

JESSICA LOO

PhD Student, Duke University
jessica.loo@duke.edu

EDUCATION

PhD, Biomedical Engineering, Duke University
4.0 GPA

2017 – Present

MEng, Biomedical Engineering, Imperial College London
1st Class Honours (equivalent to 4.0 GPA)

2011 – 2015

RESEARCH / WORK EXPERIENCE

Duke Reading Center

August 2017 – Present

- Developing image analysis software for optical coherence tomography (OCT), scanning laser ophthalmology (SLO), and microperimetry images.
- Analyzing OCT, SLO, and microperimetry images for clinical studies and trials.

Vision and Image Processing Laboratory, Duke University

August 2017 – Present

- Developing deep learning-based algorithms for clinical applications such as the automatic segmentation and quantification of biomarkers in retinal and corneal diseases on OCT and slit-lamp images.

Neuramatrix Sdn. Bhd.

January 2016 – May 2017

- Developed a deep learning-based algorithm for a property insurance company to automatically classify property age based on Google Street View images.
- Developed image processing algorithms for automatic detection of salient points in images.

Developmental Biomechanics Laboratory, Imperial College London

June 2014 – August 2015

- Developed a diagnostic test for the classification of fetal health based on leg and head movement parameters modelled and extracted from clinical cine-MRI scans.
- Developed image processing algorithms to semi-automatically track the positions of the hip, knee, ankle, and spine in fetal cine-MRI scans for investigations into how skeletal development is affected by fetal movement in the womb, particularly in hip dysplasia cases.

PUBLICATIONS

J. Loo, M. F. Kriegel, M. M. Tuohy, K. H. Kim, V. Prajna, M. A. Woodward, and S. Farsiu, “Open-source automatic segmentation of ocular structures and biomarkers of microbial keratitis on slit-lamp photography images using deep learning,” *IEEE Journal of Biomedical and Health Informatics (in press)*, **2020**.

J. Loo, T. E. Clemons, E. Y. Chew, M. Friedlander, G. J. Jaffe, and S. Farsiu, “Beyond Performance Metrics: Automatic Deep Learning Retinal OCT Analysis Reproduces Clinical Trial Outcome,” *Ophthalmology* 127(6), 793-801, **2020**.

K. J. McHugh, D. Li, J. C. Wang, L. Kwark, **J. Loo**, V. Macha, S. Farsiu, L. A. Kim, and M. Saint-Geniez, “Computational modeling of retinal hypoxia and photoreceptor degeneration in patients with age-related macular degeneration,” *PLOS One* 14(6), e0216215, **2019**.

J. Loo, L. Fang, D. Cunefare, G. J. Jaffe, and S. Farsiu, “Deep longitudinal transfer learning-based automatic segmentation of photoreceptor ellipsoid zone defects on optical coherence tomography images of macular telangiectasia type 2,” *Biomedical Optics Express* 9(6), 2681-2698, **2018**.

S. Verbruggen, **J. Loo**, T. Hayat, J. Hajnal, M. Rutherford, A. Phillips, and N. Nowlan, “Modelling the biomechanics of fetal movement,” *Biomechanics and Modelling in Mechanobiology* 15(4), 995-1004, **2016**.

CONFERENCES

J. Loo, C. X. Cai, E. Y. Chew, M. Friedlander, G. J. Jaffe, and S. Farsiu, “Deep learning-based automatic segmentation of retinal cavitations on OCT images of MacTel2,” *ARVO Annual Meeting*, Baltimore, MD, **2020**.*

S. Farsiu, **J. Loo**, J. L. Duncan, D. G. Birch, and G. J. Jaffe, “Deep learning-based automatic segmentation of intact ellipsoid zone area on optical coherence tomography images of USH2A-related retinal degeneration,” *ARVO Annual Meeting*, Baltimore, MD, **2020**.*

S. Onal, **J. Loo**, T. Nguyen, M. Cherukury, S. Farsiu, and G. J. Jaffe, “In-vivo quantitative analysis of pterygium volume using anterior segment optical coherence tomography imaging,” *ARVO Annual Meeting*, Baltimore, MD, **2020**.*

A. Hasan, Z. Deng, **J. Loo**, D. Mukherjee, J. L. Duncan, D. G. Birch, G. J. Jaffe, and S. Farsiu, “Meta-learning approach to automatically register multivendor retinal images,” *ARVO Annual Meeting*, Baltimore, MD, **2020**.*

J. Loo, T. E. Clemons, E. Y. Chew, M. Friedlander, G. J. Jaffe, and S. Farsiu, “Automatic Deep Learning OCT Analysis Algorithm Reliably Reproduces Expert-Evaluated Outcome of a Randomized Clinical Trial for Macular Telangiectasia Type 2 Treatment,” *ARVO Annual Meeting*, Vancouver, BC, **2019** (Poster).

S. Farsiu, **J. Loo**, M. F. Kriegel, M. Tuohy, V. Prajna, and M. A. Woodward, “Deep learning-based automatic segmentation of stromal infiltrates and associated biomarkers on slit-lamp images of microbial keratitis,” *ARVO Annual Meeting*, Vancouver, BC, **2019** (Poster).

M. F. Kriegel, **J. Loo**, V. Prajna, S. Farsiu, M. Tuohy, P. M. Gomp, L. Niziol, and M. A. Woodward, “Reliability of physicians’ measurements when manually annotating images of microbial keratitis,” *ARVO Annual Meeting*, Vancouver, BC, **2019** (Poster).

J. Loo, T. E. Clemons, E. Y. Chew, M. Friedlander, G. J. Jaffe, and S. Farsiu, “Deep Learning Retinal OCT Analysis Reliably Predicts the Outcome of a Real-World Clinical Trial,” *Ophthalmic Technologies XXIX*, San Francisco, CA, **2019** (Talk).

J. Loo, L. Fang, D. Cuneffare, G. J. Jaffe, and S. Farsiu, “Deep learning-based automatic segmentation of ellipsoid zone defects in optical coherence tomography images of macular telangiectasia type 2,” *ARVO Annual Meeting*, Honolulu, HI, **2018** (Talk).

*Conference was cancelled due to COVID-19

A W A R D S	
John T. Chambers Fellowship Program (Duke University) One Year Special Award	2019 – 2020
John T. Chambers Fellowship Program (Duke University) One Year Special Award	2018 – 2019
Medical Imaging Training Program (Duke University) Affiliated Scholar	2018 – 2019
Duke Ophthalmology Trainee Day Scientific Symposium (Duke University) Best research presentation award	2018
Fitzpatrick Institute for Photonics Symposium (Duke University) 2 nd place poster award	2018
Stephen Richardson Prize (Imperial College London) Best MEng project award	2015
Engineering Dean’s List (Imperial College London) Top 10% of the class	2013, 2014, 2015

TECHNICAL SKILLS	Windows OS, Linux OS, MATLAB programming, C/C++ programming, Python programming, TensorFlow, PyTorch, MatConvNet, SolidWorks, PSPICE, LTSPICE
OTHER QUALIFICATIONS	Machine Learning by Stanford University (Coursera certification: WBV7QCZLNFZV) Trinity-Guildhall Music Performance, Grade 8 (Piano); ABRSM, Grade 5 (Music theory)