Danielle F. Pace

Ph.D. Candidate
Computer Science and Artificial Intelligence Laboratory
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EDUCATION

Ph.D. Candidate, Computer Science Sept 2013 – Present
Massachusetts Institute of Technology, Cambridge, MA, USA
GPA: 4.9/5.0

- Image segmentation based on machine learning to segment cardiac structures for patients with congenital heart disease.
- Advisor: Dr. Polina Golland

M.E.Sc., Biomedical Engineering Sep 2007 – Mar 2010
The University of Western Ontario / Robarts Research Institute, London, ON, Canada
GPA: 3.98/4.0

- Thesis: Real-time 4D ultrasound reconstruction for image-guided intracardiac interventions
- Advisor: Dr. Terry Peters

B.Cmp.H., Biomedical Computing Sep 2003 – Apr 2007
Queen's University, Kingston, ON, Canada
GPA: 4.15/4.3

- Undergraduate Project: Visualization for computer-assisted image-free total hip replacement
- Advisor: Dr. Randy Ellis

RESEARCH AND PROFESSIONAL EXPERIENCE

Visiting Ph.D. Candidate Jun 2017 – Aug 2017
Philips Research, Hamburg, Germany

- Collaborated with Philips researchers on machine learning for image segmentation (Ph.D. research projects).
- Advisor: Dr. Jürgen Weese

Research and Development Engineer Jul 2010 – Jun 2013
Kitware Inc., Carrboro, NC, USA

- Developed deformable image registration methods that model the sliding motion of the lungs and abdominal organs.
- Designed and implemented analyses for an orthopedic device manufacturer, including bone morphological population analysis and implant design. Progressed to co-lead, including project management and requirements generation.
- Led and wrote two successful NIH STTR research grants as well as successful commercial consulting proposals.
- Advisor: Dr. Stephen Aylward

Research Assistant May 2007 – Aug 2007
Brigham & Women's Hospital / Harvard Medical School, Boston, MA, USA

- Developed a 3D Slicer tutorial module incorporating a LEGO robot, for hands-on training in image-guided therapy.
- Advisor: Dr. Nobuhiko Hata

Research Assistant May 2007 – Aug 2007
Department of Physiology, Queen's University, Kingston, ON, Canada

- Created computational models of motorneurons to investigate how background synaptic activity affects firing rate.
- Advisor: Dr. Ken Rose

TEACHING AND MENTORSHIP

Undergraduate Mentorship Jan 2016 – Present
Massachusetts Institute of Technology, Cambridge, MA, USA

- Mentored six MIT undergraduate students for projects in machine learning and image annotation.

Introduction to Inference Sep 2016 – Dec 2016
Teaching Assistant, Massachusetts Institute of Technology, Cambridge, MA, USA
- Taught recitations, ran office hours, developed material for problem sets, labs and exams, and graded exams.

Algorithms and Data Structures for Object-Oriented Design Jan 2009 – Apr 2009
Teaching Assistant, The University of Western Ontario, London, ON, Canada
- Designed and graded assignments and weekly labs, and ran laboratory hours.

Training Specialist Mar 2008 – Dec 2008
Consulting to the National Center for Image-Guided Therapy (NCIGT)
- Developed new 3D Slicer tutorials, and taught interactive training workshops.

Programming Fundamentals for Engineers Sep 2007 – Dec 2007
Teaching Assistant, The University of Western Ontario, London, ON, Canada
- Taught core principles and debugging strategies to novice programmers.

AWARDS

- **Best Presentation,** New England Computer Vision Workshop, 2018.
- **NSERC Canada Graduate Scholarship (Doctoral)**, 2013-2016 ($63,000).
- **Best Poster**, International Society for Computer Aided Surgery, Computer Assisted Radiology and Surgery, 2010.
- **1st Poster in Imaging for Cardiovascular Therapeutics**, 7th Symposium of Imaging Network Ontario, 2008.
- **NSERC Canada Graduate Scholarship (Master's)**, 2007-2009 ($35,000).
- **Ontario Graduate Scholarship**, Government of Ontario, 2007 ($15,000, declined to take up NSERC).
- **Advanced Undergraduate Project Award**, School of Computing, Queen's University, 2007.
- **Best Undergraduate Contribution**, Canadian Student Conference on Biomedical Computing, 2006.
- **HSBC Bank Malta Undergraduate Scholarship**, 2003-2007 ($10,000).
- **Principal's Scholarship in Computing**, Queen's University, 2003-2005 ($8,000).

SERVICE

Organizing Committee
- **HVSMR Challenge (MICCAI 2016):** Workshop on Whole-Heart and Great Vessel Segmentation from 3D Cardiovascular Magnetic Resonance Images in Congenital Heart Disease

Technical Reviewer
- IEEE Transactions on Medical Imaging (TMI).
- Medical Image Computing and Computer Assisted Intervention (MICCAI).
- Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
- Journal of Cardiovascular Magnetic Resonance (JCMR).
- Information Processing in Computer Assisted Interventions (IPCAI).
- Journal of Medical Imaging (JMI).
- MICCAI Workshop on Computational and Clinical Applications in Abdominal Imaging.
- MICCAI Workshop on Clinical Image-Based Procedures: From Planning to Intervention.

Leadership
- **MICCAI Student Board:** Advisory Member (2018-2019), Educational Officer (2017-2018), Professional Students Event Officer (2016-2017), Executive Member (2015-2016).
- **MIT Canadians Club:** Deputy Prime Minister (2014-2015 and 2016-2017), Minister of Finance (2015-2016).

PEER-REVIEWED JOURNAL PUBLICATIONS

1. ***D.F. Pace***, S.R. Aylward, M. Niethammer, A locally adaptive regularization based on anisotropic diffusion for deformable image registration, IEEE Transactions on Medical Imaging; 32(11): 2114-2126, 2013.

2. A. Irimia, B. Wang, S. Aylward, M. Prastawa, ***D.F. Pace***, M. Niethammer, G. Gerig, D.A. Hovda, R. Kikinis, P.M. Vespa, J.D. Van Horn, Multimodal neuroimaging of structural pathology and neuroconnectivity in traumatic brain injury: towards personalized outcome prediction, NeuroImage: Clinical; 1:1-17, 2012.

PEER-REVIEWED CONFERENCE PROCEEDINGS

3. ***D.F. Pace***, A.V. Dalca, T. Brosch, T. Geva, A.J. Powell, J. Weese, M.H. Moghari, P. Golland, Iterative segmentation from limited training data: Applications to congenital heart disease, MICCAI Workshop on Deep Learning in Medical Image Analysis, LNCS 11045:334-342, 2018.
4. ***D.F. Pace***, A.V. Dalca, T. Geva, A.J. Powell, M.H. Moghari, P. Golland, Interactive whole-heart segmentation in congenital heart disease, Medical Image Computing and Computer Assisted Interventions (MICCAI), LNCS 9351:80-88, 2015.
5. R. Kwitt, ***D.F. Pace***, M. Niethammer, S.R. Aylward, Studying cerebral vasculature using structure proximity and graph kernels, Medical Image Computing and Computer Assisted Interventions (MICCAI), LNCS 8150:534-541, 2013.
6. ***D.F. Pace***, M. Niethammer, S.R. Aylward, Sliding geometries in deformable image registration, MICCAI Workshop on Computational and Clinical Applications in Abdominal Imaging, LNCS 7029:141-148, 2011.
7. M. Niethammer, G.L. Hart, ***D.F. Pace***, P.M. Vespa, A. Irimia, J.D. Van Horn, S.R. Aylward, Geometric Metamorphosis, Medical Image Computing and Computer Assisted Interventions (MICCAI), LNCS 6892:639-646, 2011.
8. ***D.F. Pace***, A. Enquobahrie, H. Yang, S.R. Aylward, M. Niethammer, Deformable image registration of sliding organs using anisotropic diffusive regularization, International Symposium on Biomedical Imaging (ISBI), 30:407-413, 2011.
9. T. Peters, ***D.F. Pace***, P. Lang, G. Guiraudon, D. Jones, C. Linte, Ultrasound image guidance of cardiac interventions, Proceedings of SPIE Medical Imaging; 7968:79680T, 2011.
10. C.A. Linte, M. Carias, S.D. Cho, ***D.F. Pace***, J. Moore, C. Wedlake, D. Bainbridge, B. Kiaii, T.M. Peters, Estimating heart shift and morphological changes during minimally invasive cardiac interventions, Proceedings of SPIE Medical Imaging; 7625:762509, 2010.
11. ***D.F. Pace***, D.G. Gobbi, C. Wedlake, J. Gumprecht, J. Boivert, J. Tokuda, N. Hata, T.M. Peters, An open-source real-time ultrasound reconstruction system for four-dimensional imaging of moving organs, MICCAI Workshop on Systems and Architectures for Computer Assisted Intervention, 2009.
12. J. Moore, C. Clarke, D. Bainbridge, C. Wedlake, A.D. Wiles, ***D.F. Pace***, T.M. Peters, Image guidance for spinal facet injections using tracked ultrasound, Medical Image Computing and Computer Assisted Interventions (MICCAI), LNCS 5761:516-523, 2009.
13. T.M. Peters, C.A. Linte, J. Moore, A. Wiles, J. Lo, ***D.F. Pace***, C. Wedlake, D. Bainbridge, D.L. Jones, G.M. Guiraudon, Cardiac imaging and modeling for guidance of minimally invasive beating heart interventions, Functional Imaging and Modeling of the Heart, LNCS 5528:466-475, 2009.
14. ***D.F. Pace***, A.D. Wiles, J. Moore, C. Wedlake, D.G. Gobbi, T.M. Peters, Validation of four-dimensional ultrasound for targeting in minimally-invasive beating-heart surgery, Proceedings of SPIE Medical Imaging; 7261:726115, 2009.
15. J. Jomier, L. Ibanez, A. Enquobahrie, ***D.F. Pace***, K. Cleary, An open-source testing framework for tracking devices using Lego Mindstorms™, Proceedings of SPIE Medical Imaging; 7261:72612S, 2009.
16. ***D.F. Pace***, R. Kikinis, N. Hata, An accessible, hands-on tutorial system for image-guided therapy and medical robotics using a robot and open source software, MICCAI Workshop on Open Source and Open Data, 2007.

PEER-REVIEWED CONFERENCE ABSTRACTS

17. ***D.F. Pace***, Polina Golland, David Annese, Tal Geva, Andrew J. Powell, M.H. Moghari, Creating 3D heart models of children with congenital heart disease using magnetic resonance imaging, International Society for Magnetic Resonance in Medicine (ISMRM), 2015.
18. Y. Dai, ***D.F. Pace***, J. Bischoff, Anthropometric differences in natural posterior tibial slope, Orthopaedic Research Society (ORS), 2014.
19. ***D.F. Pace***, A. Enquobahrie, P. Reynolds, J. Jomier, E. Bullitt, S.R. Aylward, TubeTK: An open-source toolkit of algorithms operating on images of tubes, 26th International Congress and Exhibition on Computer Assisted Radiology and Surgery (CARS), International Journal of CARS; 7 (S1):S79-S80, 2012.
20. ***D.F. Pace***, D. Bainbridge, J. Moore, C. Wedlake, G. Guiraudon, D.L. Jones, T.M. Peters, Real-time 4D ultrasound reconstruction for improved intraoperative imaging during image-guided beating-heart interventions, 24th International Congress and Exhibition on Computer Assisted Radiology and Surgery (CARS), International Journal of CARS; 5(S1):S271-S273, 2010 (*won International Society for Computer Aided Surgery (ISCAS) Best Poster award*).

21. C.A. Linte, D.S. Cho, M. Carias, ***D.F. Pace***, J. Moore, C. Wedlake, D. Bainbridge, B. Kiaii, T.M. Peters, Estimating heart movement and morphological changes during robot-assisted coronary artery bypass graft interventions, 24th International Congress and Exhibition on Computer Assisted Radiology and Surgery (CARS), 2010.
22. ***D.F. Pace***, T. Bui, P.K. Rose, Computational estimates of the effect of asynchronous synaptic activity on fluctuations in the membrane potential of motoneurons, Society for Neuroscience (SfN), 2006.