

Thomas Sawyer

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Profile

- Software engineer focused on internal tools, automation, developer tooling, and practical software systems.
- Built and delivered software in Elixir/Phoenix, Crystal, Ruby, SQL, JavaScript, and manufacturing control environments.
- Comfortable owning projects end to end, from design and implementation through integration, debugging, and delivery.

Selected Projects

Open Source

- **μGPT (microGPT)**
LLM construction kit and experimentation app with a graph UI for designing, training, running, and comparing small custom language models.
- **Memo** | <https://github.com/trans/memo>
Semantic search and vector storage library in **Crystal** using **SQLite FTS5**, **Postgres HNSW**, chunking, deduplication, and cosine similarity for local-first retrieval.
- **C0 DATA** | <https://github.com/trans/c0>
Serialization format using the ASCII **C0 control range** with a Unicode display convention to remain readable while optimizing for very high deserialization throughput.
- **Arcana** | <https://github.com/trans/arcana>
Agent communication bus and routing library in **Crystal** for coordinating AI services and multi-agent systems.
- **YAM** | <https://github.com/trans/yam>
YAML 1.2 parser in **C** built from scratch with a focus on spec compliance, parser edge cases, and test-driven development.
- **QED** | <https://github.com/rubyworks/qed>
Documentation-driven test framework for **Ruby** that turns examples and documentation into executable tests.
- **Ruby Facets** | <https://github.com/rubyworks/facets>
Large collection of general-purpose extensions and utility libraries for **Ruby**, published under **rubyworks/facets** and used widely in the Ruby community.

On-Job Projects

- **NAI Schedule**
Internal operations software in **Elixir**, **Phoenix**, **MySQL**, and **Ecto** for Fishbowl-integrated production scheduling, search, and order visibility.
- **Keyence CoA**
Report automation tool in **Elixir** and **Phoenix LiveView** that turned Keyence CSV exports into print-ready Certificates of Analysis in seconds.
- **BENCHCON 2**
Refactor of a legacy laser and motion-stage control system in a **FORTH-variant** production automation environment to improve modularity, units handling, maintainability, and onboarding.

Publications and Preprints

- **Prefix-Trie Factorization of Autoregressive Gradient Descent** | **Preprint** on gradient-factorized autoregressive language-model training over a prefix trie, with a memory-scalable **CUDA** implementation and empirical results showing about **10x fewer optimizer steps** at matched context on Shakespeare. Preprint: <https://github.com/trans/microgpt/blob/main/docs/agpt-paper.md>
- **Trie Path Probability Convergence** | **Preprint** on prefix-trie path probabilities as stable ordinal fingerprints of corpus

distributions, with empirical results showing **Spearman rho ≥ 0.80** across depths up to 16 on corpora from **1.1M to 5M characters**. Preprint: <https://github.com/trans/microgpt/blob/main/rnd/results-extended.md>

Professional Experience

National Aperture, Inc. | Junior Production Manager, Software Developer, IT Generalist | 2018-2025

- Built internal software for production scheduling, reporting, and manufacturing visibility.
- Supported production automation and laser micro-machining workflows.
- Worked across software development, operations, troubleshooting, and practical IT support in a small manufacturing environment.

Independent | Freelance Web Developer and Open Source Developer | 2009-2017

- Built websites and web features for clients.
- Developed open-source applications and libraries, primarily in Ruby.

Independent | Part-Time Senior Care | 2004-2015

- Provided dependable part-time senior care support.

Skills

- Languages: Crystal, Elixir, Ruby, JavaScript, SQL, HTML/CSS, C, C++, FORTH
- Frameworks: Phoenix, Phoenix LiveView, Ecto, Kemal
- Data: MySQL, PostgreSQL, SQLite, FTS5
- Tools: Git, Linux, VS Code, Claude Code, OpenAI Codex

Education

St. John's College, Santa Fe Campus | 1998-2000

- Coursework in Philosophy and History of Mathematics and Science

Anne Arundel Community College | 1992-1993

- Coursework in Computer Science and General Curriculum