

John Stuart Haberl Baxter, BSE

CURRICULUM VITAE

**Robarts Research Institute, University of Western Ontario,
1151 Richmond St. N., London, Ontario, N6A 5B7**

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RESEARCH OBJECTIVES

My goal as a researcher is to understand and develop mechanisms for knowledge professionals (such as clinicians) to effectively communicate information to a computer regarding ill-defined problems, especially those in computer vision. This information often includes mixtures of example solutions, incomplete hints, numeric parameters, and specifications of the solution's desired properties. This research program is threefold, including:

- Investigating and classifying different types and classes of communicable information in different applications,
- Developing new and extendable algorithms for addressing this knowledge in a computationally efficient manner, and
- Designing new interaction mechanisms for encoding this knowledge in both a human- and computer-understandable manner, which provides a bridge for communicating these problems.

Similarly, this research relies on a deep understanding of a number of disparate fields including machine learning, mathematical optimization, human-computer interaction, and cognitive science. So far, I have worked extensively in the field of medical image segmentation encoding general classes of anatomical knowledge along the lines of topological and geometrical information.

EDUCATION

- Sept. 2012-present** **University of Western Ontario**, London, Ontario
Candidate for PhD in Biomedical Engineering
Supervisor: Terry Peters, PhD
Thesis: "Contributions of Continuous Max-Flow to Medical Image Processing"
- Sept. 2007-Apr. 2012** **University of Waterloo**, Waterloo, Ontario
Bachelor of Software Engineering (Honours) with a Cognitive Science Option
and a Management Sciences Option, Co-op Program
Graduated with Distinction on the Dean's List
Design Project Supervisor: Paul Thagard, PhD & Tobias Schröder, PhD
Design Project: "LIMBS: Locally Integrated Multi-Brain Systems"

SKILLS and INTERESTS

- Excellent software design and programming skills in several languages such as C, C++, NVIDIA CUDA, Java, Python, and Matlab
- Proven skills in computer vision algorithm development through the invention of novel variational optimization based segmentation and image enhancement frameworks
- Proven skills in cognitive science and human-computer interaction through the creation of the LIMBS framework, a novel socio-cognitive modeling platform designed for social scientists
- Effective leadership, communication, and editing skills through two years of co-editing mathNEWS, the Faculty of Mathematics newsletter at the University of Waterloo, co-chairing the Network of Imaging Students, and founding the Robarts Association of Trainees

EMPLOYMENT and POSITIONS

May 2010 - Research Programmer,

present

Robarts Research Institute, University of Western Ontario, London, Ontario

- Developed a GPU accelerated framework for medical volume visualization
- Designed and implemented VTK compatible classes for library inclusion
- Implemented general-purpose augmented reality framework and tailored for Vuzix 920AR augmented reality hardware

Jan. 2009 – Software Quality Assurance Analyst,

Apr. 2009

Harris Corporation Broadcast Communications Division, Waterloo, Ontario

- Designed and implemented manual testing scripts
- Developed mathematical framework for automated test suite generation based on original concept of prioritized orthogonal arrays
- Interfaced with external clients in order to ensure external software was compatible with product line

May. 2008 – Automated Quality Assurance Analyst,

Aug. 2008

Parlay Entertainment Limited, Oakville, Ontario

- Created automated testing scripts to validate game and game management software
- Developed probability table generating programs for Bingo and Keno
- Performed functional testing on both back-end and front-end software

HONOURS AND AWARDS

- Sep. 2016 -
Aug. 2017** **Doctoral Research Excellence Award,**
University of Western Ontario (\$10, 000)
Institutional
- Sep. 2015 -
Aug. 2017** **Natural Sciences and Engineering Research Council of Canada,**
Alexander Graham Bell Canada Graduate Scholarship (\$75, 000)
National
- Oct. 2015** **Bayesian and Graphical Models in Biomedical Imaging (BAMBI),**
Best Paper Award, (€300)
International
- Apr. 2015** **Imaging Network of Ontario Symposium,**
Poster Award, 1st Place
Provincial
- Mar. 2015** **London Health Research Day,**
Medical Physics, Engineering, Imaging, Transplantation, Devices, Surgical &
Clinical Studies Poster Award, 1st Place (\$500)
Local
- Sep. 2014 -
Aug. 2015** **Ontario Graduate Scholarship Program,**
Queen Elizabeth II Graduate Scholarship in Science and Technology
(\$15, 000)
Provincial
- June 2014** **London Imaging Discovery Day,**
Student Research Award, 3rd Place (\$50)
Local
- Mar. 2014** **London Health Research Day,**
Platform Presentation Award, 2nd Place (\$600)
Local
- Sep. 2013 -
Aug. 2014** **Ontario Graduate Scholarship Program,**
Ontario Graduate Scholarship (\$15, 000)
Provincial
- Sept. 2012 -
Aug. 2013** **Natural Sciences and Engineering Research Council of Canada,**
Alexander Graham Bell Canada Graduate Scholarship (\$17, 500)
National
- Apr. 2012** **University of Waterloo,**
Sanford Fleming Foundation Award for Academic Excellence
Awarded to the student with the highest graduating average in their cohort
Institutional
- Dec. 2007 -
Apr. 2012** **University of Waterloo,**
Faculty of Mathematics Dean's Honour List
Awarded to students in the Faculty of Mathematics with an average $\geq 88\%$
Institutional

- Dec. 2007 -
Apr. 2012** **University of Waterloo,**
Faculty of Engineering Dean's Honour List
*Awarded to students in the Faculty of Engineering in the first decile of their class
with an average of at least 83%*
Institutional
- Jan. 2012** **Sunnybrook Health Sciences Centre, Toronto, Ontario,**
Finalist for the 2012 Sunnybrook Prize (\$100)
*Awarded to 1 of 10 selected finalists for outstanding undergraduate research
(honoraria for selected finalists)*
National
- May 2010** **University of Waterloo,**
Sanford Fleming Foundation Work Term Report Award (\$300)
*Awarded to the top 8 engineering work term reports that term, report title "A
Comparison of Automatic Test Suite Generation with Explicit Priority Structures"*
Institutional
- Sept. 2007 -
Apr. 2008** **University of Waterloo,**
President's Scholarship of Distinction (\$5, 000)
Awarded to all entering students with an average of at least 95%
Institutional
- Sept. 2007 -
Apr. 2008** **University of Waterloo,**
Software Engineering Entrance Scholarship (\$3, 500)
*Awarded to entering students on the basis of secondary school performance and
extensive extracurricular involvement*
Institutional

PUBLICATIONS and CONFERENCES

A. Refereed Journal Manuscripts

(11 accepted, 1 in submission, 3 in preparation, * primary author)

In press or accepted:

1. **Baxter, J.S.H.***, Rajchl, M., McLeod, A.J., Yuan, J. & Peters, T.M. "Directed Acyclic Graph Continuous Max-Flow Image Segmentation for Unconstrained Label Orderings" *International Journal of Computer Vision*, 2017. (accepted)
2. Ameri, G.*, **Baxter, J.S.H.**, McLeod, A.J., Peters, T.M. & Chen, E.C.S., "Effects of Line Fiducial Parameters and Beamforming on Ultrasound Calibration", *Journal of Medical Imaging*, 2017. (accepted)
3. **Baxter, J.S.H.***, Inoue, J., Drangova, M., & Peters, T.M., "Shape Complexes: the intersection of label orderings and star convexity constraints in continuous max-flow medical image segmentation", *Journal of Medical Imaging*, 2016. (accepted)
4. **Baxter, J.S.H.***, Rajchl, M., Peters, T.M. & Chen, E.C.S., "Optimization-based interactive segmentation interface for multiregion problems", *Journal of Medical Imaging*, 2015.
5. Rajchl, M.*, **Baxter, J.S.H.***, McLeod, A.J., Yuan, J. Qui, W., Peters, T.M. & Khan, A.R. "Hierarchical Max-Flow for Multi-Atlas Segmentation with Kohonen Self-Organizing Map Based Gaussian Mixture Modeling", *Medical Image Analysis*, 2015.
6. Cantor-Rivera, D.*, **Baxter, J.S.H.**, de Ribaupierre, S., Lau, J.C., Mirsattari, S.M., Goubran, M., Burneo, J.G., Steven, D.A., Peters, T.M. & Khan, A.R. "Individual feature maps: a patient-specific analysis tool with applications in temporal lobe epilepsy", *International Journal of Computer Assisted Radiology*, 2015.
7. McLeod, A.J.*, **Baxter, J.S.H.**, Ameri, G., Ganapathy, S., Peters, T.M., & Chen, E.C.S. "Detection and Visualization of Dural Pulsation for Spine Needle Interventions ", *International Journal of Computer Assisted Radiology*, 2015.
8. Chen, E.C.S.*, McLeod, A.J., , **Baxter, J.S.H.**, & Peters, T.M. "Registration of 3D Shapes Under Anisotropic Scaling: Anisotropic-Scaled Iterative Closest Point Algorithm", *International Journal of Computer Assisted Radiology*, 2015.
9. Kayvanrad, M.H.*, McLeod A.J., **Baxter, J.S.H.**, McKenzie C.A, & Peters, T.M., "Stationary wavelet transform for under-sampled MRI reconstruction", *Magnetic Resonance Imaging*, 2014.
10. Abhari, K.*, **Baxter, J.S.H.**, Khan, A.R., Peters, T.M., de Ribaupierre, S., & Eagleson, R. "Visual Enhancement of MR Angiography Images to Facilitate Planning of Arteriovenous Malformation Interventions" *ACM Transactions on Applied Perception*, 2014.
11. Abhari, K.*, **Baxter, J.S.H.**, Chen, E.C.S., Khan, A.R., Peters, T.M., de Ribaupierre, S., & Eagleson, R. "Training for Planning Tumour Resection: Augmented Reality and Human Factors" *IEEE Transactions in Biomedical Engineering*, 2014

In submission or review:

1. **Baxter, J.S.H.***, Hosseini, Z., Peters, T.M., & Drangova, M. "Cyclic Continuous Max-Flow: A Third Paradigm in Generating Local Phase Shift Maps in MRI", *IEEE Transactions in Medical Imaging*.

In preparation:

1. **Baxter, J.S.H.***, Gibson, E., Eagleson, R. & Peters, T.M. "Semiotics and Segmentation", *Medicine, Healthcare and Philosophy*.
2. Ameri, G.*, **Baxter, J.S.H.***, Bainbridge, D., Peters, T.M., & Chen, E.C.S, "Augmented Reality Ultrasound Guidance Systems: a case study in system development and a cautionary tale", *International Journal of Computer-Assisted Radiology and Surgery*.
3. Capaldi, D.*, **Baxter, J.S.H.**, McLeod, A.J., Guo, F., Peters, T.M., & Parraga, G. "Four-dimensional Pulmonary Proton Magnetic Resonance Ventilation Weighted Imaging: Preliminary Evaluation in Healthy Volunteers and Patients with Asthma", *Medical Physics*.

B. Published Refereed Conference Papers (23) (* primary author)

1. **Baxter, J.S.H.***, Hosseini, Z., Liu, J., Drangova, M., & Peters, T.M. (2016) "Cyclic Continuous Max-Flow: Phase Processing Using the Inherent Topology of Phase", Conference of the International Society of Magnetic Resonance in Medicine, Singapore.
2. **Baxter, J.S.H.***, Inoue, J., Drangova, M., & Peters, T.M., (2016) "Shape Complexes in Continuous Max-Flow Hierarchical Multi-Labeling Problems". Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
3. Pardasani, U.,* **Baxter, J.S.H.**, Peters, T.M., & Khan, A.R. (2016) "Single slice US-MRI registration for neurosurgical MRI-guided US". Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
4. Rajchl, M.*, **Baxter, J.S.H.**, Qiu, W., Khan, A.R., Fenster, A., Peters, T.M., Ruecket, D., & Yuan, J. (2016) "Fast Deformable Image Registration with Non-Smooth Dual Optimization", IEEE Conference on Computer Vision and Pattern Recognition
5. **Baxter, J.S.H.***, Rajchl, M., Yuan, J., & Peters, T.M., (2015) "Directed Acyclic Graphical Continuous Max-Flow Image Segmentation". MICCAI Workshop on Bayesian and Graphical Models for Biomedical Imaging , Munich, Bavaria, Germany.
6. McLeod, A.J.,* **Baxter, J.S.H.**, Jayaranthne, U., Pautler, S., Peters, T.M., & Luo, X. (2015) "Stereoscopic Motion Magnification in Minimally-Invasive Robotic Prostatectomy". MICCAI Workshop in Computer-Assisted and Robotic Endoscopy , Munich, Bavaria, Germany.
7. Inoue, J.* **Baxter, J.S.H.**, & Drangova, M. (2015) "Left Atrial Wall Segmentation from CT for Radiofrequency Catheter Ablation Planning". MICCAI Workshop in Clinical Image Processing, Munich, Bavaria, Germany.
8. Ameri, G., **Baxter, J.S.H.**, McLeod, A.J., Peters, T.M. & Chen, E.C.S. (2015) "Augmented Reality Ultrasound Guidance for Central Line Procedures: Preliminary Results". MICCAI Workshop in Augmented Environments for Computer-Assisted Interventions, Bavaria, Germany.
9. Chen, E.C.S.* McLeod, A.J., **Baxter, J.S.H.**, & Peters, T.M. (2015) "An Iterative Closest Point Framework for Ultrasound Calibration". MICCAI Workshop in Augmented Environments for Computer-Assisted Interventions, Bavaria, Germany.
10. **Baxter, J.S.H.***, Rajchl, M., McLeod, A.J., Khan, A.R., Yuan, J., & Peters, T.M., (2015) "Optimization Based Interactive Segmentation Interface for Multi-Region Problems". Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, Orlando, Florida, USA.

11. Ameri, G.*, McLeod, A.J., **Baxter, J.S.H.**, Chen, E.C.S., & Peters, T.M., (2015) "Line fiducial material and thickness considerations for ultrasound calibration". Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, Orlando, Florida, USA.
12. Rajchl, M*, **Baxter, J.S.H.**, Bae, E., Xue-Cheng, T., Fenster, A., Peters, T.M. & Yuan, J. (2015) "Variational Time-Implicit Multiphase Level-Sets". Energy Minimization Methods in Computer Vision and Pattern Recognition, Hong Kong, China.
13. **Baxter, J.S.H.***, Rajchl, M., McLeod, A.J., Khan, A.R., Yuan, J., & Peters, T.M., (2014) "Smoothness parameter tuning for generalized hierarchical continuous max-flow segmentation." Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
14. Ameri, G.*, **Baxter, J.S.H.**, McLeod, A.J., Jayaranthe, U.L., Chen, E.C.S., & Peters, T.M., (2014) "Synthetic aperture imaging in ultrasound calibration." Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
15. McLeod, A.J.*, **Baxter, J.S.H.**, de Ribaupierre, S., & Peters, T.M., (2014) "Motion magnification for endoscopic surgery." Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
16. Abhari, K. *, **Baxter, J.S.H.**, Chen, E.C.S, Khan, A.R., Wedlake, C., Peters, T.M., de Ribaupierre, S., & Eagleson, R., (2013) "Use of a mixed-reality system to improve the planning of brain tumour resections: Preliminary results", *Augmented Environments for Computer-Assisted Interventions, Lecture Notes in Computer Science*, Springer Berlin / Heidelberg.
17. Abhari, K., **Baxter, J.S.H.**, Chen, E.C.S, Wedlake, C., Peters, T.M., Eagleson, R., & de Ribaupierre, S., (2013) "The Role of Augmented Reality in the Training and Planning of Brain Tumour Resection", *Joint Medical Image and Augmented Reality (MIAR)* Nagoya, Japan.
18. Rajchl, M., **Baxter, J.S.H.**, Yuan, J., Peters, T.M., & Khan, A.R., (2013) " ASeTs: MAP-Based Brain Tissue Segmentation using Manifold Learning and Hierarchical Max-Flow Regularization", *Medical Image Computation and Computer-Assisted Interventions (MICCAI)*, Nagoya, Japan.
19. Abhari, K., **Baxter, J.S.H.**, Chen, E.C.S, Wedlake, C., Peters, T.M., Eagleson, R., & de Ribaupierre, S., (2013) "Development and Evaluation of an Augmented-Reality Training System for Planning Brain Tumour Resection Interventions", *Medical Image Understanding and Analysis*, Birmingham, UK.
20. Abhari, K., **Baxter, J.S.H.**, de Ribaupierre S., Peters T. M., & Eagleson R., (2012), "Perceptual Improvement of Volume-Rendered MR Angiography Data using a Contour enhancement Technique," Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
21. Chen, E.C.S, Sarkar, K., **Baxter, J.S.H.**, Moore, J., Wedlake, C., & Peters, T.M., (2012) "An augmented reality platform for planning of minimally invasive cardiac surgeries", Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.
22. Buchanan, S., Moore, J., Lammers, D., **Baxter, J.S.H.**, & Peters, T.M., (2012) "Characterization of tissue-simulating phantom materials for ultrasound-guided needle procedures", Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, San Diego, California, USA.

23. **Baxter J.S.H.**, Peters T. M & Chen E. C. S., (2011), "A unified framework for voxel classification and triangulation", Society of Photographic Instrumentation Engineers Proceedings in Medical Imaging, Orlando, Florida, USA.

C. Technical Reports and other non-peer reviewed contributions (6) (* primary author)

1. **Baxter J.S.H.***, McLeod, A.J. & Peters, T.M., (2015) "A Continuous Max-Flow Approach to Cyclic Field Reconstruction", *arXiv preprint arXiv:1511.03629*.
2. **Baxter, J.S.H.***, Yuan, J., & Peters, T. M. (2015). "Shape Complexes in Continuous Max-Flow Hierarchical Multi-Labeling Problems". *arXiv preprint arXiv:1510.04706*.
3. **Baxter, J.S.H.***, Rajchl, M., Yuan, J., & Peters, T. M. (2015). "A Proximal Bregman Projection Approach to Continuous Max-Flow Problems Using Entropic Distances". *arXiv preprint arXiv:1501.07844*.
4. **Baxter, J.S.H.***, Rajchl, M., Yuan, J., & Peters, T. M. (2014). "A Continuous Max-Flow Approach to Multi-Labeling Problems under Arbitrary Region Regularization". *arXiv preprint arXiv:1405.0892*.
5. **Baxter, J.S.H.***, Rajchl, M., Yuan, J., & Peters, T. M. (2014). "A Continuous Max-Flow Approach to General Hierarchical Multi-Labeling Problems". *arXiv preprint arXiv:1404.0336*.
6. Rajchl, M.* , **Baxter, J.S.H.**, Qiu, W., Khan, A. R., Fenster, A., Peters, T. M., & Yuan, J. (2014). "RANCOR: Non-Linear Image Registration with Total Variation Regularization". *arXiv preprint arXiv:1404.2571*.

INVITED LECTURES

1. *A Brief History of Max-Flow Image Segmentation*, (Oct 12, 2015) Imperial College, London, United Kingdom.

REVIEWING ACTIVITIES

Journals:

- IEEE Signal Processing Letters (1 paper)
- Medical Image Analysis (MedIA) (1 paper)
- International Journal of Computer Assisted Radiology and Surgery (IJCARS) (1 paper)
- IET Journal of Computer Vision (2 papers)

Conferences:

- Information Processing in Computer Assisted Interventions (IPCAI) (4 papers)
- Workshop in Augmented Environments in Computer Assisted Interventions (AE-CAI) (2 papers)
- Medical Image Processing and Computer Assisted Interventions (MICCAI) (1 paper)

INSTRUCTIONAL EXPERIENCE

Sept 2013 - **Medical Imaging - Teaching Assistant,**

present

University of Western Ontario, London, Ontario

- Developed and taught tutorials on ultrasound, X-ray, MRI, CT, nuclear medicine, and Fourier analysis
- Interacted with students on a one-to-one basis and provided direct feedback on class material and student progress
- Marked assignments and assisted in proctoring exams

Jan 2016 - **Problem Solving in Medical Biophysics and Biomedical Engineering - Course**

Dec 2016 **Designer and Guest Lecturer**

University of Western Ontario, London, Ontario

- Developed lecture and assignment materials on problem solving communication, divergent thinking, diagrammatic reasoning, and analogical reasoning in biomedical science.
- Gave guest lectures on diagrammatic reasoning and analogical reasoning.

Sept 2009 - **Foundations of Sequential Programs Teaching Assistant,**

Dec 2009

University of Waterloo, Waterloo, Ontario

- Managed a team of 7 graduate student teaching assistants
- Developed lecture and tutorial materials and supplementary study materials

LEADERSHIP and VOLUNTEER ACTIVITIES

2017 **Chair:** Biomedical Engineering Student Council

Chair: Network of Imaging Students (NOISe)

Founder & Committee Member: Robarts Association of Trainees (RATs)

BME Representative: Schulich Graduate Student Council

Student Representative: Biomedical Imaging Research Centre (BIRC)

Member: Society of Photographic Instrumentation Engineers (SPIE)

Member: International Society of Magnetic Resonance in Medicine (ISMRM)

2016 **Chair:** Biomedical Engineering Student Council

Chair: Network of Imaging Students (NOISe)

Organizer: Robarts Research Retreat Conference

Founder & Committee Member: Robarts Association of Trainees (RATs)

BME Representative: Schulich Graduate Student Council

Student Representative: Biomedical Imaging Research Centre (BIRC)

Member: Society of Photographic Instrumentation Engineers (SPIE)

Member: International Society of Magnetic Resonance in Medicine (ISMRM)

2015 **Chair:** Biomedical Engineering Student Council

Chair: Network of Imaging Students (NOISe)

BME Representative: Schulich Graduate Student Council

Member: Biomedical Imaging Research Centre (BIRC)

Member: Society of Photographic Instrumentation Engineers (SPIE)

2014 **Alumni Judge:** University of Waterloo, Software Engineering Design Project Symposium

Chair: Network of Imaging Students (NOISe)

Treasurer: Biomedical Engineering Student Council

- Member:** Biomedical Imaging Research Centre (BIRC)
Member: Society of Photographic Instrumentation Engineers (SPIE)
- 2013** **Alumni Judge:** University of Waterloo, Software Engineering Design Project Symposium
Student Representative: University of Western Ontario, Biomedical Engineering Pedagogical Committee
Organization Committee Member: Network of Imaging Students (NOISe)
Member: Biomedical Imaging Research Centre (BIRC)
- 2012** **Class Representative:** University of Waterloo, Mathematics Society
Class Representative: University of Waterloo, Engineering Society 'A'
Social Development Studies Statistics Tutor: University of Waterloo,
mathNEWS Columnist: University of Waterloo
Student Representative: University of Western Ontario, Biomedical Engineering Pedagogical Committee
Member: Network of Imaging Students (NOISe)
Member: Biomedical Imaging Research Centre (BIRC)
- 2011** **Speaker:** University of Waterloo, Mathematics Society Speaker
Class Representative: University of Waterloo, Mathematics Society
Class Representative: University of Waterloo, Engineering Society 'A'
Social Development Studies Statistics Tutor: University of Waterloo,
mathNEWS Columnist: University of Waterloo
- 2010** **Speaker:** University of Waterloo, Mathematics Society Speaker
Class Representative: University of Waterloo, Mathematics Society
Class Representative: University of Waterloo, Engineering Society 'A'
mathNEWS Editor: University of Waterloo
- 2009** **Class Representative:** University of Waterloo, Mathematics Society
Class Representative: University of Waterloo, Engineering Society 'A'
mathNEWS Editor: University of Waterloo
Volunteer: Renison Ministry Centre and Institute of Ministry
- 2008** **mathNEWS Editor:** University of Waterloo,
Class Representative: University of Waterloo, Mathematics Society
Representative: Renison Residence Council, Renisix
- 2007** **mathNEWS Columnist:** University of Waterloo,
Class Treasurer: University of Waterloo, Software Engineering
Representative: Renison Residence Council, Renisix.

RELEVANT COURSES

Biomedical Engineering Graduate Program
University of Western Ontario, London, Ontario

Aug. 2016	ENGSCI 9701	Business Acumen <i>Introduction to business concepts and language including accounting, finance, marketing, competition, strategic management, leadership and innovation.</i> <i>Grade: PASS</i>
Jan. 2014 - Apr. 2014	COMPSCI 9552 AUDIT	Human-Computer Interaction <i>Exposure to topics in human-computer interaction, including: frameworks for human-computer interaction; requirements gathering; rapid prototyping; user interface systems and tool kits.</i>

- Jan. 2013 -** BME 9502 **Engineering Analysis of Physiological Systems**
Apr. 2013 *Modelling of the respiratory, cardiac, and neuromuscular systems. Related physiological and ethical implications.*
Grade: 95%
- Sept. 2012 -** BME 9509 **Introduction to Digital Image Processing**
Dec. 2012 *Pointwise, algebraic, and geometric image processing operations. Applications in image registration, segmentation, and analysis.*
Grade: 98%
- Sept. 2012 -** BME 9513 **Medical Imaging**
Dec. 2012 *Physics and image formation of ultrasound, X-ray, magnetic resonance, computed tomography, nuclear medicine, positron emission tomography.*
Grade: 97%

Software Engineering

University of Waterloo, Waterloo, Ontario

- Jan. 2012 -** SE 465 **Software Testing and Quality Assurance**
Apr. 2012 *Systematic testing of software systems through software verification, reviews, metrics, quality assurance, and prediction of software reliability. Related management issues.*
Grade: 92%
- Jan. 2012 -** ECE 457B **Fundamentals of Computational Intelligence**
Apr. 2012 *Knowledge-based reasoning systems, expert systems, fuzzy logic and inference, feedforward and recurrent neural networks. Soft computing for the analysis and control of ill-defined systems.*
Grade: 96%
- Aug. 2011 -** SE 464 **Software Design and Architectures**
Sept. 2012 *Design, implementation, and evolution phases of software development. Software design processes, methods, notation, and architectural patterns. Design management.*
Grade: 100%
- Aug. 2011 -** ECE 428 **Computer Networks and Security**
Sept. 2012 *Network protocol layers and implementation such as TCP,UDP, IP, ethernet, and HTTP. Network and distributed applications, and introductory cryptography.*
Grade: 92%
- Sept. 2010 -** ECE 457A **Cooperative and Adaptive Algorithms**
Dec. 2010 *Ill-structured problem formulation and heuristics. Guided searches, ant colony optimization, genetic algorithms, and particle swarm optimization. Adaptive variants and tuning.*
Grade: 96%
- Sept. 2010 -** SE 463 **Software Requirements Specification and Analysis**
Dec. 2010 *Models, notation, and processes for software requirements identification, representation, analysis, and validation. Cost estimation from early documents and specification.*
Grade: 94%
- Sept. 2010 -** PHIL 447 **Seminar in Cognitive Science (Topic: Mind and Society)**
Dec. 2010 *Multi-agent systems and underlying individual agent models. Rational and post-modern agent theory. Applications of computational epistemology in the social sciences.*
Grade: 90%
- Jan. 2010 -** CS 457 **System Performance Evaluation**
Apr. 2010 *Techniques for system performance evaluation from performance modelling, discrete event simulation, verification, and queuing theory. Applications of system modeling to distributed computer systems.*
Grade: 99%

REFERENCES

Terry Peters, PhD

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