



Jess Sullivan

Cover Letter, Resume, Fun Facts, Projects

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My name is Jess Sullivan— I am a full stack engineer, musician and birdwatcher, currently based in Lewiston, ME & Boston, MA. Find below a cover letter highlighting my recent and current activities and an up-to-date technical resume.

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Full Stack Contracting and FOSS

Long term committer, member and supporter of numerous organizations including the **Rocky Enterprise Linux Foundation**, [rspamd](#), [Chapel-lang](#), [KeePassXC](#) (ongoing security bug fixes and contributions to the macOS build and test coverage), [nixpkgs](#), [numtide/nix-vm-test](#), [manaflow-ai/cmux](#), [charmbracelet/crush](#), [diku-dk/Futhark](#), [Liqo](#), the **Apache Foundation**, [xCaddy](#), [libdns](#), Skeleton UI, [Klipper](#), [Joplin](#), [FFT.js](#), [svelte-superforms](#), [ShikiJS textmate-grammars-themes](#), [ggplot2](#), and [QuickChpl / Mason](#), along with the creation of numerous FOSS automation tools and GIS utilities.

Systems & kernel research — Ongoing engagement with the **Rocky Enterprise Linux Foundation**, carrying a Rocky 10 / 6.1.y-rt PREEMPT_RT kernel sub-lane with backports of **CVE-2026-31431** ([algif_aead Copy-Fail](#)), **CVE-2026-43284** (Dirty Frag / [xfrm-esp](#), CVSS 8.8) and **CVE-2026-43500** (Dirty Frag / [RxRPC](#)). Original 2026 hardware-recovery research on USB-bridge **XRAM injection** for firmware write-protected NVMe SSDs (§5). Concurrent Rust systems work on an encrypted sync filesystem (Linux FUSE + macOS FileProvider) anchored on XChaCha20-Poly1305 + Argon2id, FastCDC content-defined chunking, BLAKE3 hashing, zstd compression, and NATS JetStream-backed fleet sync.

- Extensive technical work with startups and hardware projects including **Adaptive Motorsport** (2018); long thread of personal HID, XR, and sensor-fusion side projects
- Developed web GIS tools used by the **National Park Service**, **Foundation for Healthy Communities**, **GPRED**, the **Northern Border Regional Commission**, presented at the 2019 **AAG Annual Meeting** in Washington, DC (§5)

- **Machine Learning** with [MushroomObserver.org](#) and **Visipedia**: Collaborated on the development and adoption of fine-grained image classification models among crowd-sourced community science niches
- **Expanded client list** on request. Current clients include the entire business stack for [MassageI-thaca.com](#) (grown through four business expansions over 3 years!), **Rossel & Co**, Tetrahedron Services, R&D for TimberBuddy hydraulic sawmill systems, many more.

My current stack & technologies:

- **Web & product**: SvelteKit Runes, Bun, Vite 8/Rolldown, TypeScript (TS7), Tailwind CSS, Skeleton UI, Effect TS, Postgres, FingerprintJS; auth, scheduling, mapping, and site systems.
- **Operations & observability**: Tempo/Grafana, Caddy, Tailscale Operator, on-prem RKE2, Podman Compose.
- **Infrastructure**: Nix flakes, Bazel RBE, justfile, OpenTofu, sops+age, Ansible.
- **Systems & research**: Chapel, Rust, Zig, Haskell, Futhark, GhidraScript, Frida, ILSpy, Caldera, Wireshark.

Research:

- **Reverse Engineering & Binary Analysis**: [GhidraScript](#), [Frida](#), [ILSpy](#), Mitre [Caldera](#), [Zig](#) — firmware RE and [NVMe XRAM recovery](#) (see §5).
- **Author of numerous Zig capability libraries** with C ABI surfaces and cross-platform builds: [zig-crypto \(docs\)](#), [zig-notify \(docs\)](#), [zig-keychain \(docs\)](#), and [zig-ctap2 \(docs\)](#).
- **linux-xr** — Rocky Linux 10 real-time (PREEMPT_RT) 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.
- **Functional & Heterogeneous Compute**: [Futhark/WebGPU](#), ESDT monads, fine-grained classification systems, [Rust SIMD](#), [Nix](#) build systems, deeper WASM integration, and WASM-native inference pipelines.
- **Always building**: Hey! I am *always* hacking, learning, building, reading, and tinkering. Day in, day out, this is what I do. For a more up-to-date view into what I am up to whenever you are reading this document, I invite you to explore my [blog](#), recent commits on my [personal GitHub](#), and the [organization](#).

Technical Resume

Computer Vision Software Engineer @ Macaulay Library

(2019–2021)

Developed & launched **Merlin Sound ID** & The Machine Learning Blog @ Macaulay Library. Worked on the R&D and implementation of internal fine-grained machine learning annotation tools for audio classification. Built internal classification and model evaluation web APIs. Streamlined Macaulay Library MLOps and asset ingestion pipeline.

My stack:

- **Model Training:** Python (`tensorflow`, `numpy`, `pandas`, `matplotlib`, `JUPYTER`)
- **Web & training annotation stack:** Flask & TypeScript (`fft.js`, Leaflet, React, Vue, Node, Docker, WebAssembly, Purr), live demos written in React Native and Swift
- **Training and development Infra:** Project managed in Confluence + BitBucket, hosting on EC2 & Heroku

Fabrication Laboratory Manager for the Landscape Architecture Makerspace @ Cornell CALS

(2021–2022)

Developed and taught rapid fabrication curricula for DLA students and faculty.

My stack:

- `OpenSCAD` & `Fusion 360`; `Inkscape` for vector work. Some tiler development with TAs in `C++`.
- Project management in GitHub & Linear. Built a small Discord ticketing system and OBS printer monitoring system.

Systems Analyst (DevSecOps) @ Bates College

(2024–Present)

Building and maintaining reliable, scalable enterprise systems directly supporting staff, faculty and the technical ILS team. Responsibilities include the maintenance and modernization of legacy systems; the development of bespoke Ansible extensions, roles, and plugins; 24/7 availability for CVE mitigation; SAML and application interoperability integration work; Open Telemetry and reporting development; the development of CI/CD pipelines (extensive work in GitLab AutoDevOps, OpenTofu and RKE2 + Rancher clusters) as well as leading IaC adoption across the College. I enjoy a fair amount of autonomy, and can be found wriggling across a wide variety of languages, projects and epics throughout any given week.

Noteworthy projects include:

- Built a property-based orchestrator and instrumentation harness for 1980s-era degree-management C in `Haskell` + `Python` (`QuickCheck`, `Cabal`, `podman-compose` for dev parity, `FPM` for packaging, `AutoDevOps` for CI/CD); turned an unautomatable legacy codebase into a verifiable, traceable, k8s-friendly workload.
- Overhauled and automated the event-management lifecycle (`C#`, `Go`, `Ansible`).
- Led adoption of horizontally-scalable `Apache Solr` instances across multiple public and private indexing and search applications.
- Built out internal ACME-first certificate-management and DNS libraries, templates, and tooling.
- Drove enterprise secret-management practice and authentication / authorization college-wide; developed multiple SAML, LTI, Shibboleth, and bespoke TOTP / OAuth integrations; led adoption of `KeePassXC`, `firewalld`, and `fail2ban` inside declarative Ansible workflows; `OTEL` / `LGTM` / `Tempo` telemetry stack in production.
- Carry a private Rocky 10 real-time (`PREEMPT_RT`) kernel sub-lane for scientific / HPC experimentation, including locking-context audits and the Dirty Frag CVE backport set against 6.1.y LTS

(§1 for the underlying CVE work).

Volunteer, Community Involvement and Board Positions

First Fellow @ the D&M Makerspace at Plymouth State University (“PSU”) *(2017–2020)*

- Taught **Advanced GIS Programming & Intro to Electromechanics** at PSU
- Coordinated the development and manufacture of ventilators, shields and positive pressure masks with makerspaces throughout New England at the onset of the COVID-19 pandemic; worked with the Artisans Asylum (Cambridge, MA) and the NH hospital system to deliver 3d printed and lasercut medical supplies, used and distributed throughout the state.

Membership Chair and 3d Printing Captain of the Ithaca Generator (“IG”) *(2020–2022)*

- Led IG, a local 501(c)3 non-profit Makerspace through a period of rapid growth, profitable outreach and massive educational expansion
- Coached hundreds of students through my popular, portable & public-facing “**Fusion 360 for 3d printing**” class series throughout New York

Ventures

Columbari.us LLC

(2017–2021)

Independent contractor / contributor business while in the GIS & ML space. Fully insured and registered in both NH and NY. Structured solely to better negotiate contracts with UNH, NH municipal works and later Cornell.

Moonlight Coworking LLC

(2021–2024)

Formed in NY to raise capital and interest in a for-profit hackerspace with a focus on mathematics and high performance computing alongside my nonprofit work leading the Ithaca Generator; shelved due to move to Maine.

Tinyland, Inc (github.com/tinyland-inc)

(2024–present)

Agent orchestration platform for semiautonomous infrastructure lifecycle management in higher education. Bootstrapped and in stealth; source-available where appropriate. Infrastructure flywheel work spans [GloriousFlywheel \(docs\)](#), [blahaj](#), [lab](#), [tinyland-auth](#), and the [Tinyland Bazel registry](#).

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

First recorded instance of interspecific parental feeding between these two species, documented at Plymouth State University. Field observation and video documentation of a Black-capped Chickadee provisioning Hermit Thrush nestlings over sustained periods, resulting in successful fledging.

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

Novel technique for recovering firmware write-protected NVMe SSDs over USB by injecting NVMe Submission Queue entries directly into the ASMedia ASM2362 bridge controller's internal XRAM via vendor SCSI commands, bypassing the bridge's opcode whitelist. Demonstrated successful recovery of a Phison PS5012-E12 based SSD from permanent silent-write-failure mode using Sanitize Block Erase via XRAM injection and PCIe TLP doorbell signaling.

Presentations

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

Presented community-driven GIS mapping and Photovoice methods for youth recreation access in New Hampshire, alongside avian field research tools built with R, Shiny, and GDAL for KML/CSV/SHP data conversion and centroid analysis of banded bird territories. Work conducted in collaboration with the National Park Service, Foundation for Healthy Communities, GPRED, and Northern Border Regional Commission.

Some More Fun Facts About Me and My Eclectic Work History

Professional Photography

Commercial photography business— paid my way through my undergraduate degree!

- I cut my teeth professionally with the **world renowned aerial photographer Alex Maclean** and with **Mike Nyman Wedding Photography** prior to going into business as **J.S. Event Photography**.
- **I wrote** (and taught for three years!) **the youth photography curriculum** at the **Joppa Flats** and **Drumlin Farm** Mass Audubon Wildlife sanctuaries, **programs still going strong** to this day!
- Some public clients and superlatives of this chapter of my life included **extensive** work for the **corporate branding offices** of the **YMCA**, The **Watertown Savings Bank**, photography and videography for the **YCCA** youth programs, **FUUSN** and serving as the **Staff Photographer for MCCS @ PSU** among others.
- My work has been featured, displayed and sold at numerous photo shows, venues and art sales throughout New England, including many shows with **Celebrate Newton**, The **Newton Public Library**, The **Pease Public Library** in NH, **Newtonville Cinema**, **Just Next Door Card Shop**, The **Newton Camera Club**, **Broadmoor Wildlife Sanctuary**, featured in the **Newton Tab newspaper** and many others.
- I did much of my own printing with a heavily modified inkjet printer. **Was completely burnt out** from photography by the end of 2017 or thereabouts, sold all my gear by the end of college.

Bartending, Music and Bagels

I am a multiinstrumentalist and am usually practicing guitar or organ when I am not writing code or looking for birds outside.

- I have played guitar pretty seriously for over 20 years; I currently play a custom 9 string electric guitar made for me in NH and a 12 string acoustic.
- I've been playing the piano for over 25 years; my keyboard playing these days is primarily on my wacky rotary Yamaha organ.

I enjoy bartending, baking and music as social hobbies, adjacent to my oddball enthusiasm for esoteric spirits, distilling technologies, gluten and rock & roll. As such, I've held a number of delightful evening bartender & bakery positions:

- I was an evening bartender and event organizer at **Modern Alchemy Game Bar** in Ithaca. I organized and hosted monthly Goth Nights, art shows and many other private functions for various organizations I've been affiliated with in this cozy board game bar.
- I was a bartender at **The Downstairs** Listening room & Tavern as well as at **the Watershed** in New York.
- I was a casual Bagel Baker at Tandem Bagel Co in Northampton MA throughout the Spring of 2024. I made many terrific friends here and learned a great deal about baking professionally.

If there were no computers I'd probably be a baker, a minstrel or a bard.

