
EDUCATION

Duke University

PhD, Biomedical Engineering

- 3.94 GPA
- Dissertation: "Deep Learning Image Analysis Framework for Clinical Management of Retinal and Corneal Diseases"
- Recipient of the Biomedical Engineering Doctoral Dissertation Award

Durham, NC
August 2017 – May 2022

Imperial College London

BEng/MEng, Biomedical Engineering

- 1st Class Honours (equivalent to 4.0 GPA)
- Thesis: "Fetal Movements as Biomarkers for Fetal Health"
- Recipient of the Stephen Richardson Prize for Best MEng Project

London, UK
October 2011 – August 2015

RESEARCH / WORK EXPERIENCE

Verily Life Sciences

Data Scientist, Digital Pathology

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

South San Francisco, CA
June 2022 – Present

Data Science Intern, Digital Pathology

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

May – August 2021

Duke University

Graduate Research Assistant, Vision and Image Processing Laboratory

- 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.

Durham, NC
August 2017 – May 2022

Neuramatix Sdn. Bhd.

Software Engineer, Research and Development

- 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.

Kuala Lumpur, MY
January 2016 – May 2017

Imperial College London

Undergraduate Research Assistant, Developmental Biomechanics Laboratory

- 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.

London, UK
June 2014 – August 2015

SELECTED JOURNAL PUBLICATIONS

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. Kwar, **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**.

| 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,” <i>44th Annual Macula Society Meeting</i> , 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,” <i>ARVO Annual Meeting</i> , 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 <i>USH2A</i> -Related Retinal Degeneration,” <i>ARVO Annual Meeting</i> , 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,” <i>ARVO Annual Meeting</i> , 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,” <i>ARVO Annual Meeting</i> , 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,” <i>Ophthalmic Technologies XXIX</i> , 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,” <i>ARVO Annual Meeting</i> , Honolulu, HI, 2018 (Podium). | |

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

| AWARDS | |
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| Outstanding Teaching Assistant Award (Duke University) | 2021 |
| Honorable Mention | |
| John T. Chambers Fellowship Program (Duke University) | 2019, 2020 |
| One Year Special Award | |
| Medical Imaging Training Program (Duke University) | 2019 |
| Affiliated Scholar | |
| Duke Ophthalmology Trainee Day Scientific Symposium (Duke University) | 2018 |
| Best Research Presentation Award | |
| Fitzpatrick Institute for Photonics Symposium (Duke University) | 2018 |
| 2 nd Place Poster Award | |
| Engineering Dean’s List (Imperial College London) | 2013, 2014, 2015 |
| Top 10% of the Class | |

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| AREAS OF INTEREST | Data Science, Deep Learning, Machine Learning, Computer Vision, Image Analysis, Medical Imaging |
| TECHNICAL SKILLS | Python, MATLAB, C/C++, TensorFlow, PyTorch, MatConvNet |
| REVIEWER | Biomedical Optics Express, Computers in Biology and Medicine, IEEE Journal of Biomedical and Health Informatics, IEEE Transactions on Medical Imaging, International Journal of Medical Informatics, PLOS One, Scientific Reports, Translational Vision Science & Technology |
| OTHER QUALIFICATIONS | HMX Pro Immuno-oncology by Harvard Medical School (Certification: https://hrvd.io/1fa651d1) Machine Learning by Stanford University (Coursera certification: WBV7QCZLNfZV) Trinity-Guildhall Music Performance, Grade 8 (Piano); ABRSM, Grade 5 (Music Theory) |