
Jess Sullivan

Agent Orchestration · Computer Vision · Full Stack Engineer · DevSecOps · ML/HPC
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Languages

Python (10+ yrs, enterprise)
TypeScript / SvelteKit (SOTA)
Chapel (expert), Haskell
Zig, Go, C#

ML/AI & HPC

Fine-grained classification
Horizontal parallelism in ML/AI
WASM-native inference
MLOps & model evaluation

Infrastructure

CI/CD pipelines (expert)
Kubernetes orchestration
Binary analysis (Ghidra, Frida)
Realtime & time-series pipelines

Experience

Full Stack Contracting and FOSS

(Ongoing)

Ongoing contributor and community member of numerous open source projects including—and not limited to—the **Apache Foundation** (Solr web security), **rsync**, **Chapel-lang**, **Caddy/xcaddy**, **libdns**, **Skeleton UI**, **Klipper**, **Joplin**, **FFT.js**, **KeePassXC**, **svelte-superforms**, the **Rocky Enterprise Linux Foundation** (Community Team, Kernel SIG, AltArch SIG), **Liqa** (K8s topology fabric, used by CERN), **Budgie DE**, **Mason**, along with authoring numerous FOSS automation tools, libraries and open source utilities. Expanded client list and customer references available upon request.

- Startup work: **Dover Micro** (2017), **Adaptive Motorsport** (2018)
- Web GIS tools for **National Park Service**, **Foundation for Healthy Communities**, **GPRED**, **Northern Border Regional Commission**. Presented at 2019 **AAG Annual Meeting** in Washington, DC (§4).
- Fine-grained image classification with **MushroomObserver.org** and **Visipedia**; early adopter of CNN-based species ID at scale.

Current stack:

- **Web:** **SvelteKit** (Runes), **Bun**, **Vite 8** (Rolldown), TS7. Proprietary SvelteKit libraries for fingerprinting, auth, mapping, telemetry.
- **HPC:** **Chapel**, **Haskell**. Performance-oriented systems and property-based testing.

Research:

- **Reverse Engineering & Binary Analysis:** **Ghidra**, **Frida**, **Zig** — firmware RE and NVMe controller recovery via USB bridge XRAM injection (§4). 5,400 LOC Zig tool for bypassing ASMedia ASM2362 opcode whitelists.
- **Heterogeneous Compute:** **WebGPU**, **Futhark** (GPU-targeting functional language), deeper WASM integration and WASM-native inference pipelines.
- **Functional Programming:** ESDT Monads and pixelwise classification research ([pixelwise-research](#)). **Rust** (SIMD), **Nix** (build systems).

Systems Analyst (DevSecOps) @ Bates College

(2024–Present)

Scalable enterprise systems supporting staff, faculty, and ILS team. Legacy modernization; bespoke Ansible extensions/roles/plugins; 24/7 CVE mitigation; SAML and application interoperability; OpenTelemetry reporting; CI/CD pipelines (GitLab AutoDevOps, OpenTofu, RKE2 + Rancher); leading IaC adoption college-wide.

Noteworthy projects:

- Developed high performance orchestrator and instrumentation tooling for degree management and degree auditing software in **Haskell + Python** (QuickCheck, Cabal, podman-compose for development, FPM for packaging and autodevops for CI/CD); uplifted “unautomatable” 1980s morris-worm era code unique to higher ed into a verifiable, traceable, k8s friendly workload
- Overhauled and completely automated the lifecycle of our event management system (extensive development in **C#**, **Go**, **Ansible**)
- Led adoption of horizontally scalable **Apache Solr** instances for multiple public and private indexing and search applications

- Led adoption and built out numerous internal ACME-first certificate management and DNS libraries, templates and tooling
- Extensive work and peer education around enterprise secret management patterns and SAML at the college. Developed numerous SAML integrations, LTI integrations, Shibboleth and led adoption of [KeePassXC](#) as part of a declarative Ansible workflow.

Fabrication Laboratory Manager @ Cornell CALS (2021–2022)

Developed and taught rapid fabrication curricula. [OpenSCAD](#), [Fusion 360](#), [Inkscape](#), [C++](#). [GitHub/Linear](#) project management.

Computer Vision Software Engineer @ Macaulay Library, Cornell Lab of Ornithology (2018–2022)

Developed & launched [Merlin Sound ID](#), a production fine-grained audio classification system now used by millions worldwide. Led R&D on internal ML annotation tooling, model evaluation APIs, and end-to-end MLOps pipelines. Built real-time inference demos deployed at scale.

Stack:

- **Model Training:** Python ([TensorFlow](#), [NumPy](#), [Pandas](#), [Matplotlib](#), [Jupyter](#))
- **Web & Inference:** [Flask](#), [TypeScript](#), [React](#), [Vue](#), [Docker](#), [WebAssembly](#), [React Native](#), [Swift](#)
- **Infrastructure:** [EC2](#), [Heroku](#), [BitBucket](#) CI/CD, production model deployment at scale

Volunteer & Community

First Fellow @ D&M Makerspace, Plymouth State University (2017–2020)

Taught **Advanced GIS Programming & Intro to Electromechanics**. COVID-19 response: coordinated regional makerspace network for medical PPE manufacturing.

Membership Chair & 3D Printing Captain @ Ithaca Generator (2020–2022)

Led 501(c)(3) makerspace through rapid growth; coached hundreds via “Fusion 360 for 3D printing” series.

Business Ventures

Tinyland.dev, Inc (github.com/tinyland-inc) (2024–present)

Agent orchestration platform for semiautonomous infrastructure lifecycle management in higher education. Bootstrapped and in stealth; targeting source-available / zlib dual licensing.

Scope: 5 bespoke SLMs, 100+ autonomously callable tools, full IaC lifecycle coverage via a multicloud harness. Horizontal scaling with Chapel-based parallelism. Kubernetes-native architecture with Liqo-based multicloud topology.

rox.d.ai — ML/AI research arm. Bespoke SLM development, property-based testing of agent systems, and multi-cloud federation research. Chapel, Python, Go.

Previous: **Columbari.us LLC** (2017–2021) — GIS & ML contracting for UNH, NH municipal, Cornell. HPC hackerspace venture (2021–2024).

Publications

Reitsma, L.R., Burns, C., & **Sullivan, J.** (2019). *Poecile atricapillus* (Black-capped Chickadee) Feeding *Catharus guttatus* (Hermit Thrush) Nestlings. *Northeastern Naturalist*, 26(2). [doi:10.1656/045.026.0213](https://doi.org/10.1656/045.026.0213)

Sullivan, J. (2026). Recovering Write-Protected NVMe SSDs Through USB Bridge XRAM Injection: Bypassing the ASMedia ASM2362 Firmware Opcode Whitelist. transscendsurvival.org/papers/recovery-paper.pdf

Presentations:

Sullivan, J. (2019). Web GIS: Telling Stories & Solving Problems. *Association of American Geographers Annual Meeting*, Washington, DC.
