Jacob Valdez

Data/ML Engineering, Robotics, Full-Stack

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Research Collaboration · TalOS Robotics · Aug 2026 – Oct 2026

Robot learning and VLA research with the TalOS Robotics team. Worked on these 3 projects:

- RRP (relational robot policy): morphology-general control where a planner samples a structured latent packet, a body-side controller realizes it from proprioception and touch, and every attention layer adds declared relational terms from one registry of 75 factors. More at https://jvboid.dev/projects/rrp

- ¨0.1:behaviour cloning of the full pretrained ¨0humanoid VLA with relational QK attention biases and morphology tokens, against the identical fine-tune without the structure on the SIMPLE benchmark.

- Dissecting Egocentric Action Pretraining in Vision-Language-Action Models (NeurIPS 2026 UniReps workshop): mechanistic study of ¨0s backbone before and after action pretraining, followed into its action expert. More at https://github.com/JacobFV/vla-action-pretraining

Engineer · SuperCognition Labs · Jul 2026 – Oct 2026

Data engineering, machine learning, research. Worked on these 3 models:

- Whole brain dynamics (SC-WBD-003/004): 26M model that integrates neural dynamics, anatomical priors, and heterogeneous EEG, MEG, fMRI, and intervention data for predicting optimal targets for transcranial magnetic stimulation. More at https://sc-wbd.pages.dev

- Implicit brain model (IBM-1): ~100M mathematically generalized model that materializes task-specific smaller models from shared anatomical, topological, and physiological representations. Modeling the brain implicitly rather than thru an explicitly structured modality mapping allowed us to associate modalities that currently have no datasets and to more efficiently utilize the data trained on. More at https://super-cognition-labs.github.io/IBM-1

API / Integration Architect · AGI, Inc. · Jan 2026 – Apr 2026

Interfaces and integration across our API, SDKs, and other partner-facing surfaces. iOS, on-device llms, model quantization, agents, control plane, etc.

Owned api.agi.tech. First-responder to API infra / full-stack backend issues (Team across 3 countries/timezones, constant pushes directly to production)

Software Engineer · AGI, Inc. · Oct 2025 – Jan 2026

full-stack + infrastructure engineering across agentic systems: typescript, python, react/next.js, node.js, apis, distributed systems, cloud infrastructure, aws, gcp, s3, data engineering, containers, drizzle, pg/psql, databases, queues, browser/computer use, agent runtimes, tool use, model inference, llm integrations, multimodal models, evals, automation, control planes, observability, debugging, deployment, ci/cd, production operations. shipped rapidly across the stack in a high-velocity, production-first environment.

Software Engineer · Breezy · Apr 2025 – Oct 2025

Full-stack product engineering across a rails/next.js monorepo for a prosumer (single-person business) AI receptionist platform.

Independently owned features end-to-end from product requirements and implementation through integration, debugging, and production delivery.

Worked across frontend, backend, ai integrations, and application infrastructure; Left for infra role at AGI Inc

Applied Machine Learning Engineer · Deepshard · Sep 2024 – Dec 2024

Hardware and software for Truffle-1, a personal AI computer running models on-device: enclosure iteration across SLA, FDM and SLS printing against thermal constraints, alongside on-device ML work.

Humanoid Robot Prototyping · Jan 2023 – Sep 2024

Prototyped hydraulically actuated, endoskeletal humanoid robot: KiCAD, FreeCAD, Blender, Python, 3D printing, mdf board CNC routing, 3/16" A16 plasma cutting, 100um + 300um trace PCB fabrication and SMT assembly (LCSC), 3018 mdf milling. Supplier outreach; worked with Dakings Rapid. Pre-llm engineering.

Software Engineer · Motio, Inc. · Aug 2022 – Jan 2023

Developed Soterre for Qlik Sense

Software Engineer (Intern) · Motio, Inc. · Jun 2022 – Aug 2022

Developed Soterre for Qlik Sense

Software Developer · IT Lab · UT Arlington · Jun 2021 – May 2022

Flask-based statistical visualization tool CoWiz; research group collaboration

Full stack Next-React-GraphQL stack: MLN Dashboard

Software Developer · College of Social Work · UT Arlington · Jun 2021 – May 2022

Maintain and enhance multi-platform (iOS and Android) data collecting application MyAmble using flutter and firebase and web administrator interface

Apr 2020 – Jun 2021

Pandemic + first year at the University of Texas at Arlington

Crew Trainer · McDonald's · May 2016 – Mar 2020

Led 30-minute monthly safety meetings

English and Spanish

B.S., Computer Science · The University of Texas at Arlington · 2020 – 2022

CS coursework alongside heavy lab work, independent ML/robotics prototypes, and a steady research output. GPA 3.6/4.0.

A.A.S., Mathematics · Navarro College · 2016 – 2018

Math associate degree taken dual-credit during high school. GPA 3.9/4.0.

PROJECTS

TensorCode · Apr 2022 – Dec 2022, Sep 2026: PROBLEM Turning Python objects into tensors and back takes hand-written glue that breaks whenever a type changes. TASK Open-source neurosymbolic framework for Python and TypeScript that traces any value through ordinary code and trains only the learned steps. OUTCOME **89.4% on banking77 after 3.3s of CPU training**; published on PyPI and npm. TensaCo/tensacode tensorcode.dev pypi/tensorcode npm/tensorcode · python, typescript, pytorch, differentiable programming

Tensegra · Sep 2026: PROBLEM Agents reuse stale work, ignore valid tool results and waste compute, and one score can't say which failure happened. TASK PyTorch modules for graph-conditioned attention and protected symbolic execution, with causal diagnostics at each model-tool boundary. OUTCOME **570-run** attention study; with full inputs, imitation-bootstrapped dependency-aware policies reached **0.93–0.98 sealed IID success** with near-zero invalid reuse, and removing the applicability input raised invalid reuse to 0.41–0.46. JacobFV/tensegra huggingface.co · python, pytorch, typed graphs, recurrent computation

Computerworld · Sep 2026: PROBLEM Computer-use agents train on real VMs that can't be replayed or cheaply forked, so RL is slow and bugs don't reproduce. TASK One deterministic Rust engine simulating machines, shells, apps, a browser and an internet, shipped native, on PyPI and on npm. OUTCOME **265 µs fork, 4.78 µs step** across 5 machines, 93 services and 87 sites, with cross-platform pixel parity. ComputaCo/computerworld computaco.ai pypi/computerworld npm/computerworld · rust, wasm, pyo3, wasm-bindgen, cpu rasterizer, simulation

IBM-1 · Sep 2026: PROBLEM EEG, MEG and vision data are rarely trained together, so each brain model sees only one slice. TASK One shared 3.84M kernel lazily materialized into 16 models across EEG, MEG, vision and a musculoskeletal body. OUTCOME **63.5% image-to-EEG retrieval (127× chance)**; the body stays upright with 0.17 mm drift under a 5 N push. Super-Cognition-Labs/IBM-1 Talk super-cognition-labs.github.io/IBM-1 · python, mne, opensim

langcurriculum · Aug 2026: PROBLEM Fixed reasoning benchmarks leak into training data, so scores can't separate reasoning from memorization. TASK Zero-dependency procedural curriculum: 180 self-grading lesson generators, rendered in 411 languages and five media. OUTCOME Unlimited contamination-free episodes **without using any data**, gated by **4,026 tests**. JacobFV/formal-language-cirriculum jacobfv.github.io · python, sqlite, unification grammar, dsp

jterm · Aug 2026: PROBLEM When a machine crashes, terminals lose the command you typed but never ran. TASK Mirrored every readline edit to crash-safe snapshots, with tmux-style splits that never restart the shell. OUTCOME Survives SIGKILL with scrollback and unsent commands intact; **155 tests**, installers for macOS, Windows and Linux. JacobFV/jterm jacobfv.github.io/jterm · rust, tauri, typescript, react, xterm.js, codemirror, three.js

SC-WBD · Aug 2026: PROBLEM EEG, fMRI, stimulation and behaviour each see a different slice of the brain, so their results rarely combine. TASK 414-region whole-brain dynamics model fusing all four through physics forward operators, released behind a claim gate. OUTCOME Four public checkpoints; the 26.3M-param SC-WBD-003 **beat every baseline on 27 held-out participants**. JacobFV/sc-wbd sc-wbd.pages.dev · pytorch, python, mne, nibabel, e-field solvers

fieldratchet · Jun 2026: PROBLEM PCB layout is done by hand, and none of that intuition compounds back into the tool. TASK Self-improving layout compiler whose oscillator placement engine mutates itself, gated by an independent EMI solver. OUTCOME Beat simulated annealing by **78%** on a 187-component board; an evolved optimizer improved an unseen board **~24%**. **Finalist in AI Engineer World's Fair Hackathon 2026**. JacobFV/fieldratchet · typescript, remotion, electron, kicad, mojo/max, kuramoto oscillators, emi simulation

canvas-engineering · Jan 2026 – May 2026: PROBLEM World models hide their causal structure in weights, so nobody can check what is allowed to influence what. TASK Compiler that lowers a typed schema of latent regions, connectivity and clocks into attention masks on a stock diffusion transformer. OUTCOME Across 236 runs, matched dense accuracy with **19.6% of the connections** and **~5× faster training**. commandAGI/canvas-engineering ⌘ Post · python, pytorch, diffusion transformers, cogvideox, pydantic, world models, neurosymbolic, research

SynthUX · May 2026: PROBLEM Computer-use agents need grounded training data, but recording full VMs is expensive. TASK Generator that expands goals into grammar trees and replays them as real input in three browser desktop simulators. OUTCOME Published a Hugging Face dataset of 1,949 frames: **81.1% app-native**, **0 validator errors**. JacobFV/synthux · python, node tree grammars, svelte simulators, hugging face datasets, computer-use agents, synthetic data

browser-os · windows-web-next · macos-web-next · Nov 2025 – May 2026: PROBLEM Computer-use agents need desktops that are inspectable and instantly resettable, which real OSes aren't. TASK Svelte desktop shell (windows, filesystem, app lifecycle) with Windows 11 and macOS simulations and 20+ apps. OUTCOME Live on Vercel as SynthUX's substrates: **100% app-native on macOS**, 81.1% across all three. JacobFV/browser-os JacobFV/windows-web-next JacobFV/macos-web-next desktop-shell.vercel.app windows-web-next.vercel.app macos-web-next.vercel.app · typescript, svelte, vercel, html2canvas, computer-use agents

Chem-0 · May 2026: PROBLEM A real chemistry bench brings calibration, occlusion and contact that no API abstracts away. TASK MCP stack letting an agent drive a low-cost SO-101 arm from a live camera, with IK, YOLO vial analysis and an Electron console. OUTCOME The agent posed a real arm from camera feedback; the failed vial grasp pinned the blockers: calibration, compliance, fast local control. JacobFV/chem-0 Post · lerobot so-101, python, opencv, placo, yolo, mcp, typescript, electron, robotics

Trash Sorter · May 2026: PROBLEM Trash sorting is a valuable robot job, once calibration, perception and grasping hold up. TASK Calibrated, teleoperated and tuned a LeRobot SO-101 arm with camera perception to pick and sort trash. OUTCOME Prototype built by a team of **four** in **one weekend** at Founders Inc Physical AI Hack. · lerobot, so101 arm, computer vision, robotics, teleoperation

Lunar Rover · Apr 2026: PROBLEM Off-world robots can't be joysticked, so autonomy has to survive relays and ground control. TASK Regolith-collecting rover on a four-node stack (viewer, ground control, satellite relay, robot) with LLM route planning. OUTCOME Working rover and mission demo in **one weekend** at RoboHacks at Y Combinator. Post · robotics, llm route planning, mars robots, distributed control, autonomy

The Tensor Computer · Feb 2026: PROBLEM LLM agents spend 20–50 tokens on what one machine instruction does; could programs be learned as machine code instead? TASK Rebuilt a full von Neumann computer (ALU, cache, memory, GPU) as differentiable JAX tensor ops. OUTCOME **4 independent backends agree on 59 conformance vectors**; a self-hosting C compiler matches the host's output **byte for byte**. · python, jax, c, rust, c++, differentiable programming, program synthesis, research

precisionBOM · Jan 2026: PROBLEM Hardware teams source parts by hand across spreadsheets and vendor pages. TASK Next.js app over a Python multi-agent service that matches each BOM line against DigiKey's live catalog. OUTCOME Shipped precisionbom.com: live stock, price breaks and alternates in one pass, exported as an orderable BOM. **First place ($1000) at AI Agents & MCP Hardware Hackathon**. precision-bom/precisionBOM precisionbom.com · next.js, python, multi-agent systems, digikey api, hardware procurement

bsbr · Mar 2025: PROBLEM Attention cost grows quadratically with sequence length, making long context expensive. TASK Pip-installable attention: exact within chunks, retrieval over compressed chunk states, plus a GPT-2 converter. OUTCOME **5.6× faster than linear attention** and **30× faster than DeltaNet** at 1,024 tokens. JacobFV/bsbr Post pypi/bsbr · python, pytorch, transformers, hugging face, pypi, research

jnumpy · Sep 2021 – Nov 2021: PROBLEM UT Arlington ML courses banned third-party frameworks, so every assignment meant rewriting backprop. TASK Built my own numpy deep-learning library with arbitrary-DAG autodiff and neural-network and RL abstractions. OUTCOME Carried my homework across **three ML courses**; later added connect-4 RL and a C port. JacobFV/jnumpy · python, numpy, autograd, deep learning, reinforcement learning

DesparadosAEye · Jan 2021 – May 2021: PROBLEM Mobile chatbots need cloud servers that cost money and expose user data. TASK Led a 5-person team porting Facebook's BlenderBot-small to TFLite for on-device Android inference. OUTCOME **335M-parameter chatbot running fully on-device**; presented at UTA Innovation Day 2021. kmosoti/DesparadosAEYE · kotlin, java, sqlite, android, tensorflow lite, blenderbot, hugging face

SKILLS (ATS)

Languages: Python, TypeScript, SQL, Rust, C, Java, Kotlin

AI / ML: deep learning, transformers, diffusion models, world models, reinforcement learning, foundation models, computer vision, LLMs, PyTorch, JAX, Hugging Face

Agents: AI agents, multi-agent systems, computer use, tool use, Model Context Protocol (MCP), evals

Robotics / Hardware: robot learning, imitation learning, manipulation, LeRobot, MuJoCo, embedded firmware, ESP32, PCB design, KiCAD, CAD, 3D printing

Infrastructure / Web: distributed systems, data pipelines, PostgreSQL, AWS, GCP, Cloudflare Workers, Vercel, CI/CD, React, Next.js, Node.js, FastAPI

Mobile: iOS, Android, React Native, Flutter