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## EDUCATION

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### PhD, Biomedical Engineering, Duke University

August 2017 – May 2022

- 3.94 GPA
- Dissertation: Deep Learning Image Analysis Framework for Clinical Management of Retinal and Corneal Diseases

### BEng/MEng, Biomedical Engineering, Imperial College London

October 2011 – August 2015

- 1<sup>st</sup> Class Honours (equivalent to 4.0 GPA)
  - Thesis: Fetal Movements as Biomarkers for Fetal Health
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## RESEARCH / WORK EXPERIENCE

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### Verily Life Sciences

South San Francisco, CA

#### Data Scientist, Digital Pathology

June 2022 – Present

- Developing and validating machine learning-based algorithms for histological, immunohistochemical, immunofluorescence, and autofluorescence images for clinical applications in pathology.

#### Data Science Intern, Digital Pathology

May – August 2021

- Developed a deep learning-based algorithm for automatic quality control of autofluorescence images for clinical applications in pathology.

### Duke University

Durham, NC

#### Graduate Research Assistant, Vision and Image Processing Laboratory

August 2017 – May 2022

- Developed and validated deep learning-based algorithms for clinical applications in ophthalmology such as the automatic segmentation and quantification of biomarkers in retinal and corneal diseases on optical coherence tomography, angiography, and slit-lamp photography.
- Developed image analysis software for optical coherence tomography, scanning laser ophthalmoscopy, microperimetry, and color fundus images for clinical studies and trials.

### Neuramatix Sdn. Bhd.

Kuala Lumpur, Malaysia

#### Software Engineer, Research & Development

January 2016 – May 2017

- Developed a deep learning-based classification algorithm to predict property age based on Google Street View images for property insurance applications.
- Developed image processing algorithms for automatic detection of salient points in images for robotic applications.

### Imperial College London

London, UK

#### Undergraduate Research Assistant, Developmental Biomechanics Laboratory

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 clinical cine-MRI scans for investigations into how skeletal development is affected by fetal movement in the womb.
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## SELECTED JOURNAL PUBLICATIONS

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J. Loo, K. Y. C. Teo, C. H. Vyas, J. M. N. Jordan-Yu, A. B. Juhari, G. J. Jaffe, C. M. G. Cheung, and S. Farsiu, "Joint Multimodal Deep Learning-Based Automatic Segmentation of ICGA and OCT Images for Assessment of PCV Biomarkers," *Ophthalmology Science (In Press)*, **2023**.

J. Loo, G. J. Jaffe, J. L. Duncan, D. G. Birch, and S. Farsiu, "Validation of a Deep Learning-Based Algorithm for Segmentation of the Ellipsoid Zone on Optical Coherence Tomography Images of an *USH2A*-Related Retinal Degeneration Clinical Trial," *Retina* 42(7), 1347-1355, **2022**.

J. Loo, C. X. Cai, J. Choong, E. Y. Chew, M. Friedlander, G. J. Jaffe, and S. Farsiu, "Deep Learning-Based Classification and Segmentation of Retinal Cavitations on Optical Coherence Tomography Images of Macular Telangiectasia Type 2," *British Journal of Ophthalmology* 106(3), 396-402, **2022**.

J. Loo, M. A. Woodward, V. Prajna, M. F. Kriegel, M. Pawar, M. Khan, L. M. Niziol, and S. Farsiu, "Open-Source Automatic Biomarker Measurement on Slit-Lamp Photography to Estimate Visual Acuity in Microbial Keratitis," *Translational Vision Science & Technology* 10(12), 2, **2021**.

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* 25(1), 88-99, **2021**.

D. Y. Kim, J. Loo, S. Farsiu, and G. J. Jaffe, "Comparison of Single Drusen Size on Color Fundus Photography and Spectral-Domain Optical Coherence Tomography," *Retina* 41(8), 1715-1722, **2021**.

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**.

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## SELECTED CONFERENCE PRESENTATIONS

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E. M. Lad, W. Liang, G. J. Jaffe, Z. Deng, **J. Loo**, D. Mukherjee, and S. Farsiu, “The RUSH2A Study: Microperimetry and SD-OCT Measures at Baseline,” *44th Annual Macula Society Meeting*, **2021** (Virtual).

**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*, **2020** (Virtual).

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*, **2020** (Virtual).

**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).

**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** (Podium).

**J. Loo**, L. Fang, D. Cunefare, 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** (Podium).

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## TEACHING EXPERIENCE

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<b>BME 544 Digital Image Processing (Teaching Assistant, Duke University)</b>	<b>Fall 2020</b>
<ul style="list-style-type: none"> <li>Developed and taught lectures on deep learning for inverse problems (denoising, super-resolution, etc.) and motion estimation.</li> <li>Held weekly office hours, communicated with students via email, graded assignments, and prepared solutions.</li> </ul>	
<b>BME 671L Signal Processing &amp; Applied Mathematics (Teaching Assistant, Duke University)</b>	<b>Spring 2021</b>
<ul style="list-style-type: none"> <li>Conducted weekly lab sessions on signal processing using MATLAB.</li> <li>Held weekly office hours, communicated with students via email, graded assignments, and prepared solutions.</li> </ul>	

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## AWARDS

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<b>Outstanding Teaching Assistant Award (Duke University)</b> Honorable Mention	<b>2021</b>
<b>John T. Chambers Fellowship Program (Duke University)</b> One Year Special Award	<b>2019, 2020</b>
<b>Medical Imaging Training Program (Duke University)</b> Affiliated Scholar	<b>2019</b>
<b>Duke Ophthalmology Trainee Day Scientific Symposium (Duke University)</b> Best Research Presentation Award	<b>2018</b>
<b>Fitzpatrick Institute for Photonics Symposium (Duke University)</b> 2 <sup>nd</sup> Place Poster Award	<b>2018</b>
<b>Stephen Richardson Prize (Imperial College London)</b> Best MEng Project Award for Thesis: “Fetal Movements as Biomarkers for Fetal Health”	<b>2015</b>
<b>Engineering Dean’s List (Imperial College London)</b> Top 10% of the Class	<b>2013, 2014, 2015</b>

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<b>AREAS OF INTEREST</b>	Data Science, Deep Learning, Machine Learning, Computer Vision, Image Analysis, Medical Imaging
<b>TECHNICAL SKILLS</b>	Python, MATLAB, C/C++, TensorFlow, PyTorch, MatConvNet
<b>OTHER QUALIFICATIONS</b>	HMX Pro Immuno-oncology by Harvard Medical School (Certification: <a href="https://hrvd.io/1fa651d1">https://hrvd.io/1fa651d1</a> ) Machine Learning by Stanford University (Coursera certification: WBV7QCZLNFZV) Trinity-Guildhall Music Performance, Grade 8 (Piano); ABRSM, Grade 5 (Music Theory)
<b>LANGUAGES</b>	English (Fluent), Malay (Fluent), Spanish (Basic), Mandarin (Conversational)