Ashley Jieun Lee

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EDUCATION

Massachusetts Institute of Technology (MIT) | Cambridge, MA

Master of Engineering in Electrical Engineering and Computer Science (on leave)

- **Concentration:** Artificial Intelligence

Bachelor of Science in Computer Science and Engineering Jun 2019

- **Relevant Coursework:** Computational Cognitive Science (6.804), Computational Intelligence (6.861/9.523), Linear Algebra (18.06)
- **Teaching Experience:** Linear Algebra (18.06) Grader, Fundamentals of Programming (6.009) LA

RESEARCH EXPERIENCE

Marveri | Cambridge, MA

ML Researcher & Founding Engineer Oct 2023 – Present

- Architected a **"System 2" agentic RAG engine** for a legal-tech AI platform, decomposing complex queries into a **Compute Graph (execution DAG)** of tool calls and rule-based checks, emitting a **cited provenance graph** for auditable, evidence-grounded outputs.
- Integrated **Vision-Language Models (VLMs)** and **OCR** to parse unstructured data rooms (scanned PDFs, tables), building a retrievable evidence index for complex M&A and regulatory diligence; added cross-encoder re-ranking and grounding checks to produce clause extractions with document links and span-level citations.
- Developed time-sliced pro forma drafting for charter documents (e.g., Certificate of Incorporation), reconciling versioned filings using effective-date and precedence logic; generated auditable drafts with clause-to-source references across the underlying filings.
- Architected a high-throughput, **asynchronous data ingestion and preprocessing pipeline** on AWS/Azure for parallel processing of thousands of documents under strict residency constraints, supporting low-latency retrieval and inference for interactive legal analysis.
- Built **MLOps infrastructure** to support continuous model deployment, large-batch inference, auto-scaling, and evaluation of compute-intensive workloads in a high-compliance setting.

MIT Media Lab: Object Based Media Group | Cambridge, MA

Research Assistant (Supervisor: Vik Parthiban) Mar 2018 – Dec 2019

- **Project:** *LUI: A Multimodal Intelligent Interface for Large Displays*
- Engineered a **multimodal sensor-fusion architecture** synchronizing high-velocity vision streams (Leap Motion) with asynchronous NLP vectors. The system resolved temporal alignment issues to disambiguate deictic, underspecified commands in high-latency AR/VR environments.
- Developed a **CNN-based gesture keyboard** using **spatial text interpretation** for robust character classification, and optimized the signal-processing pipeline within a ReactJS interface to support low-latency multimodal interaction.
- Reduced the system to practice, resulting in a USPTO patent filing and a peer-reviewed conference publication at *ACM VRCAI 2019*.

MIT CSAIL: Geometric Data Processing Group | Cambridge, MA

Undergraduate Researcher (Advisor: Prof. Justin Solomon) Sep 2018 – May 2019

- **Project:** *3D Point Cloud Classification and Segmentation*
- Investigated geometric deep learning architectures for non-Euclidean data, implementing **Dynamic Graph CNN (DGCNN)** models for 3D point-cloud classification and segmentation.
- Complemented PointNet's permutation-invariant architecture with **EdgeConv-style modules** that build **dynamic k-nearest-neighbor graphs** in feature space, capturing local manifold topology and fine-grained geometric structure that are lost when points are processed independently.

IBM Research: MIT-IBM Watson AI Lab | Cambridge, MA

Research Intern Jan 2019 – Feb 2019

- **Project:** *Improving Deep Learning via Second-Order Optimization*
- Investigated **Second-Order Hessian Gradient Descent (HGD)** to address ill-conditioning in **non-convex loss landscapes**, incorporating curvature information to improve the stability limits of first-order algorithms (SGD, Adam).
- Engineered a **parallelized hyperparameter-tuning** framework on IBM DLAaS to run systematic sweeps (learning rate, momentum, regularization) and analyze basin-of-attraction properties and convergence behavior.
- Demonstrated that incorporating second-order curvature can accelerate convergence and improve classification accuracy versus baseline stochastic methods on CIFAR-10-scale image benchmarks.

KAIST KI for BioCentury | Daejeon, Korea

Research Intern Jun 2016 – Aug 2016

- **Project:** *Structural Analysis of the MEGF10 Phagocytic Receptor*
- Contributed to structural characterization of MEGF10, a transmembrane receptor mediating astrocytic synapse elimination, by engineering expression constructs targeting the EMI domain and EGF-like repeats of the extracellular domain (ECD).
- Performed molecular cloning and recombinant protein purification via affinity chromatography, validating expression and conformation using Western blotting and establishing protocols to stabilize the flexible ECD for downstream structural assays.

Broad Institute of MIT and Harvard: Kellis Lab | Cambridge, MA

Undergraduate Researcher Feb 2016 – May 2016

- **Project:** *Regulatory Architecture of Type 2 Diabetes*
- Analyzed ChIP-profiling data of H3K27ac to assess allele-specific regulatory effects in genetically engineered cell lines.
- Investigated global effects of IRX3 and IRX5 on adipocyte development, contributing to the understanding of the regulatory basis of obesity and Type 2 diabetes.

McGovern Institute for Brain Research Graybiel Lab | Cambridge, MA

Undergraduate Researcher Jan 2016 – May 2016

- **Project:** *Neural Mechanisms of Cost-Benefit Decision Making*
- Conducted behavioral experiments in rat models to examine neural circuits underlying decision-making under chronic stress.
- Gained foundational experience in in vivo experimental design and quantitative analysis of behavioral and biological data.

PUBLICATIONS & PATENTS

- **A. J. Lee**, "VisualLearning: A Debugger for Bayesian Networks." *Submitted to ACM Conference on Intelligent User Interfaces (IUI)*.
- V. Parthiban and **A. J. Lee**, "LUI: A multimodal, intelligent interface for large displays," in *The 17th International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI '19)*, Brisbane, Australia, Nov. 2019.
- **Patent Disclosure (MIT TLO):** "LUI: Multimodal Intelligent Interface Platform"; reduced to practice (April 19 2019).

INDUSTRY EXPERIENCE

Microsoft | Cambridge, MA
Software Engineer (Intune) Oct 2020 – Sep 2023
Software Engineer Intern (Intune) Jul 2019 – Sep 2019

- Architected the **distributed state-management system** for the Android Open Source Project (AOSP) device-management agent, scaling secure device-policy enforcement across 1M+ managed endpoints globally.
- Built an **asynchronous, multi-region telemetry-ingestion pipeline** across sovereign cloud deployments to support data-driven optimization while satisfying government data residency requirements.
- Led **threat-modeling** and end-to-end testing frameworks for device provisioning, significantly hardening user authentication and device-enrollment flows for large enterprise deployments.

Imperva | Redwood City, CA
Software Engineering Intern (Advanced Bot Protection Team) Jun 2018 – Aug 2018

- Developed a React/Redux single-page application (SPA) for real-time monitoring and analysis of malicious bot traffic patterns.
- Integrated Immutable.js and Reselect for efficient state management, reducing dashboard rendering latency under high-volume data streams.

Samsung Electronics | Suwon, Korea
Intern (New Device Lab) Jun 2017 - Aug 2017

- Implemented DSP algorithms to filter raw photoplethysmography (PPG) sensor data and derive real-time health metrics.
- Built an Android wellness application that used PPG signals from heart-rate sensors to estimate heart-rate variability (HRV).

TECHNICAL SKILLS

- **Languages:** Python, Java, Kotlin, JavaScript/TypeScript, SQL
- **ML Frameworks & Data:** PyTorch, TensorFlow, Hugging Face Transformers, LangChain/LlamaIndex, OpenCV, Pinecone, scikit-learn, NumPy, Pandas
- **MLOps & Infrastructure:** AWS, Azure, Docker, Kubernetes, Terraform
- **Full Stack:** Node.js, React, Redux, Django