Mark Asselin

EDUCATION

QUEEN'S UNIVERSITY
M.Sc. in Computing
Biomedical Specialization
Expected June 2021

B.Computing honours with distinction
Biomedical Specialization
June 2019

UNIVERSITY OF BRITISH COLUMBIA
B.ASc. in Electrical Engineering
Biomedical Engineering Option
3 years completed

SKILLS

PROGRAMMING
C • C++ • HTML • CSS • JavaScript/React
Java • 8051 Assembly • Python • LaTeX
Visual Basic • VHDL

OPEN SOURCE SOFTWARE DEVELOPMENT
PLUS Toolkit (Public software Library for UltraSound imaging research)
3D Slicer (Platform for medical interventional navigation research)

SOFTWARE TOOLS
3D Slicer • PLUS Toolkit • Visual Studio
Fusion360 • Git (&Github)
Lightroom • Photoshop

OTHER SKILLS
• Electronics hardware, PCB prototyping and creation of embedded systems.
• Very proficient amateur photographer.

COURSEWORK

UNDERGRADUATE
Software Engineering • Circuit Analysis & Design
Rapid Prototyping (Electronic & Mechanical)
Embedded Systems • Electromagnetics

CONTACT INFORMATION
Email:
mark.asselin@queensu.ca

EXPERIENCE

FOUNDER & CEO | June 2019-
Pixel Medical Inc.
- Pixel Medical Inc. provides medical and surgical software development & system prototyping
- Responsible for setting the strategic direction of the company and managing day-to-day operations

GRADUATE RESEARCH ASSISTANT | June 2019-
Laboratory for Percutaneous Surgery, Queen's University

- Performed technical integration of advanced mass-spectrometry tissue analysis with clinical navigation systems
- Provided training and mentorship to undergraduate students

EXECUTIVE OFFICER | Nov 2018-
MICCAI Student Board

- Responsible for helping organize and deliver MICCAI student board events for MICCAI 2019 in Shenzhen, China.
- Lead web developer.

RESEARCH APPOINTMENT | Jun 2018-
Kingston Health Sciences Center

- Trained to operate scientific equipment in the operating room
- Pioneered the integration of a navigated intra-operative mass spectrometry workflow into the operating workflow
- Involved with over 20 surgical cases in this capacity

SOFTWARE DEVELOPER | March 2018-
NeuroImaging & Surgical Technologies Lab, Montreal Neurological Institute, McGill University

- Ongoing development to improve support in PLUS for the Atracsys optical trackers

MEDICAL ENGINEERING CONSULTANT | December 2017-
Verdure Imaging, Stockton, California

- Developing an ultrasound system for diagnostic assessment of the alignment of the spine.

TEACHING ASSISTANT | September 2017- May 2019
School of Computing, Queen's University

- CISC 271 Head TA (January 2019): Scientific computing and introductory data science
- CISC 251 (September 2018): Machine learning
- CISC 102 (July 2018): Introductory course on discrete mathematics for computing
- CISC 271 Head TA (January 2018): Scientific computing and introductory data science
- CISC 204 (September 2017): Formal logic for computer science

UNDERGRADUATE RESEARCH ASSISTANT | May 2017- May 2019
Laboratory for Percutaneous Surgery, Queen's University

- Development and refinement of open source surgical navigation systems
- Deployment & operation of systems in the operating theatre
- Software development in 3D Slicer, PLUS Toolkit
- Instructed new students in learning to develop navigation systems using 3D Slicer & PLUS
- Developed a navigation system based upon an inexpensive commercially available webcam
- Prototyping of mechanical components using 3D printing

ENGINEERING RESEARCH INTERN | October 2015-May 2016
Djavad Mowafaghian Centre for Brain Health, University of British Columbia

- Responsible for the implementation of a circuit to perform in vivo single cell electroporation in Xenopus tadpoles for the injection of photosensitive dyes.

AWARDS

2019   NSERC Alexander Graham Bell Canada Graduate Scholarship - Masters (CGS-M) ($17,500)
2019   Queen's University Master's Tri-Agency Recipient Recognition Award ($5,000)
2019   Arthur B. MacDonald prize for Academic Excellence ($15,000) - Declined
2019   Imaging Network of Ontario Honourable Mention for the scientific oral presentation entitled "Navigation of the iKnife for intra-operative tissue characterization in neurosurgery" ($100)
2018   Queen's Dean's Honour List
2018   NSERC Undergraduate Student Research Award - Undergraduate summer research award ($4,500)
2018   Christopher Knapper Award Honorable Mention - Recognizes Queen's teaching assistants who have demonstrated outstanding commitment to the education of students
2017   Queen's Dean's Honour List
2017   QHacks RBC prize for best use of natural language processing
2013   NKB Presidents Award - Awarded to most outstanding swimmer based on leadership, commitment and passion for excellence
2013   Silver Medal Society (90% or above average, all 4 years of high school)

PATENTS

U.S. PROVISIONAL PATENT APPLICATION NO.: 62/864,137 | June 20, 2019
Spatio-Temporal Localization for Mass Spectrometry Sample Analysis

PRESENTATIONS

CONFERENCE ORAL PRESENTATIONS

- Hamlyn Symposium on Medical Robotics 2019 (London, England): "SlicerVR for image-guided therapy planning in immersive virtual reality" (Upcoming)

- CARS 2019 (Rennes, France): "Accounting for surgical aerosol propagation delay in navigated intra-operative tissue characterization by mass spectrometry" (Upcoming)

- IMNO 2019 (London, Ontario, Canada): "Navigation of the iKnife for intra-operative tissue characterization in neurosurgery"

- SPIE 2019 Image-Guided Procedures, Robotic Interventions, and Modeling (San Diego, California, USA): "Controlling virtual views in navigated breast conserving surgery"

- SPIE 2019 Image-Guided Procedures, Robotic Interventions, and Modeling (San Diego, California, USA): "Evaluation of 3D Slicer as a medical virtual reality visualization platform"

- CSearch 2018 - Queen's Computing Student Research Conference (Kingston, Ontario, Canada): "Navigated molecular analysis for surgery, a demonstration".

- MICCAI 2018 Point of Care Ultrasound Workshop (Granada, Spain): "A training tool for ultrasound-guided central line insertion with webcam-based position tracking"

TUTORIALS

- Slicer 1-day Winter Bootcamp (January, 2019)

- MICCAI Point of Care Ultrasound: "Assembly of an open-source tracked ultrasound navigation system" (September, 2018)
- Slicer 3-day Bootcamp (May, 2018)

COURSE LECTURES

- CISC 472 (Medical Informatics): "Segmentation 101: Delineation of Anatomical Structures in Medical Imaging"
- CISC 472 (Medical Informatics): "Position Tracking & Image Registration for Ultrasound Based Navigation Systems"
- CISC 330 (Computer Integrated Surgery): "Practical Applications of Computer Assisted Surgery"

PUBLICATIONS

THESIS

- Bachelor's Thesis: "Spatially navigated intra-operative margin analysis by Rapid Evaporative Ionization Mass Spectrometry"

JOURNAL PAPERS

- Andras Lasso, Hannah H. Nam, Patrick V. Dinh, Csaba Pinter, Jean-Christophe Fillion-Robin, Steve Pieper, Sankhesh Jhaveri, Jean-Baptiste Vimort, Ken Martin, Mark Asselin, Francis X.McGowan, Ron Kikinis, Gabor Fichtinger, Matthew A.Jolley. "Interaction with Volume-Rendered Three-Dimensional Echocardiographic Images in Virtual Reality." Journal of the American Society of Echocardiography 31(10):1158-1160 (August 2018).
- Csaba Pinter, Saleh Choueib, Andras Lasso, Mark Asselin, Jean-Christophe Fillion-Robin, Jean-Baptiste Vimort, Ken Martin, Gabor Fichtinger. "SlicerVR for medical intervention training and planning in immersive virtual reality." IEEE Transactions on Medical Robotic and Bionics (submitted).

PEER-REVIEWED

- Mark Asselin, Andras Lasso, Tamas Ungi, Gabor Fichtinger. "Towards webcam-based tracking for interventional navigation." Proc. SPIE 10576, Medical Imaging 2018: Image-Guided Procedures, Robotic Interventions, and Modeling, 1057627 (Houston, TX, USA, February 2018).
- Mark Asselin, Andras Lasso, Tamas Ungi, Gabor Fichtinger. "Component fusion in a webcam based optical tracker for interventional navigation." Imaging Network Ontario Symposium 2018 Proceedings (Toronto, ON, Canada, March 2018).
- Mark Asselin, Tamas Ungi, Andras Lasso, Gabor Fichtinger. "A Training Tool for Ultrasound-guided Central Line Insertion with Webcam-based Position Tracking." MICCAI 2018 Point of Care Ultrasound Workshop (Granada, Spain, September 2018).
- Mark Asselin, Martin Kaufmann, Julia Wiercigroch, Tamas Ungi, Andras Lasso, John Rudan, Gabor Fichtinger. "Navigated real-time molecular analysis in the operating theatre, demonstration of concept." SPIE Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling 109512C. (San Diego, CA, USA, February 2019).
- Laura Connolly, Tamas Ungi, Andras Lasso, Thomas Vaughan, Mark Asselin, Parvin Mousavi, Scott Yam, Gabor Fichtinger. "Mechanically-Controlled Spectroscopic Imaging for Tissue Classification." SPIE Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling 109512E . (San Diego, CA, USA, February 2019).
- Jacob Laframboise, Tamas Ungi, Andras Lasso, Mark Asselin, Matthew S. Holden, Pearl Tan, Lawrence Hookey, Gabor Fichtinger. "Analyzing the curvature of the colon in different patient positions." SPIE Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling 109512F . (San Diego, CA, USA, February 2019).
- Shaun Lund, Thomas Vaughan, Tamas Ungi, Andras Lasso, Mark Asselin, Caitlin Yeo, C. Jay Engel, Gabor Fichtinger. "Controlling virtual views in navigated breast conserving surgery." SPIE Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling 1095114. (San Diego, CA, USA, February 2019).

- Sydney Perrin, Zachary Baum, Mark Asselin, Grace Underwood, Saleh Choueib, Hillary Lia, Tamas Ungi, Andras Lasso, Gabor Fichtinger. "Reproducibility of freehand calibrations for ultrasound-guided needle navigation." SPIE Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling 109512B. (San Diego, CA, USA, February 2019).

- Pearl Tan, Jacob Laframboise, Charles Scott, Robert Bechara, Andras Lasso, Mark Asselin, Matthew Holden, Tamas Ungi, Gabor Fichtinger and Lawrence Hookey. "Quantitative assessment to determine changes in colonic curvature with supine versus prone position using computed tomography colonography." Canadian Digestive Diseases Week 2019 Conference (Banff, AB, Canada, March 2019).

- Mark Asselin, Martin Kaufmann, Natasja Janssen, Julia Wiercigroch, Kyle Sunderland, Tamas Ungi, Andras Lasso, John Rudan, Gabor Fichtinger. "Navigation of the iKnife for intra-operative tissue characterization in neurosurgery." Imaging Network Ontario Symposium 2019 Proceedings (London, ON, Canada, March 2019).

- Jacob Laframboise, Tamas Ungi, Andras Lasso, Mark Asselin, Matthew S. Holden, Pearl Tan, Lawrence Hookey, Gabor Fichtinger. "Quantifying the effect of patient position on the curvature of colons." Imaging Network Ontario Symposium 2019 Proceedings (London, ON, Canada, March 2019).

- Mark Asselin, Julia Wiercigroch, Kyle Sunderland, Martin Kaufmann, Natasja Janssen, Tamas Ungi, Andras Lasso, John Rudan, Gabor Fichtinger. "Accounting for surgical aerosol propagation delay in navigated intra-operative tissue characterization by mass spectrometry." 33rd International Congress Exhibition on Computer Assisted Radiology and Surgery (CARS). Int J CARS (2019) 14 (Suppl 1):S45-S46. (Rennes, France, June 2019).

- Victoria Wu, Mark Asselin, Tamas Ungi, Gabor Fichtinger. "Detection of Spinal Ultrasound Landmarks Using Convolutional Neural Networks." 33rd International Congress Exhibition on Computer Assisted Radiology and Surgery (CARS). Int J CARS (2019) 14 (Suppl 1):S128–S129. (Rennes, France, June 2019).

- Mark Asselin, Amoon Jamzad, Andras Lasso, Tamas Ungi, John Rudan, Gabor Fichtinger. "Identification of the electrocautery state to enable spatially navigated intra-operative mass spectrometry tissue analysis". Hamlyn Symposium on Medical Robotics, Imperial College. In proceedings ISSN: 2516-5029, pp 57-58. (London, England, June 2019).

- Csaba Pinter, Andras Lasso, Mark Asselin, Jean-Christophe Fillion-Robin, Jean-Baptiste Vimort, Ken Martin, Gabor Fichtinger. "SlicerVR for image-guided therapy planning in immersive virtual reality". Hamlyn Symposium on Medical Robotics, Imperial College. In proceedings ISSN: 2516-5029, pp 91-92. (London, England, June 2019).

- Colton Barr, Andras Lasso, Mark Asselin, Steve Pieper, Faith C. Robertson, William B. Gormley, Gabor Fichtinger. "Towards portable image guidance and automatic patient registration using and RGB-D camera and video projector." SPIE Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling. (Houston, TX, USA, February 2019).

- Laura Connolly, Amoon Jamzad, Martin Kaufmann, Rachel Rubino, Alireza Sedghi, Tamas Ungi, Mark Asselin, Scott Yam, John Rudan, Christopher Nicol, Gabor Fichtinger, Parvin Mousavi. "Classification of tumor signatures from electrosurgical vapors using mass spectrometry and machine learning: a feasibility study." SPIE Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling. (Houston, TX, USA, February 2019).

- Lauren Yates, Laura Connolly, Amoon Jamzad, Mark Asselin, Rachel Rubino, Scott Yam, Tamas Ungi, Andras Lasso, Christopher Nicol, Parvin Mousavi, Gabor Fichtinger. "Robotic tissue scanning with biophotonic probe." SPIE Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling. (Houston, TX, USA, February 2019).

- Colton Barr, Andras Lasso, Mark Asselin, Steve Pieper, Faith C. Robertson, William B. Gormley, Gabor Fichtinger. "Validation of a projector-based navigation system for bedside surgical procedures." Imaging Network of Ontario Symposium 2020 Proceedings (Toronto, ON, Canada, March 2020).

- Laura Connolly, Amoon Jamzad, Martin Kaufmann, Rachel Rubino, Alireza Sedghi, Tamas Ungi, Mark Asselin, Scott Yam, John Rudan, Chris Nichol, Gabor Fichtinger, Parvin Mousavi. "Classification of metastatic and primary cancer in breast cancer xenograft models." Imaging Network of Ontario Symposium 2020 Proceedings (Toronto, ON, Canada, March 2020).

- Lauren Yates, Laura Connolly, Amoon Jamzad, Mark Asselin, Rachel Rubino, Scott Yam, Tamas Ungi, Andras ALsso, Chris Nicol, Parvin Mousavi, Gabor Fichtinger. "Using a biophotonic probe for robotic tissue scanning." Imaging Network of Ontario Symposium 2020 Proceedings (Toronto, ON, Canada, March 2020).

NON-PEER-REVIEWED

- Mark Asselin, Tamas Ungi, Andras Lasso, Jay Engel, John Rudan, Gabor Fichtinger. "A navigated intelligent knife for breast cancer surgery". Inquiry @ Queen's Undergraduate Research Day (March 2018).

- Mark Asselin, Martin Kaufmann, Andras Lasso, Tamas Ungi, Gabor Fichtinger. "Navigated molecular analysis for surgery, a demonstration". CSearch: Queen's Computing Student Research Conference (September 2018).

- Laura Connolly, Thomas Vaughan, Mark Asselin, Andras Lasso, Tamas Ungi, Scott Yam, Parvin Mousavi, Gabor Fichtinger. "A variation of 3D printer machinery for spectroscopic tissue analysis". Inquiry @ Queen's Undergraduate Research Day (March 2019).

MENTORED STUDENTS

LAURA CONNOLLY | MAY - AUGUST 2019
Queen's University, Kingston, ON, Canada
- Implemented machine learning algorithms on mass-spectrometry dataset obtained from mouse xenograft tumors

LAUREN YATES | MAY - AUGUST 2019
Queen's University, Kingston, ON, Canada
- Developed computer vision algorithms for the identification of tissue mounted on pathology slides and the generation of Raman sampling points on these tissue samples

JUYOUNG KIM | MAY - AUGUST 2019
Vanderbilt University, Nashville, TN, USA
- Developed a PLUS (Public Library for Ultrasound) Toolkit device for the acquisition of video from BlackMagic capture cards

PROFESSIONAL MEMEBERSHIPS

- SPIE: The international society for optics and photonics (2019-)

- MICCAI: The Medical Imaging Computing and Computer Assisted Surgery Society (2018-)

EXTRACURRICULAR ATHLETICS

IRONMAN DISTANCE TRIATHLETE | 2017-2019
- 2018 All World Bronze Athlete (top 10% in age group worldwide)

COMPETITIVE SWIMMER | 10 YEARS, INCLUDING 3 YEARS AT CANADIAN SENIOR NATIONAL LEVEL & 2 YEARS AT THE CANADIAN UNIVERSITY LEVEL
- Multiple gold medalist Canadian Age Group National Swimming Championships (Montreal 2013)
- Finalist at World Championships and Commonwealth Games Trials (Victoria 2013)
- Competed at Canadian Olympic Swimming Trials (Montreal 2012)