Jesse Knight

MASc Candidate, Image Analysis in Medicine Lab, University of Guelph

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Education

MASc, Engineering Systems & Computing Sept 2015 – May 2017
Image Analysis in Medicine Lab, University of Guelph
GPA: 94.3; Thesis: Nonparametric white matter lesion segmentation using FLAIR MRI only

BEng, BioMedical Sept 2011 – May 2015
University of Guelph
GPA: 93.7; Foci: medical image and signal processing, engineering design

Awards & Achievements

Research Funding

Ontario Graduate Scholarship (M) Sept 2016
Canadian Graduate Scholarship (M, NSERC) Sept 2015

Awards

Dean's Scholarship May 2016, 2015, 2014, 2013
Engineering Peer Helper of the Year May 2016, 2015
Top 3 in Engineering Teaching Assistant of the Year May 2016
E.B. MacNaughton Convocation Medal July 2015
Association of the Professional Engineers Medal July 2015
College of Physical and Engineering Science Society of Excellence July 2015
Helen Grace Tucker Design Award July 2015

Proficiencies

Languages: MATLAB, Python/Theano, TeX, basic HTML/CSS/JS, basic C/C++
Remote Software: SharcNet (ComputeCanada), GitHub, basic Docker
GRE Scores: 170/170 Math, 164/170 Verbal, 4.5/6 Writing

Undergraduate Research Experience

Research Assistant: Richard I Aviv MD May – Aug 2014
Dept. Neuroradiology, Sunnybrook Health Sciences Centre

- Coregistered acute and follow-up ischemic stroke lesion ROIs from a database of 400 patients
- Then depicted regions which are/not salvageable through recanalization and/or collateral circulation, facilitating better stroke intervention decisions

Research Assistant: Herman J Eberl, PhD May – Aug 2013
Biophysics Interdepartmental Group, University of Guelph

- Helped extend a computational model of human colonic microflora into additional spatial dimensions
- Analyzed numerical solution techniques for the partial differential mass-balance equation model

Publications

Submitted and In Print

J Knight, and A Khademi, "MS Lesion Segmentation Using FLAIR MRI Only" in MSSeg Challenge at Medical Image Computing and Computer-Assisted Intervention – MICCAI. (to appear).

J Knight, and A Khademi, "Disease-Inspired Feature Design for Computer-Aided Diagnosis of Breast Cancer Digital Pathology Images" in Medical Image Analysis and Informatics: Computer-Aided Diagnosis and Therapy 2. CRC Press, (in print).

B Reiche, J Knight, A R Moody, and A Khademi, "Segmentation and Characterization of WML in FLAIR MRI" in Medical Image Analysis and Informatics: Computer-Aided Diagnosis and Therapy 2. CRC Press, (in print).

Journal Publications

D C Huynh, M W Parsons, M Wintermark, A Vagal, C D D'Esterre, R Vitorino, D Efkehari, J Knight, T J Huynh, A Bivard, R Swartz, S Symons, and R I Aviv, "Can CT perfusion accurately assess infarct core?". Neurovascular Imaging. 2(7), 1-7. 2016.

E M Fanou, J Knight, R I Aviv, S Hojjat, S P Symons, L Zhang, and M Wintermark, "Effect of Collaterals on Clinical Presentation, Baseline Imaging, Complications, and Outcome in Acute Stroke". AJNR. American journal of neuroradiology. 36(12), 2285-91. 2015.

Conferences

J Knight, A R Moody, and A Khademi, "Noise in parallel MRI: how to determine whether single-coil assumptions still hold (they don't) (Poster)" in Imaging Network Ontario Symposium – ImNO. 2016.

Reviewer Work

Canadian Journal of Electrical and Computer Engineering – CJECE (1 review)

Canadian Conference of Electrical and Computer Engineering – CCECE (2 reviews)

Teaching Experience

Teaching Assistant

School of Engineering, University of Guelph

ENGG 3390 Signal Processing (F16)
ENGG 4660 Medical Image Processing (W16)
ENGG 4060 Biomedical Signal Processing (W16)
ENGG 4040 Medical Imaging Modalities (F15)

- Average rating: 4.54/5.0
- Lead weekly tutorials and labs for 5 to 45 students
- Independently rewrote lab manuals, developed problem sets and solutions at the request of students
- Managed online course content, digital assignments, feedback and grading

Curricular Projects

Design Projects

Adaptive Directional Acoustics Filter (capstone project)	Jan – Mar 2015
Sudden Infant Death Syndrome Prevention Biosensor	Sept – Nov 2014
Stroke Rehabilitation Support Glove	Sept – Nov 2014
Fetal Doppler Monitor Phantom	Jan – Mar 2014
Batmobile Wind-Up Kinder Surprise Toy	Jan – Mar 2013

Individual Projects

A Convolutional Neural Network to Assess Malignancy in Breast Cancer Histology	Sept – Nov 2016
An Image Processing Approach to Assess Malignancy in Breast Cancer Histology	Sept – Nov 2016
CT Perfusion Lesion Segmentation Algorithm	Jan – Mar 2015

Extracurriculars and Volunteering

Engineering Peer Helper, *University of Guelph* Aug 2013 – Present

- Organized and lead over 50 course-specific problem solving sessions for one to 100+ students
- Lead a transition to digital scheduling and student booked sessions in lieu of static weekly slots

Summer Institute Rwanda, *Engineering World Health* June – July 2015

- Worked with local biomedical engineering technicians at Kibuye Hospital to repair equipment
- Developed an online maintenance management module for better tracking and remote requests

Bike Centre Volunteer, *CSA Bike Centre, University of Guelph* Aug 2014 – Present

Novice Men's Rowing, *University of Guelph* Sept 2014 – April 2015

Interests

In my spare time I enjoy cycling with the Morning Glory Cycling Club, trading polemic banter with friends about philosophy and politics, and reluctantly commenting my code for open sourcing.