

ADAM HARRISON

Curriculum Vitae

Contact

Affiliation: Department of Electrical and Computer Engineering

University of Alberta
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Education

PhD in Electrical and Computer Engineering

University of Alberta

Sept. 2010-May 2012, Jan. 2013- present

- ◆ Advisor: Dr. Dileepan Joseph
- ◆ Ph.D. Thesis: *Numeric Tensor Framework: Toward a New Paradigm in Technical Computing*
 - ◆ Developing technical computing framework using numeric tensor formalism and constructivism to operate on multi-dimensional data, with emphasis on computer vision applications
 - ◆ Took a leave of absence to pursue an 8-month research internship at Siemens Corporate Research
 - ◆ Authored TPAMI journal paper, SPIE conference proceeding (best paper award), 1 technical report, and 2 journal publications, one submitted and one in preparation
 - ◆ Developed LibNT and NTToolbox, open-source C++ and MATLAB libraries, respectively, for dense and sparse numeric tensor calculations
 - ◆ Awarded A+ in course on differential equations, extra to degree

MSc in Electrical and Computer Engineering

University of Alberta

Sept. 2007-Dec. 2009

- ◆ M.Sc. Thesis: *Computer Vision for Computer-Aided Microfossil Identification*
 - ◆ Applied computer vision techniques to automate microfossil identification, a task important to climate research and hydrocarbon exploration
 - ◆ Authored/co-authored 3 journal articles and 1 disclosure
 - ◆ 4.0 GPA

Bachelor of Science in Engineering Systems and Computing

University of Guelph

Sept. 2002-May 2006

- ◆ Graduated with Distinction, top of class

Refereed Journal Articles

- ♦ **A.P. Harrison** and D. Joseph, "Maximum Likelihood Estimation of Depth Maps Using Photometric Stereo," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 34, no. 7, pp. 1368-1380, 2012.
- ♦ **A.P. Harrison** and D. Joseph, "Translational photometric alignment of single-view image sequences," *Computer Vision and Image Understanding*, vol. 116, no. 6, pp. 765–776, 2012.
- ♦ **A.P. Harrison**, C.M. Wong, and D. Joseph, "Virtual Reflected-Light Microscopy," *Journal of Microscopy*, vol. 244, no. 3, pp. 293-304, 2011.
- ♦ K. Ranaweera, **A.P. Harrison**, S. Bains, and D. Joseph, "Feasibility of Computer-Aided Identification of Foraminiferal Tests," *Marine Micropaleontology*, vol. 72, no. 1-2, pp. 66-75, 2009.
- ♦ A. Cranney, **A.P. Harrison**, et al., "Driving Problems in Patients with Rheumatoid Arthritis," *Journal of Rheumatology*, vol. 32, no. 12, pp. 2337-42, 2005.

Articles Submitted or In Preparation

- ♦ **A.P. Harrison** and D. Joseph, "Numeric Tensor Framework: Sparse Computations," *SIAM Journal on Scientific Computing [Submitted]*, pp.1—20.
- ♦ **A.P. Harrison** and D. Joseph, "Numeric Tensor Framework: Extending and Exploiting Einstein Notation," *[In Preparation]*, pp.1—20.

Refereed Conference Papers

- ♦ **A.P. Harrison** and D. Joseph, "Depth-Map and Albedo Estimation with Superior Information-Theoretic Performance," In: E.Y. Lam and K.S. Neil (eds.) *Image Processing Machine Vision Applications VIII, Proceedings of the SPIE*, vol. 9405, pp. 94050C-94050C-15, 2015
****Winner of Best Paper Award****
- ♦ **A.P. Harrison**, N. Birkbeck, and M. Sofka, "IntellEditS: Intelligent Learning-Based Editor of Segmentations," In: Mori, K., Sakuma, I., Sato, Y., Barillot, C., and Navab, N. (eds.) *MICCAI 2013, LNCS*, vol. 8151, pp. 235-242. Springer, Heidelberg, 2013.

Invited Talks

- ♦ **A.P. Harrison**, "Multi-Index Array Framework with Imaging Applications," Siemens Corporation, Corporate Technology, Princeton, NJ, USA, 2012.
- ♦ C.M. Wong, **A.P. Harrison**, K. Ranaweera, and D. Joseph, "Human-Based Computation for Microfossil Identification," 2012 Geological Society of America Annual Meeting, 2012.

Disclosures

- ♦ **A. P. Harrison**, N. Birkbeck, and M. Sofka, "IntellEditS: Intelligent Learning-Based Editor of Segmentations," U.S. Provisional Patent Application, 2013, Case Number: 2013P04942 US.
- ♦ **A. P. Harrison**, M. Sofka, and S. K. Zhou, "Local Splice-Based Editing of Meshes Using Random Walker," U.S. Provisional Patent Application, 2012, Case Number: 2012P24293 US.
- ♦ D. Joseph and **A.P. Harrison**, "Method and System for Computer-Aided Object Identification," U.S. Provisional Patent Application, 2011.

Other Publications

- ♦ O. Skorka, J. Li, **A.P. Harrison**, M. Alexiuk, and D. Joseph, "Design of a low-dose X-ray imaging system using vertically-integrated CMOS circuits," Technical Report, U. of Alberta, Edmonton, AB, Canada and IMRIS, Winnipeg, MB, Canada, 2011.
- ♦ **A.P. Harrison**, "Computer Vision for Computer-Aided Microfossil Identification," Master's thesis, U. of Alberta, 2010.
- ♦ "Embedded Open Source Analysis," White Paper, Klocwork Inc., Ottawa, ON, Canada. [Primary Author]

Employment

Intern

June 2012 – Dec. 2012

Siemens Corporation, Corporate Technology, Princeton, NJ, USA

- ♦ Conducted high-level medical imaging research, focusing on intelligent and interactive tools for segmenting CT and MRI volumetric data
- ♦ Produced client deliverable tools, 2 disclosures, and a paper to the Medical Image Computing and Computer Assisted Intervention conference (the largest in medical imaging analysis)

Professional Services Technician

May 2006 – Aug. 2007

Technical Marketing Lead

Klocwork Inc, Ottawa, ON

- ♦ Created customer-driven add-ons to the Klocwork product, on-schedule and meeting customer requirements
- ♦ Published widely read whitepaper *Embedded Open Source Analysis*, explaining the technical results and impact of Klocwork's source code analysis on numerous open source projects

Research Assistant

May 2005 – Aug. 2005

University of Guelph, Guelph, ON

- ♦ Prototyped electronic sound capture and visualization device to aid veterinary students in diagnosis
- ♦ Required independently learning new skills, including hands-on circuit design, hardware interfacing, and visualization

Research Assistant**May - Aug. 2004 and 2005***Ottawa Health Research Institute, Ottawa, ON*

- ◆ Performed data-analysis for clinical epidemiology research units
- ◆ In one summer, produced results and conclusion of rheumatoid arthritis in the population that led to a journal paper

Teaching

Teaching Assistant, Introductory Programming Contest**Winter Term 2014***University of Alberta, Edmonton, AB*

- ◆ Helped to develop and run an optional and successful programming contest sponsored by MathWorks, for first-year engineering students in introductory programming
- ◆ Developed YouTube channel and Google site for the contest
- ◆ Took the lead in grading and choosing contest winners

Lab Instructor, Multimedia Signal Processing**Winter Term 2012 and 2013***University of Alberta, Edmonton, AB*

- ◆ Responsible for teaching and running lab sessions of a 4th year course on multimedia signal processing
- ◆ Received a university-wide and departmental-wide award for teaching

Guest Lecturer, Reflectance and Shading**Winter Term 2012***University of Alberta, Edmonton, AB*

- ◆ Lectured graduate class in computer vision on the topics of shape, reflectance, and image cues

Teaching Assistant**Fall Term 2008 – Winter Term 2010***University of Alberta, Edmonton, AB*

- ◆ Subjects included introductory C++ programming and principles of written and oral technical communication

Fellowships and Awards

Award	Level	Dollar Amount	Date	Details
Izaak Walton Killam Memorial Scholarship	National	\$70,000	2013-2015	The most prestigious graduate award administered by the University of Alberta
Andrew Stewart Memorial Graduate Prize	Institutional	\$5,000	2013	Award recognizing research accomplishment while registered in a doctoral program
Alexander Graham Bell	National	\$105,000	2010-	Offered to the top-ranked applicants for national-

Graduate PhD Scholar (CGSD)			2013	level funding of graduate studies
President's Doctoral Prize of Distinction	Institutional	\$18,991	2010-2013	Offered to students holding the CGSD award
University of Alberta Graduate Student Teaching Award	Institutional	n/a	2012	University-wide teaching award
Leonard E. Gads Teaching Award	Institutional	\$300	2012	One of 4 teaching awards recognizing exemplary service in the Faculty of Engineering
Queen Elizabeth II Scholarship (Master's)	Institutional	\$5,400	2009	Awarded based on academic record, letters of appraisal, and potential contributions to research.
Alexander Graham Bell Graduate M.Sc. Scholar (CGSM)	National	\$17,500	2008-2009	Offered to the top-ranked applicants for national-level funding of graduate studies
M.Sc. Scholarship in Information and Communication Technology	Provincial	\$12,500	2008-2009	Offered to students holding the CGSM award
SPIE Student Scholarship	International	\$1,000	2008-2009	Awarded based on potential long-range contribution to optics, photonics or related field
Government of Alberta Graduate Student Scholarship	Provincial	\$2,000	2008-2009	Recognizing academic performance while enrolled in a graduate program
Walter H. Johns Graduate Fellowship	Institutional	\$4,435	2008-2009	Offered to students holding the CGSM award
University of Alberta Master's Scholarship	Institutional	\$15,000	2007-2008	One of 15 scholarships awarded to masters applicants
University of Guelph Dean's Scholarship	Institutional	\$3,000	2003-2006	Awarded annually to the top ten students in the College of Physical and Engineering Science
University of Guelph Board of Governor's Scholarship	Institutional	\$8,000	2002-2006	Awarded to students with the highest admission averages of the entering cohort
Consulting Engineers of Ontario Undergraduate Award	Provincial	\$1,000	2004-2005	Awarded to one student from each Ontario university with an engineering program
NSERC Undergraduate Student Research Award	National	\$4,500	2005	Support for undergraduate research conducted over the summer
University of Guelph Entrance Scholarship	Institutional	\$3,000	2002-2003	Awarded to students with a 90% or higher high-school average

Academic Service

Council Executive

2014-present

Electrical and Computer Engineering Graduate Students' Association, UAlberta

- ◆ Elected position representing graduate students in the department.
- ◆ Responsibilities include organizing prestigious visiting speakers, coordinating social events, and acting as liaison between students and the department administration

Social Coordinator

2005-2006

College of Physical and Engineering Sciences Student Council, UGuelph

- ◆ Elected position representing students in the College of Physical and Engineering Sciences
- ◆ Coordinated major events, including career fairs, graduate studies info nights, orientation activities and social events

Non-Academic Service

Youth Mentor

2008 – present

Uncles and Aunts at Large, Edmonton, Alberta

- ◆ Acting as mentor and positive role model for at-risk youths
- ◆ Organizing and leading monthly activity-based events for a group of boys aged 8-13

Executive and Trip Leader

2008 – 2010

University of Alberta Outdoors Club, Edmonton, Alberta

- ◆ Led groups of students, of diverse backgrounds and outdoors experience, on wilderness trips
- ◆ Managed the administration and purchasing of the club's sizeable rental equipment

International Volunteer

2006 – 2007

Canada World Youth, Ostrog, Ukraine and Mission, BC

- ◆ Participated in philanthropic and work placement projects, such as web design, press packages, and community engagement with an international and varied team
- ◆ Overcame language and cultural barriers by continuously developing teamwork and communication skills

Media Stories

- ◆ Richard Cairney, "Contest gives computer engineering students a chance to get creative in the classroom," News & Events, Faculty of Engineering, University of Alberta, Jun. 2014
- ◆ Ryan Heise, "ECE Professor and students awarded with teaching and research awards," News & Events, Faculty of Engineering, University of Alberta, Jun. 2013

- ◆ Ryan Heise, “ECE researchers cut through noise to map the depth of 2D images,” *News & Events*, Faculty of Engineering, University of Alberta, Jun. 2012
 - ◆ Ryan Heise, “Researchers better map the depth of 2-D images,” *folio*, University of Alberta, vol. 49, no. 22, pp. 10, Jul. 2012
- ◆ Brian Murphy, “3-D microscope opens eyes to prehistoric oceans and present-day resources,” *EurekAlert!*, Sep. 2011
 - ◆ Brian Murphy, “3-D microscope opens eyes to prehistoric oceans and present-day resources,” *ScienceDaily*, Sep. 2011
 - ◆ Cameron Chai, “University Of Alberta Researchers Develop Virtual Reflected Light Microscopy System,” *AZoNano*, Sep. 2011
 - ◆ Brian Murphy, “3D microscope opens eyes to prehistoric oceans and present-day resources,” *SpaceDaily*, Sep. 2011
 - ◆ John Wallace, “Virtual-reflected-light microscope visualizes ancient protozoa in 3D,” *LaserFocusWorld*, Sep. 2011
- ◆ Giles Miller, “A new way to look at microscopic collections,” Curator of Micropalaeontology’s blog, *NaturePlus*, Natural History Museum, London, UK, Sep. 2011
- ◆ Ryan Bromsgrove, “3D microscope brings new light to miniscule samples,” *The Gateway*, University of Alberta, Sep. 2011
- ◆ Ryan Heise, “Giving fossils a new look,” *News & Events*, University of Alberta, Aug. 2011
 - ◆ Ryan Heise, “Giving fossils a new look,” *folio*, University of Alberta, vol. 49, no. 1, pp. 7, Sep. 2011
 - ◆ Ryan Heise, “ECE researchers tackle geoscience problem in the third dimension,” *News & Events*, Faculty of Engineering, University of Alberta, Aug. 2011

Professional Societies

- ◆ IEEE Student Member
- ◆ SPIE Student Member