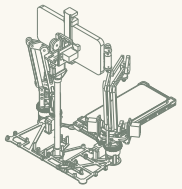
Jacob Valdez

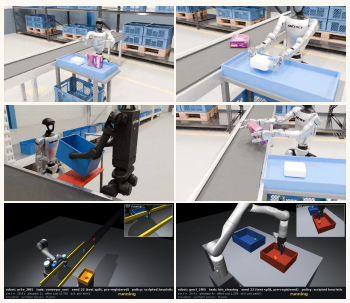
Robots research and engineering at TalOS Robotics · Integrations architect · End-to-end · Full stack ·
Co-author UniReps '26 · CommandAGI · ComputerWorld · FabLab · The only constraints are the laws of physics.
Portfolio · GitHub · jacobfv123@gmail.com · +1.469.968.9490 · Twitter @jvboid · LinkedIn


Tappet / mechanical CAD

Research and Engineering at TalOS Robotics

Robot learning and VLA research · Milan, Italy (remote) · August 2026–Present

- **Relational Robot Policy.** Samples one 64-dimensional latent per time knot and body assembly with a shared planner. Each body's controller reads the packet, joint state, and touch at 20 Hz on arms or 50 Hz on humanoids. One registry of 75 relational factors biases attention at every layer.
- **Ψ0.1.** Adds relational query–key biases and morphology tokens to the pretrained Ψ0 humanoid VLA. Full-model behavior cloning on SIMPLE, paired with an otherwise identical fine-tune to isolate the effect of structure.
- **Ψ0 action pretraining.** Traces Qwen3-VL-2B representations through egocentric action pretraining into the flow-matching action expert. Late backbone layers encode object position. The expert still draws primarily on robot state. UniReps '26 paper
- **Dynagraph.** Ongoing fine-motor manipulation research. In discussions with our customers in Italy to deploy on Unitree G1 humanoids for internal warehouse logistics.


Internal warehouse logistics training environment with Unitree G1 and H1 humanoids

Dynagraph

TalOS Robotics · One NVIDIA GB10 · 12-hour study · November 2026

- Structured recurrent world model for general-purpose robotic control, integrating typed latent memory, differentiable physics, and compositional skill learning.
- Specifically engineered for generalization with robot-, sensor-, environment-, and task-agnostic representations; SE(3)-equivariant geometry, embodiment-conditioned control, and uncertainty-aware state estimation.
- Trained using sparse-demonstration adaptation, privileged-state distillation, synthetic augmentation, and compositional zero-shot skill transfer.
- In discussions with our customers in Italy to deploy on Unitree G1 humanoids for internal warehouse logistics

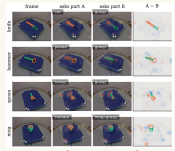
Ψ0 action pretraining

GitHub

Co-author · NeurIPS 2026 UniReps workshop · August–October 2026

Moves image integration from layer 12 to layers 20–22 of the same Qwen3-VL-2B backbone. Swapping the image changes actions by 19.5× sampling noise on training episodes, 2.7× on unseen episodes. A control-barrier correction at the output adds 10.4 mm of obstacle clearance.


Paper


Instruction attention

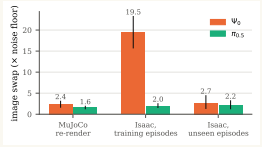


Image-swap intervention

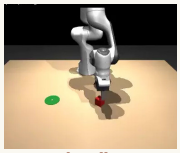
Relational Robot Policy

GitHub · Hugging Face

Cross-embodiment policy research · September–October 2026

Stores the target, grasp, and goal in named plan fields. Each arm decodes the shared plan into joint commands. Field supervision raised pick-and-place success from 314/480 to 425/480 across four simulated arms and two seeds. Behavior cloning with held-out xArm7 demonstrations reached 192/200.


Paper


Panda rollout


G1 wrist chain


Relative positions

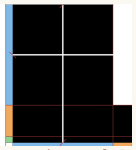
Canvas Engineering

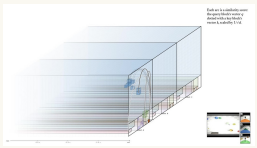
Paper · Documentation · Source · Thread

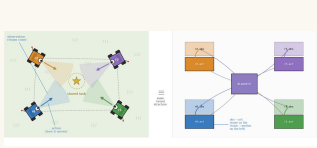
CommandAGI · Latent dynamics research · January–May 2026

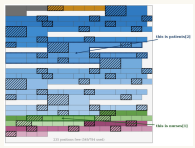
Repurposes models optimized for generating videoslop into structured latent dynamics kernels. Macro constituent structure, connectivity, update frequency, and other properties are declared explicitly while micro-scale interactions are learned with end-to-end multi-modal supervised learning. After the compiler isomorphically lowers declarative structure into attention masks and harness config of a stock diffusion transformer, internal activations gain interpretability and are integrated into serious domains, including multi-modal swarm robotics operation, hospital simulation with symbolic lookup, and cortical modeling validated against TRIBE v2 (R^2 = 0.825). Product of Looped Attention in Video Diffusion Transformers and The Cortical Canvas.

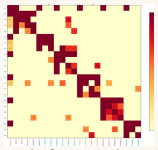

Paper

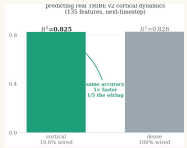

Attention mask


Three-robot simulation


Four-robot dispatch


ICU symbolic lookup


Cortical connections



TRIBE v2 prediction

BridgeData V2 action loss, 0.073 with 350k trainable parameters versus 0.088 with 11.7M. Cortical next-step prediction, R^2 = 0.825 at 19.6% connectivity versus 0.826 fully connected. Swarm visualization uses an untrained transformer.

Training SC-WBD-003, SC-WBD-004, and IBM-1.

IBM-1 project

SuperCognition Labs · Research and Engineering · San Francisco · July–October 2026

Models 414 brain regions as one evolving state. EEG and fMRI read it through separate measurement models on different clocks. IBM-1 retrieves group-average EEG responses from images. Ranks the correct response first for 127 of 200 THINGS-EEG2 images. 63.5% top-1 accuracy versus 0.5% chance.

Read the SC-WBD paper


Paper


SC-WBD connectome


IBM-1 retrieval

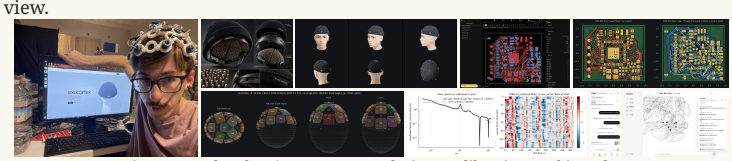

IBM-1 talk at Tesla

Exocortex

exocortex2.com · Dream

CommandAGI / Helm Technologies* · A New Layer of Perception · June 2026–Present

Dry EEG cap design. Targets 1,118 contacts at 500 Hz per channel. Routes 66 tiles to an acquisition hub through 16 daisy chains. Five brim cameras record the wearer's view.

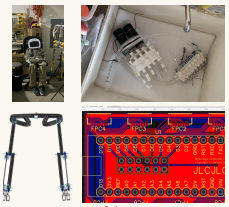

Wearing an EEG headset / Exocortex cap designs, calibration, and interfaces

HumanRobots

Independent · Humanoid prototyping · 2019–2020 and 2023–2024

Full-scale hydraulic humanoid. Garage-built endoskeleton with hip, knee, and ankle linkages. One pump feeds antagonistic actuators through a printed valve manifold. Custom valve-driver PCBs, two experimental fluidic hand assemblies, and a pressure-tested drill-driven actuator.

Printed valve manifold · Spine assembly drawing · Actuator bench test



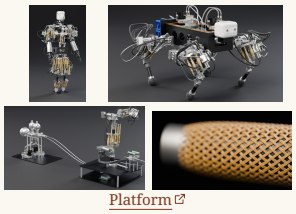
Archive

Limboid BoidKit

Limboid · Modular hydraulic actuation · 2025–2026

Shares one hydraulic design across humanoid, quadruped, and manipulator bodies. Two lobe pumps charge an accumulator. Six valves share each limb manifold. Braided muscles bend joints. Rotary vanes twist them. Across 6 simulated loads, the fast muscle model matches strand-level finite elements to within 1% of full force and 1.2% of displaced oil volume.

Soft-muscle study · Hexapod and snake bodies



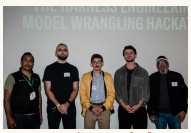
Platform

LabRat

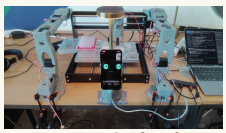
MongoDB hackathon

Cerebral Valley · 2nd place, Recursive Harnessing · October 2026

Robotic lab built in one day. Captures 30 Hz demonstrations with two SO-101 arms. Transfers liquid with a servo pipette on a 3018 CNC. Screens 16 protocols in simulation for motion, volume, and tip use. Reads the bench result with an iPhone and retains calibration updates that reduce prediction error.



MongoDB / Second place



Demonstration bench



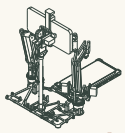
LabRat digital twin

Tappet

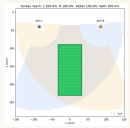
Mechanical CAD

Fun project · Desktop mechatronics · October 2026

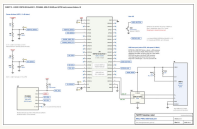
Taps a phone with two 3-joint arms and capacitive styli. Calibrates the mapping from nine screen points. Across 100 simulated taps with servo noise and backlash, mean error 0.81 mm, 95th percentile 1.70 mm. Open CAD, schematic, firmware, and calibration procedure.



Tappet CAD



Screen reach



Control electronics

Lunar Rover

Lunar rover project

Four-person team at YC RoboHacks · Distributed robot control · April 11–12, 2026

Designed to sample regolith. Links a remote viewer, ground control, a simulated satellite relay, and an onboard computer across four nodes. Parts printed onsite. Route planning demonstrated on hardware.



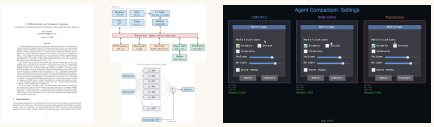
YC RoboHacks field photographs

Tensor Computer

Independent research · Differentiable architecture · February 2026

Makes machine code differentiable. The ALU runs all 32 operations each cycle and mixes their outputs by opcode weight. Lowering the softmax temperature toward zero recovers discrete execution. C, Rust, C++, and JAX implementations agree on 59 conformance vectors.

Paper · Machine architecture · Opcode mixture · Agent comparison at 0:05 · Post



Paper, architecture, and three agents on one Settings task

CommandAGI

CommandAGI · Run records · Replay

Research and Engineering · Robotics and agent infrastructure · San Francisco (house) · April 2026–present

Building the infrastructure for a world under command. The intelligence, tools, and environments to make anything happen. From software to machines to entire organizations. Agent harnesses driving System-2/tool-call-based and interactive/realtime/System-1-style setups. Simulation and real control of robots, CNCs, and GUI-based computer-use. Full-stack. Serverless and container-hosted services. Maintain full deployment surface across: Web app, Mobile (in review), Desktop (Electron GUI + background service worker) (macOS, Linux, and Windows; unsigned on Windows), Chrome Web Store, ESP32, TypeScript SDK on npm, Python SDK on PyPI, MCP, API, CLI, docs.

Robotics and factory simulation

Unitree G1 · SO-101 · CNC tending

Joins camera frames, executed actions, and outcomes in one run record. Scores each phase to distinguish grasp failures from carry errors. G1 passed 175/240 simulated factory trials. CNC tending passed 12/12 starts. An 18-design arm sweep raised simulated reach from 63.9% to 95.6%.

Agent runtimes and editable media

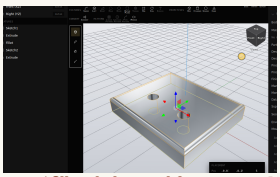
Claude Code · Codex · TypeScript video editor

Runs Claude Code and Codex in shared threads with per-user tool-call attribution. Internal backlog of 6,641 turns and 469,557 calls. Video timeline and code edits update the same `.vid.tsx` file.

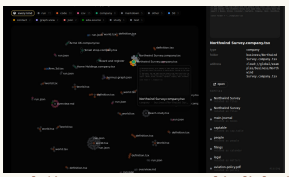
Markets, sourcing, and sales

Input–output economics · Procurement · CRM

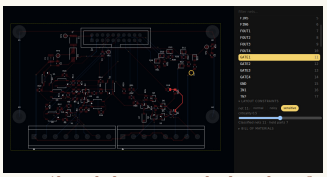
Connects simulated Gulf oil flows to 71 U.S. industries through BEA input–output tables. Prices 95 UpperBody-001 bill-of-materials lines against supplier offers. Weights open deals by stage for sales forecasts in each currency.



CAD / filleted plate and feature tree



Graph / inspect a company and its links



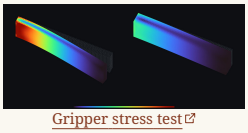
EDA / board placement and selected net



188-unit factory



G1 loads a CNC mill



Gripper stress test



Agent threads



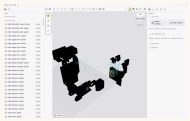
Oil trade simulation



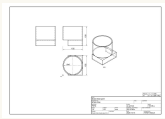
Video timeline



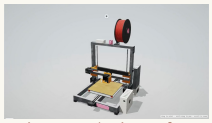
Deal forecasts



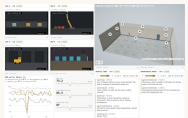
UpperBody-001 / palm PCB



Router-001 / dust shoe



Printer-001 / print replay



Factory operations



Mt. Tamalpais / LiDAR



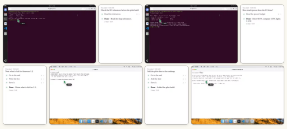
Assembly BOM / suppliers

ComputaCo

computaco.ai

Research and Engineering · ComputaCo Inc. · Agent training environments and synthetic data · San Francisco (indv.) · 2026

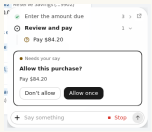
Simulates entire companies on one network. Four Halyard engineers check tolerances and power draw, update firmware notes, and schedule a pilot build. Northstar runs a launch with 21 simulated employees and buyers. At Brenmoor, buyers negotiate a pilot. Computatrum previews clicks and asks approval before payment.



Halyard engineering



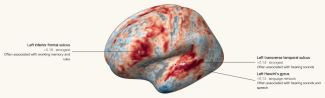
Brenmoor procurement



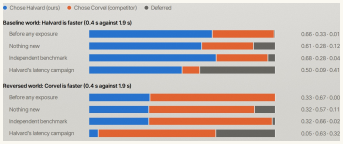
Payment approval

Explores how to distil the human brain's perceptual loss landscape into an objective for optimizing layout, copy, and UX. Predicts cortical responses to spoken company copy with TRIBE v2. In matched trials its input encoder predicts simulated buyer choices more accurately (held-out log loss lower by 0.017).

Matched study / 108 buyers per condition



Predicted cortex / spoken page



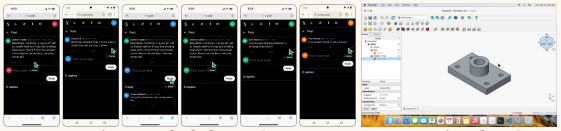
Buyer choices by arm

ComputerWorld

ComputaCo · Rust simulation engine · Open-core release, October 2026

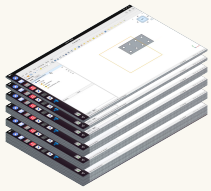
Runs five OS shells on a simulated network. Fork a company before a decision. Change one input. Replay both branches. Shares immutable 256-event log blocks and copies only the open tail. Median fork time of 35 µs after 1,000 actor steps on one pinned ARM core. With 16,013 events already logged, step time fell from 176.2 ms to 219.2 µs with identical replay hashes.

Compiles a FreeCAD feature tree into 86 mouse and keyboard actions. Rebuilds the solid. Checks 16 geometric requirements.



Six networked phones

Mounting plate



FreeCAD / 98 replay frames

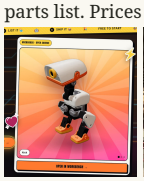
ComputerWorld · Hosted simulation API · Rust engine · Fork benchmark · Performance · Replay · 260 verified expert episodes

HeyFabLab

heyfablab.com

CommandAGI · Robot design and fabrication · 2026

Turns a description of a robot toy into a design and parts list. Prices the build and lists it for sale.



Microduck film



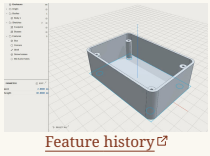
YC founder pitch

VibeCAD

vibecad.pro

CommandAGI · Mechanical design software · 2026

Parametric CAD editor. Supports both manual/GUI and agentic/API editing. Internally uses .3d.tsx file, can export STEP, STL, or 3MF.



Feature history
AI file editing
Bracket load checks



Sketch constraints
Geometry measurements
STEP and mesh export

VibeStartup

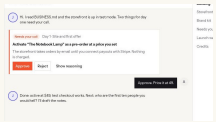
vibestartup.pro

CommandAGI · Commerce automation · 2026

AI cofounder on CommandAGI. Provisions a storefront and business email. In the Lampwise demo, owner approval of a $49 preorder triggers a checkout update and a draft customer email.



Launch studio



Owner approval

Professional experience and education

Full public résumé

Applied ML, product engineering, and computer science · 2020–2026



CES 2026



Developer platform





iOS

AGI, Inc. San Francisco

API & Integration Architect · January–April 2026

Owned api.agi.tech and partner SDK integrations for mobile agents. Worked on iOS inference, model quantization, and the agent control plane. First responder for production API and backend incidents across a team in three countries. Represented AGI at CES 2026.

Software Engineer · October 2025–January 2026

Built TypeScript and Python services for browser agents, tool execution, and multimodal inference. Shipped model evaluations and operated Postgres, queues, and containerized services on AWS and GCP.

Breezy AI

Software Engineer · San Francisco · April–October 2025

AI receptionist for one-person businesses. Booking flows connect a Rails backend to a Next.js frontend.

Deepshard

Applied ML Engineer · Los Angeles · September–December 2024

Truffle-1 on-device AI computer. SLA, FDM, and SLS enclosure prototypes designed around processor thermal limits.

University of Texas at Arlington

B.S. in Computer Science · Arlington, TX · 2022 (before chatgpt)

MLN Dashboard for multilayer networks. Mobile data collection and app maintenance for MyAmble.

EXPERIMENTS

Ψ0 / Code and interventions
RRP / Training and evaluation
Looped Attention / Models and experiments

HARDWARE REPOSITORIES

phys-0 / Robot lab tools
ESP32-S3 / USB camera firmware
Microscope / USB capture

TALKS, REPORTING, AND FIELD NOTES

BBC News / Speaking out after losing my twin Isaac
AI Builders Breakfast at Tesla / SuperCognition Labs
Founders, Inc. / Teaching a robot to sort
Chem-0 / Calibrating a lab robot
YouTube / Robot builds and experiments
The shape of experience is interior face of what self-maintaining structure experiences when maintaining existence, attention, identity, and meaning

EXPERIMENTS AND INFRASTRUCTURE

Policy improvement / Training loop
Dataset catalog / Source and access control
Arm geometry / All 18 candidates

BUILDS AND DEMOS

LabRat / Pipette deck CAD
BoidKit / Platform film
Lunar rover / RoboHacks at YC

SELECTED POSTS ON X

Leaving my new-grad SWE to begin working with robotics in 2022
RoboHacks at YC / Rover field photos
Computatrum / Computer-use research in 2021
BSBR / Block-sparse attention with retrieval
EGGROLL / Architecture-independent trainer
Truffle-1 / Thermal design for NVIDIA Orin
Chem-0 / Simulating grasp failures

RESEARCH

Publication catalog
ORCID / Research contributions
Public résumé / Education and experience
Looped Attention in Video Diffusion Transformers: 26 Experiments on What Works, What Doesn't, and Why
The Cortical Canvas: Spatiotemporal Substrate Allocation as a Unifying Principle for Multimodal Embodied Intelligence

DATASETS AND WEIGHTS

Relational Robot Policy / Checkpoints
Hugging Face / Models and datasets

CODE, DATA, AND SOFTWARE

EEG acquisition-chain simulator
Moving Atoms / Scan to BIM and Revit
Headless iOS on Linux
SynthUX / Labeled screen trajectories
Fieldratchet / KiCad placement and routing
Tensegra / Attention experiments