Jess Sullivan

Full Stack Engineer · DevSecOps · Computer Vision · Kernel & Security Research · ML/HPC
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Languages	ML/AI & HPC	Systems & Security	Infrastructure
Python	Fine-grained classification	GhidraScript	Nix, Bazel
TypeScript, Rust	TensorFlow, pandas	Frida, ILSpy	OpenTofu, Ansible
Zig, Chapel, Haskell	NUMA-aware horizontal parallelism	Mitre Caldera	RKE2 (k8s)
Go, C++, R, Shell	Realtime model evaluation & SLM inference	SAML, OAuth, TOTP	GitLab AutoDevOps

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**, **rspamd**, **Chapel-lang**, **numtide**/nix-vm-test, **manaflow-ai**/cmux, **diku-dk**/Futhark, **xCaddy**, **libdns**, Skeleton UI, **Klipper**, **Joplin**, **FFT.js**, **KeePassXC**, svelte-superforms, **ShikiJS**, **ggplot2**, the **Rocky Enterprise Linux Foundation**, **Liqo**, **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 (§3).
- 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. Auth, scheduling, mapping, telemetry and site systems including this SvelteKit repo, `tinyland-auth`, `scheduling-kit`, and `scheduling-bridge`.
- **HPC:** `Chapel`, `Haskell`. Performance-oriented systems and property-based testing.

Research:

- **Reverse Engineering & Binary Analysis:** `GhidraScript`, `Frida`, `ILSpy`, Mitre Caldera, `Zig`. Firmware RE and NVMe XRAM recovery (see §3).
- **Author of numerous Zig capability libraries** with C ABI surfaces: `zig-crypto` (docs), `zig-notify` (docs), `zig-keychain` (docs), `zig-ctap2` (docs).
- **linux-xr** — Rocky Linux 10 RPM kernel lane carrying XR display patches and Dirty Frag security backports. Backported **CVE-2026-31431**, **CVE-2026-43284**, and **CVE-2026-43500** into 6.1.y ahead of public disclosure.
- **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.

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

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

Presentations:

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