# C Thomas, PhD

(they/thes)

Website Linkedin GitHub Scholar email SF Bay Area

## Professional Summary

- **AI R&D Leader bridging frontier science and real-world constraints.** Open to Head/Director of Applied AI roles, or high-impact research leadership focused on frontier model training and interpretability.
- **Drawing on experience across academia, startups, and enterprise scale,** I specialize in translating complex topics across disciplines. I have aligned scientists, engineers, and executives to achieve high-stakes milestones, proactively identified critical institutional gaps, and built new teams from the ground up to solve them.
- **Built and lead Apple R&D team** developing novel, robust models for manufacturing product quality. Direct a core ML toolkit used by 20+ MLEs and 5+ teams to deploy breakthroughs across hundreds of global factory lines.
- **Cut operational costs by 60% and accelerated model deployment from weeks to hours** by bringing engineering and science into one team, grounding work in factory realities, and driving end-user adoption.
- **Actively advancing fundamental research** on LLM mechanics and memory-augmented architectures (ICLR, 2026).

## Skills & Tools

| | |
|---|---|
| **AI/ML Methods:** | LLM Pretraining, Computer Vision & VLMs, Domain Adaptation, LoRA Fine-Tuning, Synthetic Defect Generation, Evals |
| **Tools:** | Python, PyTorch (DDP), Hugging Face, LLM Foundry, Detectron2, OpenMMLab |
| **Engineering & Scale:** | Systems Engineering, Automated Evaluation & Stress-Testing, MLOps Infrastructure |
| **R&D Leadership:** | Research-to-Production Translation, Cross-Functional Strategy, Team Vision & Engagement, Academic Partnerships, Mentorship |

## Experience

**Apple** Cupertino, CA

Applied Research Manager, Machine Learning — 2022 – current

- **Built the applied ML research function**, directing the development of core training libraries that enable 20+ MLEs and 5+ cross-functional teams to leverage research breakthroughs across hundreds of global deployments.
- **Scaled organizational research capacity** by unifying ad-hoc university collaborations, guiding 3 internal PIs launching external initiatives, and leading an 80+ person summit to secure broad alignment and research buy-in.
- **Fostered career growth over 5+ years of ML leadership**, managing 4-6 direct reports and mentoring 5+ students; built individualized development plans at the intersection of their goals and the team's mission.
- **Accelerated image model updates from weeks to hours** by partnering with Ops and Hardware to identify bottlenecks; deployed a LoRA defect injection platform that reduced synthetic data needs from 10,000 to 5 images.
- **Reduced factory annotation costs by up to 60%** by integrating self-supervised frameworks into production systems to solve cross-generation device adaptation challenges.
- **Engineered the evaluation pipeline for a novel memory-augmented LLM** (ICLR 2026); authored a patch to LLM Foundry, built the memory-retrieval routing logic, and executed end-to-end evaluations comparing baseline and augmented architectures.

Machine Learning Engineer — 2020 – 2022

- **Reduced urgent model deployment time by 80%** by implementing MLOps infrastructure; bridged historical divides between ML, Data Engineering, and Software teams to build a unified data management platform.
- **Trained production computer vision models** for deployment on factory lines, building monitoring systems to detect model drift and core vulnerabilities prior to customer impact.
- **Established engineering standards** and mentorship to junior ICs, interns and student collaborators in collaborative software development and rigorous experimental data interpretation.

**Tua Fertility** Oakland, CA

Founder & CEO — 2019 - 2020

- **Designed, patented and prototyped a medical device**, executing end-to-end mechanical design (CAD/SolidWorks) and rapid iterations to proof of concept as a resident at the Autodesk Technology Center
- **Drove technical vision and business strategy**, pitching to investors and translating complex engineering roadmaps into compelling narratives.

**Rigetti Computing** Berkeley, CA

Senior Research Engineer & Tech Lead 2017 - 2019

- **Drove multiple quantum hardware breakthroughs** by aligning fabrication, cryogenic, and electrical teams and subsystems to stabilize and optimize complex, non-linear computing architectures.
- **Built robust R&D software** to calibrate and run quantum gate operations, analyzing large datasets and distilling results into shared tooling for research teams.
- **Influenced executive technical roadmaps**, regularly translating complex engineering progress into actionable milestones that shifted company timelines and targets.

**University of California, Berkeley** Berkeley, CA

Doctoral Research Fellow 2010 - 2017

- **Awarded the highly competitive DOE SCGF (accepted) and NSF (declined) Fellowships**.
- **Designed and built ultra-high vacuum and laser systems** to trap individual atoms in lattices of laser light, combining optics, analog electronics, and hardware with analytical mean-field modeling to explain observed quantum phase transition (Phys. Rev. Lett., Editor's Suggestion).
- **Resolved a contested phenomenon in quantum literature** by developing a predictive white-box model that provided a clear explanation for unexpected asymmetries in 2D absorption image data (Phys. Rev. A).

## Selected Publications

**Pretraining with hierarchical memories: separating long-tail and common knowledge.**
H. Pouransari, D. Grangier, *C. Thomas*, M. Kirchhof, O. Tuzel. ***ICLR 2026***. [arXiv]

**Rethinking Semi-Supervised Domain Adaptation for Semantic Segmentation in the Era of Foundation Models.** J. Kurien*, B. Balaji*, K.H. Lai, P. G. Vela, *C. Thomas*, A. Wong, S. Rambhatla. ***CVPR 2025*** *(FGVC Workshop)*.

**LangDA: Language-guided Domain Adaptive Semantic Segmentation.** C. Liu, S. Hossain, *C. Thomas*, K.H. Lai, R. Vemulapalli, S. Rambhatla, A. Wong. ***NeurIPS 2024*** *(AFM Workshop)*. [NeurIPS] [arxiv]

**Synth4Seg: Learning Defect Data Synthesis for Defect Segmentation using Bi-level Optimization.** S. Mou, R. Vemulapalli, S. Li, Y. Liu, *C. Thomas*, M. Cao, H. Bai, O. Tuzel, P. Huang, J. Shan, J. Shi. ***IEEE T-ASE 2024***. [arXiv]

## Service & Leadership

### Academic Conference Leadership

**Co-organizer**, 4th Workshop on Vision-based Industrial Inspection, CVPR 2026
**Invited Speaker**, *"Applied Research in Industrial AI"*, 3rd Workshop, ICCV 2025
**Co-organizer & Panelist**, Data-efficient defect segmentation, 2nd Workshop, ECCV 2024

### Career Mentorship

**Committee Member**, Employee Career Development & Rotations, Apple Operations 2023 – Current
**Career Mentor**, 1:1 guidance for recent graduates entering the workforce 2023 – Current

### Community

**Impact Bay Area** is a nonprofit in the SF Bay Area that trains women and girls to set and hold boundaries with verbal and physical self-defense skills.

**Board Secretary** 2023 – 2025
**Assistant Instructor** 2017 – 2025

## Education

PhD **University of California at Berkeley**, Atomic and Optical Physics 2017
Quantum simulation of triangular, honeycomb and kagome crystal structures using ultracold atoms in lattices of laser light

MA **University of California at Berkeley**, Physics 2013

BA **Boston University**, Physics and Math 2010