JESSICA LOO

Principal Data Scientist, Novartis
https://jessicaloohw.github.io/

EDUCATION

Duke University — **Durham, NC**
PhD, Biomedical Engineering — **August 2017 – May 2022**
- 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

Imperial College London — **London, UK**
BEng/MEng, Biomedical Engineering — **October 2011 – August 2015**
- 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

RESEARCH / WORK EXPERIENCE

Novartis — **Cambridge, MA**
Principal Data Scientist, Artificial Intelligence & Computational Sciences, Biomedical Research — **August 2024 – Present**
- Developing and validating machine learning-based algorithms for pre-clinical safety and drug development applications.

Verily Life Sciences — **South San Francisco, CA**
Data Scientist, Digital Pathology — **June 2022 – August 2024**
- Developed and validated 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 automatic assessment of biomarkers in retinal and corneal diseases on optical coherence tomography, angiography, and slit-lamp photography for clinical applications in ophthalmology.
- Developed image analysis software for optical coherence tomography, scanning laser ophthalmoscopy, microperimetry, and color fundus images for clinical studies and trials at Duke Reading Center.

Neuramatix — **Kuala Lumpur, MY**
Software Engineer, Research and Development — **January 2016 – May 2017**
- Developed a deep learning-based algorithm for classification of property age from Google Street View images for 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 image processing algorithms to model fetal leg and head movements in the womb from clinical cine-MRI scans for investigations into the effect of fetal movement on skeletal development, resulting in a diagnostic test for the classification of fetal health.

SELECTED PUBLICATIONS

J. Loo*, M. Robbins*, C. McNeil, T. Yoshitake, C. Santori, C. J. Shan, S. Vyawahare, H. Patel, T. C. Wang, R. Findlater, D. F. Steiner, S. Rao, M. Gutierrez, Y. Wang, A. C. Sanchez, R. Yin, V. Velez, J. S. Sigman, P. Coutinho de Souza, H. Chandrupatla, L. Scott, S. S. Weaver, C. W. Lee, E. Rivlin, R. Goldenberg, S. S. Couto, P. Cimermancic, and P. F. Wong, "Autofluorescence Virtual Staining System for H&E Histology and Multiplex Immunofluorescence Applied to Immuno-Oncology Biomarkers in Lung Cancer," *Cancer Research Communications* 5(1), 54-65, **2025**.

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* 3(3), 100292, **2023.**

J. Lai, F. Ahmed, S. Vijay, T. Jaroensri, **J. Loo**, S. Vyawahare, S. Agarwal, F. Jamil, Y. Matias, G. S. Corrado, D. R. Webster, J. Krause, Y. Liu, P. H. C. Chen, E. Wulczyn, and D. F. Steiner, "Domain-Specific Optimization and Diverse Evaluation of Self-Supervised Models for Histopathology," *Preprint*, arXiv:2310.13259, **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**.

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 PRESENTATIONS

J. Loo, Y. Wang, P. F. Wong, E. Wulczyn, J. Lai, P. Cimermancic, D. F. Steiner, and S. S. Weaver, "Predicting Immunotherapy Outcomes from H&E Images in Lung Cancer," *AACR Annual Meeting*, **2024** (Poster).

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).

PATENTS

J. Loo, Y. Wang, P. Cimermancic, S. Rao, P. F. Wong, "Virtual Immunofluorescence Staining of Tissue Samples Using Deep Learning," U. S. Patent Application 18/966,845, filed 3 December 2024, *Patent Pending.*

TEACHING EXPERIENCE

BME 544 Digital Image Processing (Teaching Assistant, Duke University) **Fall 2020**
- Developed and taught lectures on deep learning for inverse problems (denoising, super-resolution, etc.) and motion estimation.

BME 671L Signal Processing & Applied Mathematics (Teaching Assistant, Duke University) **Spring 2021**
- Conducted weekly lab sessions on signal processing using MATLAB, held weekly office hours, and graded assignments.

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

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

KEYWORDS Artificial Intelligence, Computer Vision, Data Science, Deep Learning, Foundation Models, Machine Learning, Medical Imaging