Alaa Eldin Abdelaal

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EDUCATION

University of British Columbia   Vancouver, Canada
Ph.D., in Electrical and Computer Engineering   September 2017 – Present
Advisors: Prof. Tim Salcudean and Prof. Gregory Hager (at Johns Hopkins University)

Simon Fraser University   Burnaby, Canada
M.Sc., in Computing Science   2015 – August 2017
Thesis: Event-based Control as a Cloud Service
Advisor: Prof. Mohamed Hefeeda
Cumulative GPA: 4.0

Mansoura University   Mansoura, Egypt
B.Sc., in Computers and Systems Engineering   2007 - 2012
Distinction with honor degree, Total grade: (90.68% - ranked 1st)
Thesis/Graduation Project: One-Eyed Self-Learning Arm Robot.

ACADEMIC HONORS & AWARDS

- Canada Graduate Scholarships – Michael Smith Foreign Study Supplements ($6,000)   Spring 2022
- Vanier Canada Graduate Scholarship, the most prestigious scholarship for PhD students in Canada. ($50,000 per year for three years)   2019 - 2022
- President's Academic Excellence Initiative PhD Award at the University of British Columbia   2020 – 2022
- HRI Pioneer: I was selected to participate in the Human-Robot Interaction (HRI) Pioneers Workshop, a highly selective workshop, bringing together a cohort of the world's top student researchers in this area.   2020
- ACM SIGCHI travel award to attend the ACM/IEEE International Conference on Human-Robot Interaction (HRI) in Cambridge, UK.   2020
- Best Bench-to-Bedside Paper Award at the 10th International Conference on Information Processing in Computer-Assisted Interventions (IPCAI), Rennes, France   2019
- The IEEE Robotics and Automation Society Travel Grant to attend the International Conference on Robotics and Automation (ICRA).   2019
- The Faculty of Applied Science Graduate Award at the University of British Columbia, two times.   2017 - 2019
- The International Tuition Award at the University of British Columbia.   2017 - 2019
- The School of Computing Science Travel Award at Simon Fraser University.   Summer 2017
- The School of Computing Science Graduate Fellowship at Simon Fraser University.   Fall 2015
- Graduate Scholarship at Carnegie Mellon University ($42,750 per year) (declined)   Fall 2015
- Laboratory Instruction Graduate Fellowship at the American University in Cairo (declined)   Spring 2015
- Sponsored Research Tuition Award at the University of Louisville ($22,742) (declined)   08/2014 – 07/2015
- Distinguished Graduate Award from the Egyptian Engineers Syndicate.   2012
- My graduation project was one of the winning projects in the 6th Annual Egypt's Young Entrepreneurs Competition of Injaz Egypt and we received a seed fund of 60,000 Egyptian pounds form ExxonMobil Egypt.   2012
- The Young Innovator award from Nahdet El Mahrousa Association and a prize of 6,000 Egyptian Pounds, which is given to the best bachelor theses in Egypt.   2012
- Distinction Award from the Faculty of Engineering, Mansoura University, Egypt, five times   2007 – 2012

RESEARCH EXPERIENCE

Johns Hopkins University   Baltimore, MD, USA
Computer Science Dept.   July 2021– Present
Visiting Graduate Scholar
Working with Prof. Gregory Hager at Computational Interaction and Robotics Lab (CIRL), Prof. Masaru Ishii at Johns Hopkins School of Medicine and Prof. Tim Salcudean at UBC. Conducting research in the area of surgical training and skill assessment in minimally invasive surgery.

University of British Columbia   Vancouver, Canada
Electrical and Computer Engineering Dept.   Fall 2017 - Present
Research Assistant
Working with Prof. Tim Salcudean at the Robotics and Control Lab at the University of British Columbia and Prof. Gregory

Hager at Johns Hopkins University. Conducting research in the area of Autonomy and Human-Robot Interaction with application to surgical robotics.

Simon Fraser University — Burnaby, Canada
School of Computing Science — Spring 2015– Summer 2017
Research Assistant
Working with Prof. Mohamed Hefeeda at the Network Systems Lab. Conducting research in the area of Automation and Control systems, Cloud Computing and Distributed Systems.

JOURNAL ARTICLES

- **Alaa Eldin Abdelaal,** Jordan Liu, Nancy Hong, Gregory D. Hager, Septimiu E. Salcudean, *"Parallelism in Autonomous Robotic Surgery"*. In IEEE Robotics and Automation Letters, 6.2:1824–1831, 2021. [Also presented at the IEEE International Conference on Robotics and Automation (ICRA), Xi'an, China, May 2021].

- **Alaa Eldin Abdelaal,** Apeksha Avinash, Megha Kalia, Gregory D. Hager, Septimiu E. Salcudean. *"A multi-camera, multi-view system for training and skill assessment for robot-assisted surgery"*. In the International Journal of Computer Assisted Radiology and Surgery, 15:1369–1377, 2020.

- **Alaa Eldin Abdelaal,** Prateek Mathur**,** Septimiu E. Salcudean. "*Robotics in Vivo: A Perspective on Human-Robot Interaction in Surgical Robotics*". In Annual Review of Control, Robotics, and Autonomous Systems, 3:221–242, 2020.

- Apeksha Avinash, **Alaa Eldin Abdelaal,** Prateek Mathur**,** Septimiu E. Salcudean. "*A "pickup" stereoscopic camera with visual-motor aligned control for the da Vinci surgical system: a preliminary study*". In the International Journal of Computer Assisted Radiology and Surgery, 14.7:1197– 1206, 2019. [Winner of Best Bench-to-Bedside Award at the 10th International Conference on Information Processing in Computer-Assisted Interventions (IPCAI), Rennes, France 2019].

- **Alaa Eldin Abdelaal**, Maram Sakr, Apeksha Avinash, Shahed K. Mohammed, Armaan. K. Bajwa, Mohakta Sahni, Soheil Hor, Sideny Fels, Septimiu E. Salcudean. "*Play Me Back: A Unified Training Platform for Robotic and Laparoscopic Surgery*". In IEEE Robotics and Automation Letters, 4.2:554–561, 2018. [Also presented at the IEEE International Conference on Robotics and Automation (ICRA), Montreal, QC, Canada, May 2019].

PEER-REVIEWED CONFERENCE PUBLICATIONS

- **Alaa Eldin Abdelaal,** Nancy Hong, Apeksha Avinash, Divya Budihal, Maram Sakr, Gregory D. Hager, Septimiu E. Salcudean, *"Orientation Matters: 6-DoF Autonomous Camera Movement for Video-based Skill Assessment in Robot-Assisted Surgery"*. In Proc. of the IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), Seoul, Korea, August 2022 (*in press*).

- Apeksha Avinash, **Alaa Eldin Abdelaal,** Septimiu E. Salcudean. "*Evaluation of Increasing Camera Baseline on Depth Perception in Surgical Robotics*". In Proc. of the IEEE International Conference on Robotics and Automation (ICRA), Paris, France, May 2020.

- **Alaa Eldin Abdelaal**, Tamir Hegazy, Mohamed Hefeeda. *"Event-based Control as a Cloud Service"*. In Proc. of the American Control Conference (ACC), Seattle, WA, May 2017.

- **Alaa Eldin Abdelaal,** Maram Sakr, Richard Vaughan. *"LOST Highway: a Multiple-Lane Ant-Trail Algorithm to Reduce Congestion in Large-Population Multi-Robot Systems"*. In Proc. of the 14th Conference on Computer and Robot Vision (CRV), Edmonton, Alberta, May 2017.

PEER-REVIEWED WORKSHOP PUBLICATIONS

- **Alaa Eldin Abdelaal**, Gregory D. Hager, Septimiu E. Salcudean. "*Multimodal Training by Demonstration for Robot-Assisted Surgery.*" In Proc. of the ACM/IEEE International Conference on Human-Robot Interaction (HRI), HRI Pioneers Workshop, Cambridge, UK, March 2020. (**Acceptance rate: ~24%**)

PATENTS

- Septimiu E. Salcudean, Omid Mohareri, Prateek Mathur, Apeksha Avinash, **Alaa Eldin Abdelaal**. "*Imaging device for use with surgical instrument*". U.S. Patent Application No 16/862,371, 2020.

THESES

- **Alaa Eldin Abdelaal**, "*Event-based Control as a Cloud Service*". M.Sc. Thesis, School of Computing Science, Faculty of Applied Sciences, Simon Fraser University, Burnaby, BC, Canada. April 2017.

- **Alaa Eldin Abdelaal** *et. al*, "*One-Eyed Self-Learning Arm Robot*". B.Sc. Thesis, Computers and systems Engineering Department, Faculty of Engineering, Mansoura University, Mansoura, Egypt. June 2012.

GRANTS

Intuitive Foundation, a subsidiary from Intuitive Surgical Inc. — August 2021 - July 2022
Co-Principal Investigator with Profs. Tim Salcudean, Gregory Hager and Masaru Ishii — $72,000
Title: "*Quiet Eye Training in Minimally-Invasive Surgery*"

TEACHING EXPERIENCE

University of Prince Edward Island, Cairo Campus — Cairo, Egypt
Faculty of Sustainable Design — October 2021
Guest Lecturer
ENG-4330: Innovations in Biomedical Engineering

University of British Columbia — Vancouver, Canada
Electrical and Computer Engineering Dept. — Spring 2021
Teaching Assistant
EECE 589/MECH 464/MECH 563: Introduction to Robotics

Simon Fraser University — Burnaby, Canada
School of Computing Science — Summer 2017
Teaching Assistant
CMPT376W: Technical Writing and Group Dynamics

Mansoura University — Mansoura, Egypt
Computers and Systems Engineering Dept. — 2012 - 2014
Teaching Assistant
CSE 3116: Introduction to Control Engineering
CSE 3413: Machine Learning
MUR 112: Introduction to Programming

MENTORSHIP

- Rachelle Van Rumpt, Undergraduate student, ECE, UBC — January 2022 – present
  Topic: "Quiet Eye Training in Minimally-Invasive Surgery"
- Sayem Zaman, Undergraduate student, Engineering Physics, UBC — May 2021 – present
  Topic: "Gaze-based Learning from Demonstration for Autonomous Robotic Surgery"
- Isabelle Andre, Undergraduate student, ECE, UBC — May 2021 – December 2021
  Topic: "Integrated Task and Motion Planning for Parallelism in Autonomous Robotic Surgery"
- Kritika Joshi, Undergraduate student, Engineering Physics, UBC — January 2021 – August 2021
  Topic: "Trilateral Manipulation in Autonomous Robotic Surgery"
- Jason Lee, Undergraduate student, Computer Science, UBC — May 2021 - August 2021
  Topic: "An Optimization-based Method for Camera Viewpoint Automation in Robotic Surgery"
- Kareem Alaswad, Undergraduate student, Mechanical Engineering, UBC — May 2021 - September 2021
  Topic: "A Simulation Interface for the da Vinci Surgical Robot"
- Nancy Hong, Undergraduate student, ECE, UBC — May 2020 - March 2021
  Topic: "Optimization-based Viewpoint Guidance for a 6-DoF Endoscope"
- Jordan Liu, Undergraduate student, Computer Science, UBC — May 2020 - September 2020
  Topic: "Parallelism in Autonomous Robotic Surgery"
- Linghao Lyu, Undergraduate student, ECE, UBC — May 2019 - December 2020
  Topic: "Eye gaze Tracking for Robot-Assisted Surgery"
- Divya Budihal, Undergraduate student, ECE, UBC — September 2019 - April 2020
  Topic: "Autonomous Surgical Camera Movement in 3D: A Learning from Demonstration Approach"
- Apeksha Avinash, MASc student, ECE, UBC — May 2018 – January 2020
  Topic: "A Stereoscopic "Pickup" Camera for the da Vinci Surgical System"

INVITED TALKS

- *"Human Skill Augmentation in Robot-Assisted Surgery"*
  - Queensland University of Technology, School of Electrical Engineering and Robotics, Brisbane, Australia, May 2022.
  - University of California, Santa Cruz, the Electrical and Computer Engineering Department, Santa Cruz, California, USA, May 2022.
  - King's College London, the Department of Surgical & Interventional Engineering, London, UK, May 2022.
  - Carnegie Mellon University, the Robotics Institute, Pittsburgh, Pennsylvania, USA, March 2022.
  - Rice University, Electrical and Computer Engineering Department, Houston, Texas, USA, March 2022.
- *"An "Additional View" on Human-Robot Interaction and Autonomy in Robot-Assisted Surgery"*. Disney Research, Los Angeles, USA, March 2022.
- *"An "Additional View" on Human-Robot Interaction and Autonomy in Robot-Assisted Surgery"*. Johns Hopkins University, Baltimore, Maryland, USA, November 2021.

- *"An "Additional View" on Human-Robot Interaction and Autonomy in Robot-Assisted Surgery"*. Cornell University, Ithaca, New York, USA, November 2020.
- *"Training by Demonstration for Robot-Assisted Surgery"*. Intuitive Surgical Research Symposium, Sunnyvale, CA, USA, January 2020.

SERVICE

- Panel Chair at the 16th annual Human-Robot Interaction (HRI) Pioneers Workshop which was held in conjunction with the 2021 ACM/IEEE International Conference on Human-Robot Interaction.
- Reviewer at:
  - IEEE/ASME Transactions on Mechatronics (2021)
  - IEEE Transactions on Control Systems Technology (2019)
  - IEEE Robotics and Automation Letters (2020, 2021, 2022)
  - The International Journal of Computer Assisted Radiology and Surgery (2021)
  - IEEE Control Systems Letters (2020)
  - The International Conference on Robotics and Automation (ICRA) (2021, 2022).
  - The IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (2021, 2022)
  - International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) (2020, 2021, 2022)
  - International Conference for Biomedical Robotics and Bio-mechatronics (BioRob) 2020
  - The 29th IEEE International Conference on Robot and Human Interactive Communication (RO-MAN) 2020.
  - The American Control Conference (ACC) (2018, 2021, 2022)
  - MICCAI 2019 Workshop on Augmented Environments for Computer Assisted Interventions
- Poster session committee member at the Grace Hopper Celebration of Women in Computing Conference (GHC) 2019.
- Volunteer team leader at the organization of the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017).
- Volunteer at the organization of ROSCon 2017 (the main conference for the developers of Robot Operating System (ROS)).

ADDITIONAL TRAINING

Imperial College London   London, The United Kingdom
The Hamlyn Winter School on Surgical Imaging and Vision   December 2019
The Hamlyn Winter School focuses on both the technical and clinical aspects of Surgical Imaging and Vision. Through invited lectures, hands-on demonstrations, workshops, and mini-projects, the purpose of this winter school is to help researchers familiarize with the cutting edge research of this field.

University of British Columbia   Vancouver, Canada
The Centre for the Integration of Research, Teaching and Learning (CIRTL) Summer Institute   Summer 2018
This summer institute was a five-day, hands-on, intensive teaching course that combines an emphasis on learning evidence and theory-based approaches to teaching and learning.

University of Montpellier   Montpellier, France
The 8th Surgical Robotics Summer School   September 2017
This summer school was a two-week intensive course in different areas of surgical robotics including the fundamental aspects, different applications and future trends.

VOLUNTEERING AND OUTREACH

- Judge at the Three Minute Thesis (3MT) Competition, Electrical and Computer Engineering Department, University of British Columbia   February 2021
- Coordinator of the Pathways to Professorship program at the Faculty of Applied Science at UBC which aims to prepare PhD students for the rigors of applying to, and holding, an academic position.   August 2019 – April 2020
- Cultural ambassador for the Vancouver Summer Program at the Faculty of Education at UBC.   Summer 2018
- Coordinator of the counselling team at Egypt Scholars Inc. where we provide mentorship to current and prospective students regarding studying abroad and seeking financial support through scholarships.   June 2016 – December 2020
- Volunteer at Resala Association for charity and participated in many events to help the poor in my city and the surrounding small towns.   2008 – 2014