ILONA DEMLER

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EDUCATION

California Institute of Technology *Pasadena, CA*
Ph.D. Candidate in Computing and Mathematical Sciences. *Sept 2023 - present*
Advisors: Georgia Gkioxari and Pietro Perona

Harvard University *Cambridge, MA*
B.A. in Physics. *Sept 2018 - May 2023*

SKILLS & INTERESTS

Research Interests: 3D Computer vision, scene representations, optical flow/keypoint tracking from video
Porgramming Languages: Python, C++, C, Java, MATLAB
Deep Learning Frameworks: Pytorch, Tensorflow, JAX

EXPERIENCE

Michael Brenner Lab *Undergraduate Researcher* *Harvard University* June-Aug 2022
Pose-tracking device for running clinical trials from home (repo)

- Prototyped device that runs continuous pose detection, computes biometrics, and stores data in cloud server, preserving patient privacy. Used in funded neurodegenerative treatment trial starting Nov 2022.

Disney Research *Intern* *Zurich, Switzerland* June-Aug 2022
Machine learning and data intelligence group

- Built custom PyTorch autograd and backprop modules for asynchronous, data-secure model training.

Dreams-AI *Software Engineering Intern* *Cambridge, UK* Apr - Aug 2021
Odds estimation and crypto for online gaming

- Designed+built cryptocurrency holding platform using a hierarchical deterministic wallet setup compatible with Ethereum and Binance Smart chains.
- Led team of three software engineers developing horserace betting model. Improved web-scraping and feature engineering pipeline, boosting profits by 1.2x and data saving speed by 2x.

Acronis *AI Intern* *Remote* Jan - Apr 2021
Basketball pose analysis (demo)

- Built demo that detects and analyzes basketball free throws using Detectron2 and OpenPose, calculating relevant joint/motion metrics and shot outcomes.

Cadence Design Systems *Software Engineering Intern* *Remote* May 2020 - Dec 2020
Power supply circuit simulation

- Modeled SPICE circuit outputs, reducing simulation time from 1 week to <2 hrs. Used Ray library for parallelization and parameter tuning, presenting results at quarterly R&D teams meeting.

FUNDING/AWARDS

NSF Graduate Research Fellowship 2024
Caltech EAS Chair Scholar Graduate Fellowship 2024
Harvard Physics Department Carol Davis Prize 2023
HCRP Fellowship, PRISE Fellowship 2020-21

COURSE PROJECTS

BlobGSN *(MIT 6.S819: ML for Inverse Graphics* - project website) Nov 2022

- Unconstrained Scene Generation with Locally Conditioned Radiance Fields and Mid-Level Blob Representations. The result is an editable 3D scene, and self-suprevised way of representing objects in it.

Imaging Black Holes From VLBI Data *(AM216: Inverse Problems* - colab) May 2022

- Implemented two novel signal processing algorithms and demonstrated that using closure phase data with a total variation denoising regularizer yields optimal results.

CNN for Quantum Error Correction *(Physics 160: Quantum Information)* May 2020

- Built CNN to optimize quantum error correction for storing memory on 9 qubit systems, focusing on bit and phase flip errors. Tested algorithm on IBM quantum computers, beating current methods.

ACTIVITIES

Harvard Women in Physics (WiP) *Chair* *September 2021 - May 2023*
Building an inclusive, welcoming community for undergraduate WiPs. Organize events with faculty, lab tours, and collaborate with graduate WiP for mentorship and research opportunities.

Harvard International Program of Negotiation *First author* *January 2019 - December 2021*
Together with four other students, co-created a curriculum on negotiation theory under Harvard Law School's Professor Shapiro. Book launch Oct 2022, now available online.

Small Claims Advisory Service (SCAS) *Volunteer* *January 2019 - May 2022*
Help socioeconomically disadvantaged people going through Massachusetts small claims court system.

Harvard Radio Broadcasting *Station Programmer* *September 2019 - May 2023*
Give weekly radio broadcasts specializing in hip hop, rhythm and blues, and rap music. Interview artists and write reviews of local shows, published on radio website (whrb.org).

Harvard Modern Dance Company *member* *September 2019 - December 2020*
Choreograph and perform in semesterly showcases at the Loeb Theater.

MISC. AWARDS

John Harvard Scholar; KERNEL fellowship; PRISE fellowship; Dartmouth Book Award; National Latin Exam Silver Medal; World Ballet Competition finalist; Youth America Grand Prix (ballet comp.) top 24.

HOBBIES / NON-ACADEMIC INTERESTS

Ballet: Harvard Modern Dance Company, High School Student at Bolshoi Ballet Academy in Moscow, Clara in Jose Matteo Ballet Theater Nutcracker, offer at Boston Ballet Pre-Professional Program

Tennis: High school varisty team captain and league MVP

Languages: English (native), Russian (native)

Misc.: Journaling, Taoism, tennis, jogging, flash fiction, and memoirs.