JESSICA LOO

Data Scientist, Verily Life Sciences
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EDUCATION

PhD, Biomedical Engineering, Duke University   **August 2017 – May 2022**
3.94 GPA

BEng/MEng, Biomedical Engineering, Imperial College London   **October 2011 – August 2015**
1st Class Honours (equivalent to 4.0 GPA)

RESEARCH / WORK EXPERIENCE

Data Scientist, Verily Life Sciences   **June 2022 – Present**
- Developing machine learning-based algorithms for clinical applications in pathology.

Graduate Research Assistant, Vision and Image Processing Laboratory, Duke University   **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.

Data Science Intern, Verily Life Sciences   **May 2021 – August 2021**
- Developed deep learning-based algorithms for quality control of autofluorescence images for clinical applications in pathology.

Software Engineer (Research & Development), Neuramatix Sdn. Bhd.   **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.

Undergraduate Research Assistant, 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 clinical cine-MRI scans for investigations into how skeletal development is affected by fetal movement in the womb.

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. R. Abraham, G. J. Jaffe, P. K. Kaiser, S. J. Chiu, **J. Loo**, S. Farsiu, L. Bouckaert, V. Karageozian, M. Sarayba, S. K. Srivastava, and J. P. Ehlers, "Impact of Baseline Quantitative OCT Features on Response to Risuteganib for the Treatment of Dry AMD – The Importance of Outer Retinal Integrity," *Ophthalmology Retina* 6(11), 1019-1027, **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**.

M. F. Kriegel, **J. Loo**, S. Farsiu, V. Prajna, M. Tuohy, K. H. Kim, A. N. Valicevic, L. M. Niziol, H. Tan, H. A. Ashfaq, D. Ballouz, and M. A. Woodward, "Measurement Reliability for Anterior Segment and Keratitis Morphology," *Cornea* 39(12), 1503-1509, **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**.

E. M. Lad, W. Liang, G. J. Jaffe, Z. Deng, **J. Loo**, D. Mukherjee, and S. Farsiu, "The RUSH2A Study: Baseline Microperimetry and SD-OCT Measures," *ARVO Annual 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).

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*, **2020** (Virtual).

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*, **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).

M. F. Kriegel, **J. Loo,** V. Prajna, S. Farsiu, M. Tuohy, P. M. Gompa, 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** (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).

TEACHING EXPERIENCE

BME 544 Digital Image Processing (Teaching Assistant) Fall 2020
- 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) Spring 2021
- Conducted weekly lab sessions on signal processing using MATLAB.
- Held weekly office hours, communicated with students via email, graded assignments, and prepared solutions.

AWARDS

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
2nd Place Poster Award

Stephen Richardson Prize (Imperial College London) 2015
Best MEng Project Award for Thesis: "Fetal Movements as Biomarkers for Fetal Health"

Engineering Dean's List (Imperial College London) 2013, 2014, 2015
Top 10% of the Class

AREAS OF INTEREST	Data Science, Deep Learning, Machine Learning, Computer Vision, Image Analysis, Medical Imaging
TECHNICAL SKILLS	Python, MATLAB, C/C++, TensorFlow, PyTorch, MatConvNet
OTHER QUALIFICATIONS	Machine Learning by Stanford University (Coursera certification: WBV7QCZLNFZV) Trinity-Guildhall Music Performance, Grade 8 (Piano); ABRSM, Grade 5 (Music Theory)
LANGUAGES	English (Fluent), Malay (Fluent), Spanish (Basic), Mandarin (Conversational)