Megha Kalia

Robotics and Control Lab, The University of British Columbia
5500 - 2332 Main Mall, Vancouver BC V6T 1Z4, Canada
@ mkalia@ece.ubc.ca | LinkedIn | Website | ◊ Research Gate

EDUCATION

The University of British Columbia (UBC) — **Vancouver, Canada**
Ph.D. Candidate, Electrical and Computer Engineering — 2017 - current
Thesis: "Real-Time, Perceptually Coherent Augmented/Mixed Reality Applications for Surgical Interventions"
Advisors: Prof. S. E. Salcudean, UBC & Nassir Navab, Technical University of Munich (TUM)

Indian Institute of Technology (IIT) Kharagpur — **Kharagpur, India**
M.Tech., Medical Imaging and Informatics, (Grade - 8.67/10) — 2014 - 2016
Thesis: "Methods to Improve Depth Perception in Medical Augmented Reality"
(Carried out at TUM with support from DAAD Scholarship)
Advisors: Prof. Chandan Chakraborty & Nassir Navab

Guru Gobind Singh Indraprastha University (GGSIPU) — **New Delhi, India**
B.Tech., Biotechnology, (Grade - 71.9/100) — 2010 - 2014

RESEARCH INTERESTS

Medical Augmented/Mixed Reality, Human Computer Interaction, Context-Aware Interface Design, Perception, Computer Vision

AWARDS AND SCHOLARSHIPS

- Student Travel Award, Medical Image Computing and Computer Assisted Intervention, Strasbourg, France — Oct 2021
- **Best paper in Bench-to-Bedside category**, International Conference on Information Processing in Computer-Assisted Interventions (IPCAI), Munich — June 2021
- Friedman Award for Scholars in Health, UBC — Aug 2021 - Apr 2022
- Public Scholars Initiative Award, UBC — Aug 2020 - Apr 2021
- Teaching as Research, Graduate Student Award, UBC — May 2020
- **Outstanding Paper Award**, Computer Aided Intervention Workshop, Medical Image Computing and Computer Assisted Intervention, Shenzhen, China — Oct 2019
- Graduate Student Initiative Award, UBC — Sep 2019
- International Tuition Award, UBC — 2017, 2018, 2019, 2020
- Graduate Travel Award, UBC — Mar 2018
- Travel Award, Hamlyn Winter School, Imperial College London, UK — Dec 2017
- DAAD (German Academic Exchange Service) Scholarship (for completion of master's thesis at TUM, Germany) — Sep 2015 - Mar 2016
- BOSCH India Women Inventor of the Year (for filing two patents) — 2015
- AICTE–GATE Post Graduate Scholarship, Government of India (for master's degree) — 2014 - 2016

PATENTS

- A microscope imaging system — India 4592/CHE/2015
- Meibomian gland diagnostic device — India 5742/CHE/2015

PEER-REVIEWED JOURNALS

1. **Kalia, M.**, Avinash, A., Navab, N., & Salcudean, S. E. (2021). Preclinical Evaluation of a Marker-less, Real-time, Augmented Reality Guidance System for Robot Assisted Radical Prostatectomy. *International Journal of Computer Assisted Radiology and Surgery* (Bench-to-Bedside Award).
2. **Kalia, M.**, Mathur, P., Tsang, K., Black, P., Navab, N., & Salcudean, S. E. (2020). Evaluation of a marker-less, intra-operative, augmented reality guidance system for robot-assisted laparoscopic radical prostatectomy. *International Journal of Computer Assisted Radiology and Surgery*, 15, 1225-1233.
3. **Kalia, M.**, Mathur, P., Navab, N., & Salcudean, S. E. (2019). Marker-less real-time intra-operative camera and hand-eye calibration procedure for surgical augmented reality. *Healthcare technology letters*, 6(6), 255-260. (Outstanding Paper Award)
4. Abdelaal, A. E., Avinash, A., **Kalia, M.**, Hager, G. D., & Salcudean, S. E. (2020). A multi-camera, multi-view system for training and skill assessment for robot-assisted surgery. *International journal of computer assisted radiology and surgery*, 15, 1369-1377.

PEER-REVIEWED CONFERENCES

1. *(Oral)* **Kalia, M.,** Aleef, T., Navab, N., & Salcudean, S. E. (2021). Co-Generation and Segmentation for Generalized Surgical Instrument Segmentation on Unlabelled Data. In 2021 *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)* (pp. 403-412). Springer, Cham.
2. **Kalia, M.**, Navab, N., & Salcudean, S. E. (2019, May). A real-time interactive augmented reality depth estimation technique for surgical robotics. In 2019 *International Conference on Robotics and Automation (ICRA)* (pp. 8291-8297). IEEE.
3. **Kalia, M.**, Navab, N., Fels, S., & Salcudean, S. E. (2019, March). A Method to Introduce & Evaluate Motion Parallax with Stereo for Medical AR/MR. In 2019 *IEEE Conference on Virtual Reality and 3D User Interfaces (VR)* (pp. 1755-1759). IEEE.
4. **Kalia, M.**, zu Berge, C. S., Roodaki, H., Chakraborty, C., & Navab, N. (2016, August). Interactive depth of focus for improved depth perception. *In International Conference on Medical Imaging and Augmented Reality* (pp. 221-232). Springer, Cham.

LEADERSHIP & SERVICE

Reviewer: International Conference on Intelligent Robots and Systems (IROS), 2021. IJCARS, 2020. IJCARS, 2019. Medical Imaging and Augmented Reality, Augmented Environments for Computer Assisted Interventions (AE-CAI), MICCAI, 2019.

Steering Committee Member, Biomedical Imaging and Artificial Intelligence Research Cluster, UBC 2018 - current
Planning and organizing events to promote AI related research and outreach

Member, Academic Policy Sub-committee, Graduate Council Student Caucus, UBC 2018 - 2020

Grant Writer, Kaleidoscope, UBC mental health awareness club 2018 - 2019

Executive Committee Member, Women in Engineering, UBC 2017
Organized biweekly networking event to discuss gender and diversity issues at workplace

Co-founder, Ambar, LGBTQ support group, IIT Kharagpur 2015
Organized events to spread awareness about gender-identity related issues among students

ACHIEVEMENTS

- 2^{nd} **Place**, 3 Minute Thesis Competition, ECE, UBC Feb 2021

- 3^{rd} **Place**, Reboot Startup Competition, UBC — Jan 2019
  Idea: Semi-Automatic Segmentation of Multi-modal Medical Data
- **Hult Prize Business Competition**, represented UBC in Canada Region, Toronto — Mar 2018
  Idea: Cluster farming for small farmers for maximizing profits by economies of scale.

RESEARCH EXPERIENCE

Research Assistant, Electrical and Computer Engineering, UBC, Canada — May 2017 - Current
Project: Augmented Reality for Robot Assisted Surgery
Advisor: Prof. S. E. Salcudean

- Coordinating with Urologists, Nurses for data recording and collection of human robotic prostate surgeries at Vancouver General Hospital (VGH)
- Building real-time, intra-operative AR visual guidance solutions for minimally invasive surgical procedures. Evaluating new methods (user studies and mathematical modelling).

Research Assistant, Computer Aided Medical Procedures & Augmented Reality, TUM, Germany
Aug 2016 - Mar 2017

Project: Multi-Modal Medical Visualizations
Advisors: Prof. Nassir Navab

- Software development for visualizing and evaluating AR methods using 3D data such as MRI/CT

INDUSTRIAL EXPERIENCE

Summer Intern, BOSCH Engineering and Business Solutions, Bengaluru, India — Jun 2015 - Jul 2015

- Proposed a metric for quantification of the medical condition, Meibomian Gland Dysfunction, using wavelet based features and image processing techniques. The algorithm is in a clinical product.
- Filed two patents

ADDITIONAL TRAINING

Medical Augmented Reality Summer School, University of Balgrist, Zurich — Aug 2019
Two weeks of lectures and hands-on AR project on Magic Leap head mounted display

Hamlyn Winter School on Surgical Imaging and Vision, Imperial College London, United Kingdom — Dec 2017
One week of lectures and a hand-on project on surgical robotics

Suicide Prevention Training (QPR-Question, Persuade, Refer), UBC — Dec 2019
Strategies to identify and handle peers in distress

TEACHING AND MENTORSHIP

Teaching Assistant, UBC — Jan 2018 - Apr 2018
Human Computer Interaction, CPEN 441 (Undergraduate course)

Instructional Skills Workshop, Center for Teaching, Learning and Technology, UBC — Jan 2020

Supervisor, School of Biomedical Engineering (SBME), UBC — Summer 2020
Abdulrahman Shinnawy (3^{rd} year undergraduate intern)
Student received SBME scholarship for my proposed project

Mentor, Undergraduate Research Experience Program, UBC — Fall 2020
Mentored 5 undergraduate students

Poster Presentation, CTLT Winter Institute Poster — Fall 2020
Title: Comparing the effect of individual and group code review activities on student engagement in an online classroom