Aarya Bookseller

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LinkedIn | **Google Scholar** | **Github**

Education

Texas A&M University Expected Dec 2026
***B.S. Computer Science**; Minors: Physics & Statistics* *College Station, TX*

- Coursework: **Software Engineering, Operating Systems, Distributed Systems, Algorithms, Machine Learning, Deep Learning & LLMs**.
- **PyTorch for Deep Learning Professional Certificate — DeepLearning.AI**

Experience

Research Assistant — Deep Learning Research Group Jan 2025 – Present
Texas A&M University *College Station, TX*

- Built **scalable ML experimentation pipelines** using bilevel optimization and **implicit differentiation (HVPs, CG solvers)** for principal–agent economic models.
- Designed **Monte Carlo simulation tools** modeling stochastic shocks and asymmetric information, evaluating robustness across **dozens of parameter regimes**.
- Developed **reproducible research infrastructure** (Hydra configs, typed PyTorch modules, CI workflows), reducing debugging and experiment reruns by **∼30%**.
- Collaborated in a rapid-iteration research setting, reviewing results weekly and diagnosing system failure modes.

Data Analyst Intern — Stochastic Geomechanics Lab Jan 2024 – Aug 2024
Texas A&M University *College Station, TX*

- Automated **Python + SQL ETL pipelines** for **200+ datasets**, implementing schema validation and cleaning routines to improve data reliability.
- Applied **statistical modeling and uncertainty analysis** to identify instability regimes in sensor-driven experimental data.
- Built **interactive dashboards** using Plotly Dash and PostgreSQL, accelerating anomaly detection and investigation.

Projects

CNN vs Vision Transformer — Low-Data Image Classification 2025
Python / PyTorch / FastAPI / Computer Vision

- Built an **end-to-end vision system** comparing a custom CNN and Vision Transformer trained *from scratch* on CIFAR-10 under **low-data (10%) and full-data** regimes.
- Implemented **modular PyTorch models**, shared training pipelines, data augmentation, and **fully reproducible experiments**.
- Analyzed **accuracy, convergence, and sample efficiency**, surfacing architectural tradeoffs relevant to **data-constrained production settings**.
- Exposed trained models via a **FastAPI inference service**, structuring the project for deployment readiness with clean APIs.

Bubble Tea POS System 2025
Java / PostgreSQL / JavaFX / Node.js/Express

- Built a **full-stack POS system** with JavaFX interfaces supporting cashier operations, inventory management, and analytics dashboards.
- Implemented **RESTful backend APIs** using Node.js and Express, backed by an **AWS-hosted PostgreSQL** database.
- Deployed the system on Renderproject3team21-2.onrender.com) and maintained stability using **GitHub PR reviews and CI checks**.

Publications

- **A. Bookseller**, T. Galanti, K. Ray. *Scalable Principal–Agent Contract Design via Gradient-Based Optimization*. **Under Review — ICLR 2026**. arxiv.org/abs/2510.21177
- **A. Bookseller**, T. Galanti, K. Ray. *Gradient-Based Bilevel Optimization for Principal–Agent Contract Design*. **NeurIPS 2025 Workshop**. NeurIPS 2025 Workshop Gen AI in Finance

Skills

Languages: Python, Java, JavaScript/TypeScript, C/C++, SQL
Backend & APIs: Node.js, Express.js, FastAPI, RESTful services
Systems & DevOps: Linux, Docker, CI/CD pipelines, debugging
Data & ML: PyTorch, PostgreSQL, ETL pipelines, Dash/Plotly
Core Concepts: Algorithms, data structures, OOP/OOD, reproducible systems