

EDUCATION

Harvey Mudd College (HMC) • B.S. in Physics, Dean's List FA22-SP25, Major GPA: 3.91, Overall GPA: 3.88	Claremont, CA	Aug 2022 – May 2026
Seattle Academy High School (SAAS)	Seattle, WA	Jan 2019 – June 2022

RESEARCH

Spring 2025 - Current Using machine learning and optimization techniques to model planet and asteroid orbits and find transforms to action-angle coordinates. Active research on using dimensionality reduction algorithms to find conserved quantities. One publication in preparation on using classical ML to predict proper orbital elements for asteroid.	Computational Orbit Modelling	Dan Tamayo, POEL Lab, HMC
Spring 2024 - Current Foundational ML research using graphical models as a prior for variational autoencoders (SVAE). Developing and implementing novel algorithms for Multi Object Tracking and non-linear sequence modeling. Working towards publication.	Variational Deep Learning	Gabe Hope, Hope Lab, HMC
Summer 2024 Developed several novel fMRI encoder and diffusion training strategies to improve reconstruction performance. Reverse engineered fMRI encoders for model interpretability and understanding. One publication in preparation.	fMRI to Image Brain Decoding	Helen Zhou, MNNDL Lab, National University of Singapore
Spring 2023 Revised and tested ultrasonic beam forming sonar sensor. Led low level embedded development on SAM-4 MCU. Implemented embedded communication protocol for talking to an Ethernet chip using SPI.	Embedded Programming	Matthew Spencer, ACE Lab, HMC
Summer 2023 Developed novel online alignment algorithms for 3 way audio alignment of piano concertos [IEEE ICASSP 2025 First Student Author Paper]. Lead data collection and created new audio tampering detection algorithms.	Audio Information Retrieval	TJ Tsai, MIR Lab, HMC
Fall 2022 Implemented pollen detection and classification algorithms (translational ML work with biologists). Trained zero shot classifier using Siamese Net & ResNet transfer learning. Developed public website to share the model and blog post explaining the basics of siamese nets and auto encoders (kavidey.com/l/bee-post)	Zero-shot Image Classification	Morgan Carr-Markell, Bee Lab, HMC
2020-2022 Developed accessible robot tele-operation interfaces. Led interface design and studies of interface alternatives and ran 200+ person online user study. Co-first authored [IEEE IROS 2021 Co-First Authored Paper]. Modeled interaction pattern analysis [IEEE RO'MAN 2021 Paper]. Led research in programming by demonstration & human-in-the-loop object grasping and manipulation approach. Mentored 5 undergraduates across 3 different projects.	Robotic Tele-Operation	Maya Cakmak, HCR Lab, University of Washington
Summer 2019 Goal: Integrated deep learning into curb-ramp detection to improve temporal tracking of sidewalk quality to improve transparency about sidewalk accessibility [ACM ASSETS 2021 Poster Paper]	Deep Learning	Jon Froehlich, Makeability Lab, University of Washington

PUBLICATIONS

Kavi Dey, Leia Shen, Kat Volk, Sam Hadden, and Dan Tamayo. Predicting Asteroid Proper elements with linear estimation and regression. The Astrophysical Journal. **In preparation, author order & title not finalized.**

Kate Glazko, Margaret Seehorn, Medina Lamkin, JunHyeok Cha, **Kavi Dey**, Ben Kosa, Sudheesh Singanamalla, and Jennifer Mankoff. Prompt injections as a tool for agency and expression in multi-user gpt systems. (CSCW2), 2026. **In revision.**

Tj Tsai, **Kavi Dey**, Yigitcan Özer, and Meinard Müller. Dense-sparse dynamic time warping for customizing piano concerto accompaniments. In *ICASSP 2025 - 2025 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 1–5, 2025. doi: 10.1109/ICASSP49660.2025.10890080. URL <https://doi.org/10.1109/ICASSP49660.2025.10890080>. **First student author. Presented in person.**

Ather Sharif, Paari Gopal, Michael Saugstad, Shiven Bhatt, Raymond Fok, Galen Weld, **Kavi Dey**, and Jon E. Froehlich. Experimental crowd+ai approaches to track accessibility features in sidewalk intersections over time. In Jonathan Lazar, Jinjuan Heidi Feng, and Faustina Hwang, editors, *ASSETS Adjunct Proceedings*, pages 65:1–65:5. ACM, '21. doi: 10.1145/3441852.3476549. URL <https://doi.org/10.1145/3441852.3476549>

Maria E. Cabrera*, **Kavi Dey***, Kavita Krishnaswamy, Tapomayukh Bhattacharjee, and Maya Cakmak. Cursor-based robot tele-manipulation through 2d-to-se2 interfaces. In *IEEE/RSJ IROS*, pages 4230–4237. IEEE, '21. doi: 10.1109/IROS51168.2021.9636008. URL <https://doi.org/10.1109/IROS51168.2021.9636008>. ***Co First Authors**

Maria E. Cabrera, Tapomayukh Bhattacharjee, **Kavi Dey**, and Maya Cakmak. An exploration of accessible remote tele-operation for assistive mobile manipulators in the home. In *30th IEEE RO-MAN*, pages 1202–1209. IEEE, '21. doi: 10.1109/RO-MAN50785.2021.9515511. URL <https://doi.org/10.1109/RO-MAN50785.2021.9515511>

EMPLOYMENT

2024 - Current	Engineering TA & Grader	Machine Shop, HMC
Responsibilities: TA'd several intro and advanced engineering classes. Organized grading for 100 person class. Developed a new lab for advanced digital engineering class.		
2023 - Current	Machine Shop Proctor	Machine Shop, HMC
Responsibilities: Ensuring student safety while teaching usage of metal manufacturing (Mills & Lathes, both CNC & manual) and wood working. Spring 2024: additional role as <i>Shop Improvement Proctor</i> (weekly machine maintenance and repair, and upgrading tooling).		
2023-2024	Makerspace Steward	Makerspace, HMC
Responsibilities: Helping students learn and use 3D printers (FDM, SLS, Carbon, & Resin), laser cutters, sewing & embroidery machines, looms, welders, spray paint, and more; running workshops (15+ people). Starting spring 2024: Additional role as <i>Makerspace Repair Steward</i> , weekly preventative maintenance and repair on laser cutters and 3d printers		
2023	Computer Science TA & Grader	CS Department, HMC
Responsibilities: Taught new and experienced students computer science concepts (low level programming, classes, functional programming, data science, graphics, etc.). Graded homework and created midterm study guide		
2020-2021	Full Stack Web Development	WA State Hospital Association
Goal: Develop custom Personal Protective Equipment exchange website to help address COVID shortages. Engineered custom PPE-Distribution algorithm with input from MultiCare Hospital.		

ADDITIONAL EXPERIENCE AND AWARDS

2026 CRA Honorable Mention	2023 HMC Davies Engineering Prize for <i>trebuchet design</i>
2024 & 2025 Astronaut Scholar	2022 Harvey S. Mudd Merit Award
2024 HMC J. R. Phillips Award for <i>doppler velocity log</i>	2020 FRC Dean's List Semi-Finalist

SIGNIFICANT PROJECTS

2024 - Current	Synthetic Opals	HMC
Goal: Manufacture synthetic opals		
<ul style="list-style-type: none"> Learned about science behind opals and nano particles (Stöber process, Bragg diffraction, and structural color). Worked with HMC chemistry department to manufacture opals. Actively working with HMC engineering department to design 7 MPa, 300 °C autoclave for sintering opals 		
📖 Lab Manual kavidey.com/1/opal-manual		
2024	Doppler Velocity Log	HMC
Goal: Design and manufacture doppler velocity log		
<ul style="list-style-type: none"> Designed and manufactured custom piezoelectric transducer with good acoustic properties Created circuit with high speed h-bridge driver, TX/RX switch, differential analog receive circuitry, and high speed ADC. Implementing I2C communication and FFT on an FPGA which will control the circuit and transducers 		
📖 Report kavidey.com/1/e80-report 📖 Documentation kavidey.com/1/dvl-docs		
2023-2024	Digital Camera Sensor	HMC
Goal: Design and manufacture digital sensor completely from scratch		
<ul style="list-style-type: none"> Designed and soldered pcb with grid of 1200 phototransistors to form digital camera sensor Led 3 person team in implementing QOI image compression and debayering on an FPGA Interfaced with camera sensor and FPGA using an STM32 microcontroller to use it as a USB webcam. 		
📺 Video Demo kavidey.com/1/camera-video 📖 Documentation kavidey.com/1/camera-docs		
Spring 2023	Trebuchet Design	HMC
Goal: Worked for external client with limited budget to design method of removing waste equipment from abandoned uranium mine. Led team of 4 students; simulated, prototyped and designed a 10ft tall trebuchet capable of launching 25 lb projectile 300 ft.		
2022-2023	Compiler & Silicon Design	HMC
Goal: Design and implement a C to assembly compiler and associated processor in Verilog		
<ul style="list-style-type: none"> Designed and implemented a compiler for a subset of C. Compiler supports control flow, recursion, register allocation, liveness analysis, and using the stack. Designed a processor in Verilog with support for the compiler's assembly language 		
🔗 Compiler Github kavidey.com/1/compiler-code 🔗 Processor Github kavidey.com/1/processor-code		