an outstanding work amongst all trainees.

6. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes From Renal Transplant Recipients: Initial Results From A Single Centre Study. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.
7. Philips D, Gill D, **Singla R**, Spooner L, Tang S, Nguan C. A Novel Device to Monitor Gross Hematuria After Urologic Surgery. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.
8. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes in Renal Transplant Recipients and Donors Over One Year: A Single Institution Experience. *Western Section of American Urological Association*. 2019. Monterey, USA.
9. Schneider C, **Singla R**, Forbes C, Hetherington J, Cho A, Tang S, Rastin T, Hoyda T, Lan J, Nguan C. Quantitative Measurement of Tacrolimus-induced Tremor in Renal Transplant Recipients: A Prospective Feasibility Study. *Western Section of American Urological Association*. 2019. Monterey, USA.
10. Voznyuk S, Mehdi H, **Singla R**, Rohling R, Gill M, Nguan C. An Interdisciplinary Approach to Preventing Retained Surgical Items with the Use of Augmented Reality. *Collaborating Across Borders VII Conference: Crossroads of Collaboration*. 2019. Indianapolis, USA.
11. Burden L, Khehra K, **Singla R**, Cho A, Nguan C. Surveying Sources of Anxiety in Family and Friends of Patients Undergoing Surgical Operations. *UBC Urology 13th Annual Lorne D. Sullivan Research Day*. 2019. Vancouver, Canada.
12. **Singla R**, Forbes C, Lundeen C, Nguan C. Renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy (ESWL). *Western Section of American Urology Association*. 2018. Monterey, USA.
13. Burlinson C, **Singla R**, Honigsmann 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. Miami, USA.
14. 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. Miami, USA.

Policy Papers

15. *Policy 044 – Pregnancy and New Parenthood during Medical School*. UBC Medical Doctorate Undergraduate Program. 2020. Vancouver, Canada.
16. *Preparing Medical Students for the Impact of Artificial Intelligence on Healthcare*. Canadian Federation of Medical Students. 2020. Toronto, Canada.

PATENTS

1. Rohling R, **Singla R**, Honigsmann 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. Percentage: 15%.

INVITED PRESENTATIONS

- | | |
|---|-------------|
| 1. "Imaging Markers for Kidney Health Assessment", UBC Nephrology Provincial Grand Rounds, Vancouver, BC | 2021 |
| 2. "Quantifying the Transplanted Kidney Using Ultrasound", Solid Organ Transplant Grand Rounds at BC Children's Hospital, Vancouver, BC | 2020 |
| 3. "Smart Kidney Ultrasound", UBC Med. Undergrad. Program Lunch Seminar, Vancouver, BC | 2020 |
| 4. "Why MD/PhD?", UBC MD/PhD Open House, Vancouver, BC | 2020 |
| 5. "Ultrasound for Chronic Kidney Disease", Island Medical Lunch Seminar, Victoria, BC | 2019 |
| 6. "The Future of Anesthesiology", Anesthesiology Resident Rounds, Vancouver, BC | 2017 |
| 7. "The Evolution of Laparoscopic Surgery", IHI Health Innovation for All, Vancouver, BC | 2017 |
| 8. "Introduction to Ultrasound Imaging", EECE 544 Medical Imaging, UBC, Vancouver, BC | 2016 |
| 9. "Introduction to Robotic Surgery", BMEG 500 Orientation to the Clinical Environment, UBC | 2016 |

VOLUNTEER EXPERIENCE

Founder	UBC AI in Medicine Club	2019 – Present
<p>Created a nationally-run series of hands-on educational workshops for non-technical medical students to learn and understand AI as applied to medicine. Approximately n=200 students from 9 medical schools in Canada. Collaborated on a national policy paper for artificial intelligence (AI) education promotion. Via the Canadian Federation of Medical Students</p> <p>Created a club focused on improving awareness of and exposure to AI technology within healthcare for medical trainees given the increasing prevalence of AI.</p>		
Student Affairs Representative	University of British Columbia	2018 – Present
<p>Organized and hosted two student panels for first and second years addressing clerkship concerns and transitions to distributed sites with a total attendance of 50+ students</p> <p>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.</p>		
Section Editor, Reviews	UBC Medical Journal	2018 - Present
<p>Responsible for facilitating the peer review process of student articles, eliciting faculty member reviews, and providing prompt and succinct revision requests to authors.</p>		
Vice President, Island Medical	University of British Columbia	2018 - 2019
<p>Elected class representative for a cohort of 32 medical students in the Island Medical Program.</p> <p>Introduced and trialed Piazza, a modern online discussion forum, as an educational tool for the MD program.</p>		
Co-Director	Hatching Health	2016 - 2017
<p>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.</p>		
Founder, Coordinator and Mentor	UBC Biomedical Eng. Connections	2016 – 2017
<p>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.</p>		
Treasurer, Radio Host, Contributor	Sharing Science Radio	2015 – 2017
<p>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.</p>		
Co-Founder and President	UBC Technology in Medicine Club	2014 –2015
<p>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.</p>		
Software Lead	UBC Orbit	2013 - 2014
<p>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.</p>		
Assistant Coach	South Delta Varsity Football Club	2010 –2015
<p>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.</p>		

Student Ambassador	UBC Biomedical Engineering Program	2016 –2017
Engaged prospective UBC students through one-on-one conversations, lab and facility tours, and school fairs.		
Representative	University of British Columbia	2014 –2016
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.		
Engineering Liaison	Global Health Conference @ UBC	2015 –2015
Raised \$3000 towards the operating budget of the conference through sponsorship package creation and engagement with academic groups.		

MEMBERSHIPS AND AFFILIATIONS

<i>Engineer-in-Training</i> , Engineers and Geoscientists of British Columbia	Present
<i>Student Member</i> , Victoria Interdisciplinary Collaboration in Emergency Medicine (VIC-EM)	
<i>Member</i> , Artificial Intelligence in British Columbia (AInBC)	2019 –
	Present
<i>Student Member</i> , Clinician Investigator Trainee Association of Canada	2019 –
	Present
<i>Student Member</i> , Canadian Point of Care Ultrasound Society	2019 –
	Present
<i>Student Member</i> , American Society of Nephrology	2019 –
	Present
<i>Student Member</i> , Canadian Medical Association	2018 –
	Present
<i>Student Member</i> , Doctors of British Columbia	2018 –
	Present
<i>Student Member</i> , Diabetes Canada	2019 - 2020
<i>Student Member</i> , Society of Obstetricians and Gynaecologists of Canada	2018 - 2019