Francesco Crivelli

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Personal Profile

I am a senior EECS student at UC Berkeley, deeply passionate about AI and robotics. My projects span from machine learning, analog and digital chip design, and AI for robotics to lots of hands-on building, including drone-based wildfire detection, fast stroke diagnosis using aptamer-based electrochemical sensing, rocketry, satellites, electric vehicles, AI agents and their interactions, agents on the web, AI embodiment, low-cost robotics arms and ACT policy training. Currently, my primary focus is on advancing robot learning and its applications in real-world scenarios and developing intuition in robots.

Education

B.S in Electrical Engineering and Computer Sciences – University of California, Berkeley
Aug 2021 – May 2025

Certifications

- SCET Entrepreneurship and Technology Certificate – University of California, Berkeley, *Aug 2022*
- Group 1 Biomedical Research Investigators – CITI Program, *Feb 2022*
- Group 2 Social and Behavioral Research Investigators – CITI Program, *Feb 2022*
- Stanford Summer Quarter Certification – Stanford University, Electrical and Electronics Engineering, *2020*

Professional Experience

Undergraduate Researcher at Berkeley BAIR - Malik Group – UC Berkeley
August 2024 – Present

- Built a low-cost robotics arm, collected over 200 episodes of feed-a-person task and trained an ACT policy to enable accessible and scalable robotics
- Researching how robots can identify and learn from successful segments within failed task executions by extrapolating a diffusion and stitching method
- Developing vision-language frameworks to evaluate task progress at segment-level granularity, rather than with full episodes, with the goal of creating robotics intuition

Co-Founder and President of Recursive Pioneers – UC Berkeley
Apr 2024 – Present

- First opened a chocolate factory in Chile to teach work and social skills to people with disabilities and establish a sustainable business
- Then launched a 501(c)(3) nonprofit and UCB student club to connect and guide students in implementing high-impact, venture-backable tech and business projects in developing countries, including Chile, Guatemala, Philippines, Kenya and Uganda
- Recursive Pioneers currently has 5 active projects, including robotics software development, health tech, and marketing, and over 35 selected active members.

Founder in Residence – Entrepreneur First, San Francisco, CA
Jun 2024 – Sep 2024

- Built a github-like platform to seamlessly store, share, and showcase hardware engineering projects, from PCB design to CAD and more. Used by companies during their design reviews.
- Entrepreneur First is the world's leading talent investor with a 0.3% acceptance rate. The program funds exceptionally talented individuals to build startups from scratch with an average pre-seed investment offer of $500,000.

UC Berkeley Electrical Engineering & Computer Science (EECS)

Course Staff – EECS 16A: Designing Information Devices and Systems
Jan 2023 – May 20, 2024

- Helped create problem sets, graded students work, and gave lectures on applications of linear algebra to circuits in lab sections

Undergraduate Researcher – Chien Lab
May 2023 – February 2024

- Engaged in implantable hardware research on CMOS technologies for fast stroke diagnosis using aptamer-based electrochemical sensing
- Applied firmware for Bluetooth Microcontroller unit using Cypress PSoC4 to connect the implantable board to the ground station
- Set up robot Opentron to conduct wet lab experiments on different biomarkers

Soft-Robotics Research Intern – Chinese University of Hong Kong
May 20234 – Aug 2023

- Designed a 10x10x0.17cm PCB and implemented analog sensing with Peltier modules simulating tracheal surgery
- Developed systems for precise thermoelectric heating and cooling, including a power management system, to regulate the soft robot's physical state during surgical processes
- Developed Q-learning and Deep RL to regulate robot state via thermoelectric control in surgery

CEO for 2Kosmos – European Innovation Academy Incubator
Jul 2022 – Jun 2023

- CEO of startup to recycle and market used clothing
- Led a team to exceed goals within four weeks, including conducting 300+ customer validation interviews, acquiring 1500+ customers and retail partnerships, and developing an MVP marketing campaign and formal business plan
- Pitched the startup to multiple panels of VCs from Europe and the Bay Area

Rocket Team Member – Space Enterprise at Berkeley (SEB), UC Berkeley
Aug 2021 – May 2022

- SEB is a student-run liquid-fuel rocket team, one of the leading rocket teams in the US
- Part of avionics team that integrated the liquid fuel combustion engine system into the flight control system using PID control systems
- Assisted in assembly of rocket frame (soldering and CNC)

Google – Software Engineering Intern
June 2021 – August 2021

- Worked on Firebase and back-end with JavaScript for a customer tracker platform, using machine learning.

Undergraduate Researcher – Haas School of Business, UC Berkeley
Aug 2021 – June 2022

- Researched clinical decision-making, focusing on hypertension
- Collected and processed national clinical data to create a model with Monte Carlo simulation using High Performance Computing (HPC)
- Executed probabilistic analysis and collaborated with various health departments out of the US for data analysis
- Supervised by Paul Gertler and Claire Booire

Consultant – Global Research and Consulting Group, UC Berkeley
Aug 2021 – Dec 2021

- GRC consultant for New Breath Foundation NPO.
- Worked on a holistic SWOT analysis of the NPO's future project plans and business development
- Held weekly meetings with NPO representatives to discuss updates, including a final semester presentation

Undergraduate Researcher – Department of Mechanical Engineering, Stanford University
May 2020 – Aug 2020

- Modeled the Air Traffic Induced Transmission of COVID-19 using Monte Carlo Simulations
- Implemented the model in serial and parallel on the cluster using mpi4py with optimization; profiled and optimized the model; presented results and findings

Apprenticeship – NeoEduca, Santiago, Chile
Jun 2018 – Jul 2020

- Developed the sensing component for educational robots used in Chilean high schools

Volunteer Regional Coordinator – Techo, Chile
2017 - 2018

- Techo is a global NGO that mobilizes youth volunteers to fight extreme poverty
- Constructed transitional housing and social inclusion programs in marginalized areas of the country
- Organized and participated in multiple fundraising events

Awards and Honors

- Department of Defense Hackathon Finalist, El Segundo, CA, *April 2023*
- Falling the Wall Labs Finalist for Breakthrough Science, awarded by the German Consulate and the German Department of Science, San Francisco, *Aug 2022*
- Invited to Google Latin Student Leadership Summit, Mountain View, CA, *2022*
- Dante Alighieri Society Award for Academic Excellence in Italian literature and culture, *2020*
- International Talent Land Mexico Finalist (out of 100 invited entrants) in the category of robot racers PID loop line follower, *2019*
- Winner of Latin American Robotics Competition in the category robot racer, loop line follower, *2018*
- National Robotics Team Member with *Pontificia Universidad Catolica*, *Dec 2017 - Apr 2019*
    - Second place at US meet, Irvine 2017
- First place (out of 300 entrants) in IBM Solar Challenge Chile, *2018*
- Invited member of OCI, Chilean Informatics Olympiad (national coding team)
- Finalist at Chilean high school robotics competitions all years from 2015 - 2018, first place in 2016 and 2017

Professional Service

Judge and Mentor – NeoEduca Robotics Competition, Santiago, Chile, *2019*

- Judge and mentor for final national high school robotics competition organized by NeoEduca, the TechEd leader in Chile

Judge and Mentor – VEX Robotics Competition, Santiago, Chile, *2018*

- Judge for final national high school robotics competition organized by VEX

Projects

Alcance: Scalable AI-Powered Robot Manipulator for Assistive Applications",
Aug 2024 - Present

- This project is designed to help a Chilean non-profit, "*Tukuypaj*", that assists children and adults with physical and mental disabilities. In particular, focus is on creating robotic systems that will enable individuals with paralysis to feed themselves and perform other activities of daily living independently.
- Built high endurance and low-cost robot manipulator with tele-operating system
- Created environment setup for feeding people with disabilities for data collection
- Trained ACT policy and implemented low-level policy language conditions for choosing food items on over 200 recorded samples
- Answering question: *How can we scale robotics to daily life applications with high amounts of data?*

Agentic Minecraft VLMs via Instruction Tuning, *Aug 2024 - Present*

- Enhancing AI embodied agents' spatial understanding by enabling a VLM for Minecraft using instruction tuning and a VAE to compress frames and enabling video processing action prediction
- Created multi-agent scenarios where AI agents work together in shared environments, developing infrastructure for coordinated learning and task completion
- Answering questions: *What will the web look like in two years and how can we better create embodied agents in that environment? What orchestration will be needed?*

Computer Vision Projects *Aug 2023 - Dec 2024*

- Implemented diffusion model from scratch and researched model bias
- Created 3D Gaussian reconstructions from online videos at defense hackathon
- Implemented Tiny Nerf for object reconstruction
- Image warping, morphing, facial reconstruction and recognition

4 Stages pipeline CPU RISC-V, SuperScalar Processor *Aug 2024 - Dec 2024*

- Designed, optimized, and tested a computer processor from scratch
- Built and integrated a cache system, created a design to optimize memory performance, and maximized frequency (127 MHz)
- Optimized place and route to minimize area
- Maximized frequency by implementing 2 ALU Units

Fire Rapid Analysis Tracker (F.R.A.T.), *Aug 2023 - Jan 2024*

- Built a drone and a payload for on-site wildfire spreading. Imagine telling firefighters what area of the wildfire they should attack first!
- Implemented OpenCV algorithms to detect and localize thermal hotspots, integrating sensor data for fire rate of spread (ROS) predictions
- Utilized the Rothermel fire spread model in combination with LANDFIRE datasets (fuel models, slope, and aspect) to predict rate of spread (ROS) and classify fire danger levels in real time

Apple Watch Display Driver Design, *Aug 2023 – Dec 2023*

- Designed two-stage amplifier: high swing telescopic cascode and common source class AB output stage via gm/Id
- Exceeded requirements: settling time below 180ns and power under 300uW in test bench evaluations, maintaining stability in the feedback system with a Phase Margin of 53º through a RC compensation system
- Ran AC and Transient simulations to validate amplifier's behavior (CM/DM Gain, CMRR, PSRR, LG Phase)

Autonomous Robot Racer - Loop Line Follower, *Oct 2016 - Aug 2021*

- Designed the frame and power distribution board PDB for a loop-line follower racing car
- Developed PID control system for position and speed using magnetic encoders, IR, and accelerometers

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Skills

Design/Fabrication: Cadence, LTspice, SolidWorks, Altium (PCB), Soldering, CNC, Laser Cutter, 3D Printing, Jetson Nano, MEMS Design, Opentrons Automation

Software: Python, Simulink, Matlab, ROS, C/C++, Java, JavaScript, Arduino, SQL, Firebase, TensorFlow, nextJS, Node.js, React, Express.js, Git, Docker, PyTorch, CUDA Programming, Mermaid, HTML/CSS, Tailwind CSS, Reinforcement Learning Frameworks, Computer Vision and Machine Learning Libraries (OpenCV, scikit-learn), Motion Planning Libraries, Nerf Studio, Neural Radiance Fields, Wandb (Weights & Biases), Image Processing Techniques, Reinforcement Learning (Deep RL), Q-Learning, Minecraft Modding, Large Language Models, Le-Robot, Ollama, Azure Fabric, Jetson Nano Integration, AI Agents and agentic behaviors

Languages:
Native or bilingual proficiency: English, Italian, Spanish
Full professional proficiency: Portuguese

Presentations

- "Breaking the Wall of Delayed Immediate Medication", presentation given at German Consulate, San Francisco, CA, *2024*
- "Modeling the Air Traffic Induced Transmission of COVID-19 using Monte Carlo Simulations", presentation given at the Department of Mechanical Engineering at Stanford University, *2021*
- "Building with AI," invited talk and workshop at the *Universidad de Chile, 2020*

Fun Facts

- Built my first drone at 13 (of 9 total); represented Chile in Coding Olympiad; built a lawn mower go-kart in middle school; convinced my mom to let me mix KNO_3 to build a solid rocket in my room at 12

- Hacked at 13+ venues (code & deep tech); every week talked with 10 experts in different fields

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References

Available upon request.