Jacob J. Peoples Curriculum Vitæ

PhD, Computer Science Email: jacob.peoples@queensu.ca

Education

2016 – 2020 **PhD Computing, Queen's University**
- Supervisor: Randy Ellis
- Thesis: Composition of Transformations in Feature-Based Registration

2014 – 2016 **MSc Computing, Queen's University** Promoted to PhD
- Supervisor: Randy Ellis

2010 – 2014 **BScH Mathematical Physics, Queen's University** GPA: 4.15/4.3
- Received the undergraduate medal in mathematical physics at graduation

Publications

Journal Articles

J2 K. Scott, D. Stuart, **J. Peoples**, G. Bisleri, and R. Ellis: Efficient Automatic 2D/3D Registration of Cardiac Ultrasound and CT Images. *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization*, 2020. (doi:10.1080/21681163.2020.1835555[1])

J1 **J. J. Peoples**, G. Bisleri, and R. E. Ellis: Deformable multimodal registration for navigation in beating-heart cardiac surgery. *International Journal of Computer Assisted Radiology and Surgery*, 2019. (doi:10.1007/s11548-019-01932-2[2])

Refereed Conference Papers

C2 **J. J. Peoples** and R. E. Ellis: Composition of Transformations in the Registration of Sets of Points or Oriented Points. In *Shape in Medical Imaging*, 2020. (doi:10.1007/978-3-030-61056-2_1[3])

C1 **J. Peoples** and R. Ellis: A Generalizable Framework for Domain-Specific Nonrigid Registration: Application to Cardiac Ultrasound. In *2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)*, 2020. (doi:10.1109/ISBI45749.2020.9098434[4])

Refereed Abstracts

A2 M. S. Hefny, **J. J. Peoples**, M. L. Zec, D. R. Pichora, and R. E. Ellis: Topologically consistent triangulation for computer assisted surgery planning. In *CARS 2016, International Journal of Computer Assisted Surgery (Suppl 1)*, 2016.

A1 M. S. Hefny, **J. J. Peoples**, M. L. Zec, D. R. Pichora, and R. E. Ellis: Atlas-based scaphoid fixation planning. In *Proceedings of the Annual Meetings of CAOS-International*, 2016.

Preprints

Pr1 K. Cannon, C. Hanna, and **J. Peoples**: Likelihood-ratio ranking statistic for compact binary coalescence candidates with rate estimation. *arXiv preprint arXiv:1504.04632*, 2015.

Research Experience

2020/09 – Present **Post-doctoral Fellow, Queen's University**
- Conducting research on machine learning and radiomics applied to various clinical datasets and projects
- Helping supervise and guide student research projects

2020/06 – 2020/08 **Research Assistant, Queen's University**
- Early stage research into application of deep learning to brain tumour detection
- Helping to design patient specific surgical guides for the spine

2016/09 – 2020/04 **Graduate Researcher (PhD), Queen's University**
- Research on nonrigid point set registration toward doctoral thesis

[1] https://doi.org/10.1080/21681163.2020.1835555
[2] https://doi.org/10.1007/s11548-019-01932-2
[3] https://doi.org/10.1007/978-3-030-61056-2_1
[4] https://doi.org/10.1109/ISBI45749.2020.9098434

Selected Projects

- **Point Set Registration**
  - Developed novel algorithms for point set registration using state-of-the-art statistical methods
  - Implemented custom software using MATLAB, Python/TensorFlow and C++
  - Designed and conducted experiments for validation and testing of robustness
- **Cardiac Image Registration**
  - Developed a novel method of aligning intraoperative ultrasound and preoperative CT cardiac images
  - Implemented custom software in MATLAB and C++ to do the registration and analysis
  - Helped supervise and oversaw the onboarding of two undergraduate researchers

2014/09 – 2016/08 **Graduate Researcher (Master's), Queen's University**

- Research on 3D mesh processing and statistical shape modeling toward Master's thesis

Selected Projects

- **Preprocessing 3D Mesh Geometry**
  - Developed novel meshing algorithms to prepare data for an in-house statistical shape modeling algorithm
  - Implemented custom software in MATLAB and C++ to process 3D data
- **Study of Wrist Surgery Planning**
  - Oversaw clinician participants as they completed drill plans to be analyzed in the study
  - Conducted preprocessing on data with custom software and novel algorithms

2015/10 – 2016/01 **Special Research Student, Nara Institute of Science and Technology**

- Research on statistical shape modeling of the liver using then state-of-the-art methods
- Provided a seminar to hosting research group on shape modeling methods

2013/05 – 2013/08 **Summer Undergraduate Researcher, Canadian Institute for Theoretical Astrophysics**

- Research and software development in Python as part of the LIGO Scientific Collaboration

Teaching Experience

2018 Winter **Teaching Fellow, Queen's University**, Discrete Mathematics for Computing I (CISC102)

- Sole instructor of mandatory first year computer science course with over 100 students
- Responsible for lectures, office hours, and all other course materials
- Worked with students requiring special accommodations to ensure all needs were met
- Managed a team of teaching assistants to aid with grading and office hours

2017 Winter **Guest Lecturer, Queen's University**, Continuous Coordinate Transformations (CISC881)

- Provided 3 lectures on differential geometry (2017/01/14, 2017/01/16, 2017/03/28)

2016 Fall, 2014 Fall **Teaching Assistant, Queen's University**, Discrete Mathematics for Computing I (CISC102)

- Held office hours, graded and proctored tests, edited and suggested problems for exams

2015 Fall **Teaching Assistant, Queen's University**, Logic for Computing Science (CISC204)

- Lead group tutorial sessions, graded and proctored tests

Awards and Honours

Research Scholarships

2017/09 – Present **NSERC PGS-D**, CAD 21,000 per annum
2015/05 – 2016/04 **NSERC Alexander G. Bell CGS-M**, CAD 17,500
2016/09 – 2017/08 **Queen Elizabeth II Graduate Scholarship in Science and Technology**, CAD 15,000
2015/11 – 2016/01 **JASSO Student Exchange Support Program for Short Term Study in Japan**
2013/05 – 2013/08 **NSERC Undergraduate Summer Research Award**

Undergraduate Awards

All awards listed below were awarded by Queen's University

2014 Medal in Mathematical Physics, Dean's Honour List
2013 Dean's Honour List, Nellie and Ralph Jeffery Award in Mathematics

2012 Dean's Honour List with Distinction, Susan Near Prize in Mathematics, Susan Near Prize in Physics, Dora and Beatrice Helmkay Scholarship in Mathematics

2011 Dean's Honour List with Distinction, William Coombs Baker Memorial Prize, Day Prize in Physics and Mathematics, Annie Bentley Lillie Prize in First Year Calculus, Principal's Scholarship

2010 Principal's Scholarship

Conference Presentations

Talks

T2 **J. J. Peoples**, G. Bisleri, and R. E. Ellis: Deformable Multi-Modal Registration for Navigation in Beating-Heart Cardiac Surgery. Presented at IPCAI 2019, Rennes, France, by J. J. Peoples, 2019/06/19 (video[5])

- Chosen by audience vote after short talk given previous day

T1 **J. J. Peoples**, G. Bisleri, and R. E. Ellis: Deformable Multi-Modal Registration for Navigation in Beating-Heart Cardiac Surgery. Presented at IPCAI 2019, Rennes, France, by J. J. Peoples, 2019/06/18 (video[6])

Posters

P1 **J. J. Peoples**, G. Bisleri, and R. E. Ellis: Deformable Multi-Modal Registration for Navigation in Beating-Heart Cardiac Surgery. Presented at IPCAI 2019, Rennes, France, by J. J. Peoples, 2019/06/18 to 2019/06/19

[5] http://medialibrary.cars2019.org/mediatheque/media.aspx?mediaId=70854&channel=70776
[6] http://medialibrary.cars2019.org/mediatheque/media.aspx?mediaId=70821&channel=70776