Toronto, Canada
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EDUCATION

Toronto, Canada	**University of Toronto**	**Fall 2020 - Current**

- Ph.D. in Computer Science, Focus on AI/ML, Computer Vision, Applications in Robotic Surgery

Ottawa, Canada	**University of Ottawa**	**Fall 2014 – Summer 2020**

- M.A.Sc. in Biomedical Engineering, August 2020, GPA: 9.8/10
  Graduate Thesis: Augmented Reality C-Arm Development and Synthetic X-ray Generation Using Generative Adversarial Networks
- B.H.Sc. in Health Sciences, April 2018, GPA: 9.53/10
  Bachelor Thesis: Integration of Biomechanical Analysis into Augmented Reality Games for Rehabilitation

EXPERIENCE

Research	**University of Toronto / SickKids Hospital**	**September 2020 – Current**

- Research and develop autonomous robotic systems using the da Vinci Research Kit, working on novel soft-body physics simulator for robot learning, imitation learning techniques, and robust tracking/manipulation of soft materials

Teaching Assistant	**University of Toronto**	**September 2018 – Current**

- Teaching Assistant for CSC108 (Intro to Comp Programming), BME1478 (Coding for Biomedical Engineers) HSS2381 (Statistics), MCG5138 (Graduate Class - Machine Learning/Control Theory), MCG 5138 (Graduate Class - Robotic Surgery), and MCG4150 (Bioinstrumentation)

Research	**University of Ottawa**	**January 2017 – July 2020**

- Pioneered three large projects: pix2xray, Desired Views, and Magic Mirror. Research focuses on computer vision, deep learning through adversarial networks, and real-time augmented reality with interactive elements
- Managed the lab in a leadership position, supervising and instructing 10+ undergraduate and graduate students. Presented at multiple conferences

Research Intern	**Balgrist University Hospital**	**June 2019 – August 2019**

- Researched and developed the Camera Augmented Mobile C-arm device built using a C-arm and multiple cameras to allow for augmented reality image-guided surgical procedures
- Research focuses on augmented reality rendering techniques, including point-based rendering, as well as multi-camera multi-modal calibration and image reconstruction

Projects

- **Surgical Robotics Simulation** (2021): Robotics simulation environment for reinforcement and imitation learning using Unity, Nvidia PhysX, and PyTorch.
- **Unsupervised Soft Tissue Tracking** (2021)**:** Deep learning for surgical scene perception for unsupervised tracking and future deformation prediction
- **pix2xray** (2020): Deep Learning to generate synthetic X-rays using atypical inputs from cameras and sensors. Simulation environment to generate synthetic X-ray datasets (Python, TensorFlow, C++, OpenGL)
- **CAM-C** (2019) Surgical overlay of X-ray and video using dual depth sensors (C++, OpenGL, OpenCV)
- **Magic Mirror** (2017-2018) Augmented reality medical education tool that overlays medical anatomy on a mirror interface using the Kinect (C++, OpenGL)

ADDITIONAL EXPERIENCE AND AWARDS

NSERC Scholarships: Awarded NSERC Masters and Undergraduate scholarships to pursue research
Excellence Scholarships: Awarded University of Ottawa Excellence Scholarships and Dean's Honor List

Languages and Technologies

C++; C; C#; Python; Java; JavaScript
PyTorch, TensorFlow, OpenGL, OpenCV, Git, CMake

Awards:

Natural Sciences and Engineering Research Council of Canada (NSERC) Masters Scholarship	2019
Ontario Graduate Scholarship (Declined)	2018
University of Ottawa Excellence Scholarship – Masters	2018-2019
University of Ottawa Dean's Honour List	2014-2018
Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award	2018
University of Ottawa, Interdisciplinary School of Health Sciences Student Research Day – 1st Place Poster Session	2018
Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award	2017
Undergraduate Research Opportunity Program Award - University of Ottawa	2016

Peer-Reviewed Publications:

Haiderbhai, M., Ledesma, S., Lee, S. C., Seibold, M., Fürnstahl, P., Navab, N., & Fallavollita, P. (2020). pix2xray: Converting RGB images into X-rays using generative adversarial networks. International Journal of Computer Assisted Radiology and Surgery. https://doi.org/10.1007/s11548-020-02159-2

M. Haiderbhai, S. Ledesma, N. Navab, and P. Fallavollita. Generating X-ray Images from Point Clouds Using Conditional Generative Adversarial Networks. Presented at the International Conferences of the IEEE Engineering in Medicine and Biology, Society, Montreal, Jul. 2020. (Oral Presentation)

Mustafa Haiderbhai*, Jesus Guerrero-Turrubiates, Vinod Gutta, Pascal Fallavollita (2019). Automatic C-arm Positioning Using Multi-Functional User Interface. The 42nd Canadian Medical and Biological Engineering Conference (CMBEC) 2019. (Oral Presentation)

Jeffrey Lao, Stephanie Chevrier, **Mustafa Haiderbhai***, Sheila Esmeralda Gonzalez-Reyna, Mina Zeroual, Michel Désilets, Pascal Fallavollita (2018). Comparison of a mixed-reality technology to cadavers for gross anatomy learning. The 16th Annual Imaging Network Ontario (ImNO) Symposium 2018. (Oral Presentation)

Fady Said*, David Burbidge, **Mustafa Haiderbhai**, Sheila Esmeralda Gonzalez-Reyna, Mina Zeroual, Michel Désilets, Pascal Fallavollita. (2018) A mixed-reality user interface for gross anatomy learning. The 16th Annual Imaging Network Ontario (ImNO) Symposium 2018. (Poster Presentation)