ÁLVARO SCHWIEDOP SOUTO

AI Researcher & Engineer

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AI researcher and engineer specializing in multimodal perception, self-supervised world models and mechanistic interpretability. Develops original model architectures, tests scientific hypotheses and translates research into client solutions. Combines technical leadership with commercial negotiation and deal closing, from defining the opportunity to delivering the system.

FLAGSHIP RESEARCH

PHASE-TTC | *Causal Multimodal Perception* 2026

Author of PHASE-TTC: From Motion to Time | Research paper · Code

- #1 on the official GarlTTC Test leaderboard as of 28 Oct 2026 (three displayed entries). Achieved 20.49% lower Overall MiD than Garl-TTC: 35.80 vs. 45.03, across 6,762 scored tokens with 0% scorer-defined failures.
- Designed a nine-component event-RGB architecture that estimates motion separately in each modality, refines it over 650 ms of causal history and fuses 20 interpretable phase, timing and support features through a 1,955-parameter correction head.
- Developed differentiable scale estimation, event-native local transport and temporal phase refinement. Used controlled ablations to measure the contribution of geometric and temporal signals to time-to-contact accuracy, with grouped out-of-fold training for the fusion stages.

AWARDS AND TECHNICAL ACHIEVEMENTS

HACKSPAIN 2026 | *WINNER, MAISA AI TRACK* Sep 2026

Trace-it | Team-built policy-to-decision platform | Code · Results

- Won the track with a platform that turns business policies into tested Python rules and executes decisions deterministically, with source evidence and human escalation. The team system reproduced 471/471 reference decisions in the delivered evaluation.
- Owned document AI, ERP integrations and deployment: combined native PDF parsing, OCR and visual-model APIs with schema validation, Excel/ERP cross-checks and a field-to-document evidence viewer.
- Reduced ingestion wall time by 51%, from 182.1 s to 89.0 s for 540 synthetic invoice PDFs, in a cold-cache VPS benchmark. Improved readers and connection reuse, increased document workers from one to three and implemented duplicate-aware email intake with recovery.

IMPACTHON USC / GDG | *1ST OVERALL PRIZE* Apr 2026

Also won the mobile-use-reduction challenge with Teyka, combining a rules engine and Gemini-generated interventions in a digital-wellbeing prototype. Physiological inputs were simulated.

Teyka code

SELECTED RESEARCH CONTRIBUTIONS

Causal Workspace JEPA | *Mechanistic Interpretability* 2026

Causal interventions and differential analysis of language models | *Code and research*

- Built a 612-patch Qwen3-0.6B intervention dataset with entity-disjoint splits; activation patches transferred the donor capital answer in 50% of held-out test pairs.
- Showed that averaging Jacobians across 24 training contexts cut finite-logit-effect prediction NMSE from 0.737 to 0.354 versus exact local Jacobians, on unseen validation entities.

FlowTwin | *Physics-informed World Models* 2026

Multi-horizon vessel trajectories from NOAA AIS data | *Code and results*

- Combined gradient-boosted trees with a physics-conditioned JEPA in a three-model ensemble. Reduced trajectory MAE by 11.72%, from 2.635 km to 2.326 km, across 57 future held-out vessel trips; trip-bootstrap 95% CI for improvement: 5.90%–17.13%.

Foundation Model Adaptation for Sonar Perception 2026

Self-supervised learning, small-object detection and domain transfer | *Code and results*

- Adapted a DINOv2 Vision Transformer into a spatial sonar detector, combining a learned multiscale feature pyramid with Faster R-CNN. Designed controlled experiments on sparse supervision and cross-location transfer, and engineered a fine-detail image branch to preserve localization cues beyond the backbone patch grid.

CLIENT DELIVERY AND COMMERCIAL LEADERSHIP

J&A Automation | *Industrial Operations and Finance* 2026

Custom business platform for technicians, project managers and finance | *Code*

- Built the workflow from client and project setup to technician assignment, approved work and billing: actual hours, overtime, standby, travel, daily/technical reports and receipt-backed expenses, with manager approval and finance review.
- Engineered project profitability calculations separating worker compensation and internal costs from client billing rates. Connected approved time and expenses to project margins, budgets and work in progress, while keeping internal economics out of customer reports.
- Implemented labor, expense and fixed-price invoicing, immutable issued invoices, partial-payment tracking and accounting exports. Delivered English, Spanish and Portuguese reporting with role-based financial access, PDF/XLSX outputs and production deployment on Ubuntu, Docker and Caddy.

RESEARCH ENGINEERING AND COMMERCIAL SKILLS

Research: PyTorch, JEPA, Transformers, DINO, multimodal fusion, causal interventions, geometric learning, uncertainty estimation, controlled ablations and statistical evaluation.

Engineering: Python, SQL, FastAPI, PostgreSQL, TypeScript, React, SvelteKit, OCR, LLM APIs, Linux, Docker, CUDA Graphs, ONNX Runtime and CI/CD.

Commercial and interpersonal: client discovery, requirements negotiation, solution presentation, proposal development, stakeholder communication, commercial negotiation and deal closing.

EDUCATION AND LANGUAGES

Computer Engineering, Universidade de Santiago de Compostela | 2024–present.

Third year of a four-year degree, academic year 2026/2027.

English: C1 (Cambridge). German: C1 (TestDaF).

Spanish and Galician: native. Portuguese: bilingual.