Lambert Leong

ML/AI Health Researcher & Medical Data Scientist

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 LambertLeong   in lambert-leong

EXPERTISE

○ **5 yrs** - **Deep Learning/Machine Learning**: Convolutional Neural Networks (CNN), Variational Auto-Encoder (VAE), Self-Supervised Learning (SSL), Hyperparameter Optimization, Generative Medical Image Models, Principal Component Analysis (PCA), Classification & Regression, Linear & Tree-based and Ensemble Methods
○ **7 yrs** - **Research**: Technical Manuscript & Grant Writing, Owning & Initiating Research Agendas/Projects,
○ **5 yrs** - **Medical Imaging**: Radiomics/Biomarkers, Single & Dual 2D & 3D X-ray modalities, Privacy and Storage

EDUCATION

2023	**PhD, Bioengineering**, *University of Hawaii*, Honolulu, HI, USA.	GPA 3.95/4.0

Dissertation: **"Reducing the Burden of Cancer with Artificial Intelligence"**
Advisor: Prof. John Shepherd

2018	**MS, Computer Science**, *University of Hawaii*, Honolulu, HI, USA.	GPA 3.89/4.0

Thesis: **"A Heuristic for Optimizing the Physical Layout and Network Topology of Integrated 3D Multi-chip Systems Under Temperature Constraints"**
Advisor: Prof. Henri Casanova

2014	**BS, Biology**, *University of Oregon*, Eugene, OR, USA.	GPA 3.2/4.0

Minor: Chemistry

EXPERIENCE

Current — **Postdoctoral Researcher**, *OncoRad*, University of Washington, Washington
○ Developing biomarkers predictive of favorable cancer clnical trial outcomes through multi-modal, longitudinal image modeling.
○ Third-party validation of foundational and published models for in-house clinical use.

2018 – 2023 — **Graduate Research Assistant**, *Shepherd Research Lab*, University of Hawaii Cancer Center, Hawaii
○ Engineered a pipeline to extract raw medical data, enabling deep learning on quantitative body composition imaging. This innovation led to regression models outperforming previous benchmarks (R^2) by 15%.
○ Pioneered X-ray physics-informed VGG-16 perceptual loss functions, achieving quantitatively accurate generative medical images that can be analyised with commercial clinical software.
○ Performed initial modeling which identified novel breast cancer imaging biomarkers. Final model exhibited 10% Area Under the Curve (AUC) improvement compared to previously published models.
○ Crafted a Matlab-based preprocessing pipeline for spectral decomposition, pinpointing tissue traits within cancer clusters through convex hull computation.

Summer 2020 — **Machine Learning Research Intern**, *Anthropometry and Biomechanics Facility*, NASA, Texas
○ Reduced fitting error in 3D body scan visualizations for bone and soft tissue using genetic algorithms, leading to enhanced spacesuit design.
○ Developed a Python implementation for a local system transpose, enabling the standarization of 3D scans to the same global coordinates system.

2016 – 2018 — **Graduate Student Researcher**, *Concurrency Research Group*, University of Hawaii, Hawaii
○ Devised a simulation harnessing a greedy algorithm, optimizing the 3D physical layout of multi-CPU architectures for optimal heat dissipation, culminating in a publication at DAC 2020.
○ Leveraged task parallelism via MPI, achieving a 19X speed up in simulation speeds versus single-thread implementation.

2015 – 2018 — **Research Scientist**, Eyegenix LLC, Hawaii
○ Data-driven polymer design through regression modeling, culminating in successful polymer implantations during animal trials.
○ Synthesized and presented scientific findings and advancements to stakeholders through rigorous monthly, quarterly, and annual reporting.

Summer 2017 — **Database Engineer**, *Social Science Research Institute*, University of Hawaii, Hawaii
○ Designed and implemented a relational database to monitor recidivism rates for the state of Hawaii, by integrating data from multiple state databases, and defining the data model and relational schema.

FELLOWSHIPS

2023 — **CS Research Mentorship Program Fellowship**, Google

2022 **AIM-AHEAD** - *Artificial Intelligence/Machine Learning Consortium to Advance Health Equity and Researcher Diversity*, National Institutes of Health via University of Hawaii

HONORS & AWARDS

2023 **Merit Based Awards for Research**, Graduate Student Organization, University of Hawaii

2023 **Outstanding Dissertation Award**, University of Hawaii

2019 - 2021 **Trainee Travel Grant**, University of Hawaii Cancer Center

2020 **Graduate Student Organization Research Grant**, University of Hawaii

PROJECTS

- **pip install more-metrics**

Developed and deployed a Python package to PyPI, enabling a more comprehensive evaluation of classification models through additional statistics and advanced visualizations.Addressing a significant gap, this tool is vital for assessing new biomarkers' impact. My role showcased my expertise in crafting clean, well-documented code, emphasizing rigorous testing, deployment practices, and adherence to the best software engineering and data science practices. This project highlights my ability to innovate and contribute valuable tools to the data science and medical research communities. [Check out the PIP package!](#)

- **Photo Mosaic**

Built software to generate high-resolution photo mosaic, while addressing critical memory efficiency and processing speed challenges. By integrating advanced computer vision and machine learning techniques, I crafted an efficient and accurate image retrieval system using k-nearest neighbors, optimized through dynamic programming, tree search algorithms, and parallel computing. This project showcased my ability to blend technical expertise with creative problem-solving, resulting in a tool that not only elevates digital art but also demonstrates practical applications of AI technologies. [Read more on Medium!](#)

NOTABLE PUBLICATIONS

2024 **Leong, Lambert T**, Michael C Wong, Yong E Liu, Yannik Glaser, Brandon K Quon, Nisa N Kelly, Devon Cataldi, Peter Sadowski, Steven B Heymsfield, and John A Shepherd. Generative deep learning furthers the understanding of local distributions of fat and muscle on body shape and health using 3d surface scans. *Communications Medicine*, volume 4, page 13. Nature Publishing Group UK London, 2024.

2022 **Leong, Lambert T**, Michael C Wong, Yannik Glaser, Thomas Wolfgruber, Steven B Heymsfield, Peter Sadwoski, and John A Shepherd. Quantitative imaging principles improves medical image learning. *(Under Review) arXiv preprint arXiv:2206.06663*, 2022.

2022 Yannik Glaser, John Shepherd, **Leong, Lambert**, Thomas Wolfgruber, Li-Yung Lui, Peter Sadowski, and Steven R Cummings. Deep learning predicts all-cause mortality from longitudinal total-body dxa imaging. *Communications medicine*, volume 2, pages 1–12. Nature Publishing Group, 2022.

2021 Xun Zhu, Thomas K Wolfgruber, **Leong Lambert**, Matthew Jensen, Christopher Scott, Stacey Winham, Peter Sadowski, Celine Vachon, Karla Kerlikowske, and John A Shepherd. Deep learning predicts interval and screening-detected cancer from screening mammograms: a case-case-control study in 6369 women. *Radiology*, volume 301, pages 550–558. Radiological Society of North America, 2021.

2021 **Leong Lambert T**, Serghei Malkov, Karen Drukker, Bethany L Niell, Peter Sadowski, Thomas Wolfgruber, Heather I Greenwood, Bonnie N Joe, Karla Kerlikowske, Maryellen L Giger, et al. Dual-energy three-compartment breast imaging for compositional biomarkers to improve detection of malignant lesions. *Communications Medicine*, volume 1, pages 1–11. Nature Publishing Group, 2021.

2019 Michihiro Koibuchi, **Leong Lambert**, Tomohiro Totoki, Naoya Niwa, Hiroki Matsutani, Hideharu Amano, and Henri Casanova. Sparse 3-d nocs with inductive coupling. In *2019 56th ACM/IEEE Design Automation Conference (DAC)*, pages 1–6. IEEE, 2019.

TOOLS & SKILLS

- **Programming Languages**: 8yrs - Python & Matlab | 4yrs - Java & C/C++
- **ML/AI/Computer Vision**: 5yrs - TensorFlow, Keras, OpenCV, Scikit-learn, PyTorch, Blender
- **Big Data**: 8yrs - SQL, Pandas, DICOM,
- **Fundamentals**: >10yrs - Git, Linux, Conda, Docker