

Jason Cusati

✉ djjay@vt.edu 📞 202.596.2477 ✉ @djjay0131 🌐 jason-cusati
🔗 djjay0131 🌐 djjay0131.github.io/website 🎓 Google Scholar

PROFESSIONAL SUMMARY

- PhD candidate in Computer Science (SE with AI/ML/MI) at Virginia Tech, focused on the empirical methodology of evaluating LLM behavior and accumulating verifiable safety claims. Two papers on evidence-based reasoning in GenAI tools and knowledge accumulation in software engineering research (**ICSE 2026**; arXiv preprint). Background combines hands-on ML/LLM application work — LLM-assisted code generation, ML-driven incident prediction, behavioral evals — with **20+ years of secure-software delivery** (CSSLP-certified, recent mesh-VPN/2FA platform hardening at Virginia Tech's ARCADE Lab).

PROFESSIONAL EXPERIENCE

- 2024 – Present • **Virginia Tech — Blacksburg, VA** *Doctoral Researcher — Software Engineering with AI/ML/MI*
- Researching **LLM-curated knowledge graphs** as a provenance substrate for evidence-based research progression — studying how agent-orchestrated curation (Navigator / Extractor / Continuation) improves faithfulness of downstream LLM responses compared to LLM-generated KGs.
 - Investigating **LLM-curated KGs** as engineering-knowledge substrates (construction-domain material takeoff), with an emerging **VVUQ** layer for reproducibility of engineering-simulation claims.
 - Coauthored **Verification, Validation, and Predictive Uncertainty Quantification of an Euler-Bernoulli Beam Finite-Difference Model** (AOE/CS/ME 6444, Spring 2026; advisor Dr.~Christopher Roy; coauthor Cheng-Shun Chuang) — planned extension into a reusable VVUQ framework for engineering simulation.
- April 2026 – May 2026 • **Virginia Tech — Blacksburg, VA** *Graduate Research Assistant – ARCADE Lab (PI: Dr. Afsari)*
- Designed and built cloud infrastructure for the **Multi Robot System (MRS)** for Remote Construction Progress Monitoring, including network architecture, mesh VPN, REST API, and Web UI.
- 2024–2025 • **Yoh, A Day & Zimmerman Company — Remote, SC** *ADF Solution Architect – Core Specialty Insurance*
- Led a small SDE team delivering V1 of an **Insurance Data Ingestion Platform** for a specialty carrier: extended Microsoft's Common Data Model into a domain schema for the carrier's data types; reduced time-to-ingest by **50%**.
 - Used **Claude as engineering partner** to scaffold pipeline code and generate ADF source-to-target mappings; hand-implemented the more complex transformation and validation logic.
 - Architected and implemented an API to orchestrate Azure Data Factory pipelines and data flows.
- 2021–2023 • **Duck Creek Technologies — Columbia, SC** *Senior Technical Architect – OnDemand SaaS Operations*
- Developed Python algorithm to predict Sev 1 incidents from logs.
 - Coordinated in PEN testing and consulted on risk mitigation options for pre go-live security assessment.
 - Earlier employment history includes tenure as Principal Engineer – Sustained Engineering, Blackbaud; Solution Architect – Enterprise Professional Services, Blackbaud; Software Engineering Consultant, DJJayNet Consulting; Chief Architect, LimeLeap Solutions; Director of Professional Services, LimeLeap Solutions.

EDUCATION

- 2027 (exp.) • **Ph.D., Computer Science (SE with AI/ML/MI)**, Virginia Tech, Blacksburg, VA
- 2026 (exp.) • **M.S., Engineering**, Virginia Tech, Blacksburg, VA
- **Master of Information Technology**, Virginia Tech, Blacksburg, VA
 - **B.S., Economics**, Virginia Tech, Blacksburg, VA

RESEARCH PUBLICATIONS

JOURNAL ARTICLES

1. **J. Cusati** and C.-S. Chuang, "Virginia tech transportation safety index (vtttsi)," *arXiv preprint arXiv:2606.21154*, 2026.
🔗 <https://arxiv.org/abs/2606.21154>.
2. C. Brown and **J. Cusati**, "Exploring the evidence-based se beliefs of generative ai tools," *arXiv preprint arXiv:2407.13900*, 2025.
🔗 <https://arxiv.org/abs/2407.13900>.

1. **J. Cusati** and C. Brown, “From papers to progress: Rethinking knowledge accumulation in software engineering,” in *Proceedings of the IEEE/ACM 48th International Conference on Software Engineering (ICSE 2026)*, Accepted; to appear, 2026.
 <https://doi.org/10.1145/3793657.3793888>.

SELECTED PROJECTS & RESEARCH

- **Multi Robot System — Cloud + Edge Architecture (VT ARCADE Lab)**  — Designed and built the cloud-and-edge architecture for the ARCADE Lab’s Multi Robot System for remote construction-progress monitoring: Google Cloud (REST API + web apps), Tailscale mesh VPN for robot networking, Raspberry Pi edge nodes handling internal VPN routing and onboard video encoding, 2FA-hardened Web UI. Architecture completed and proven in a 5-week GRA appointment; **Claude used as engineering partner throughout**.
- **VTTSI — LLM-Adaptive Intersection Safety Scoring** — Distributed rewrite of a CS6604 traffic-safety application: provenance-tracked evidence ingestion (NWS weather, VDOT/511 cameras) → deterministic RT-SI + MCDM baselines → **Claude Opus** adaptive adjustment with grounding guardrails and deterministic fallback → honest-null ablation eval (Spearman / Pearson). Python ports-and-adapters microservices; live-Claude integration wired; ~97% offline coverage.
- **Agentic Knowledge Graphs for Research Progression**  — Orchestrated agent system (Navigator / Extractor / Continuation) building an **LLM-curated research KG** — problems, assumptions, constraints, evidence spans, datasets, metrics — as the provenance substrate for downstream research-assistant responses. Denario agent framework; Python / FastAPI; staging deployed on Cloud Run. Approaching experimental comparison against LLM-generated KGs.
- **Construction-AI: LLM- and KG-backed Material Takeoff**  — Web app parsing architectural drawings (DWG / DXF / PDF), extracting geometry via PyTorch / OpenCV / EasyOCR, producing JSON material takeoffs with OR-Tools cut-list optimization backed by a Neo4j **LLM-curated KG**. Phase 1 MVP deployed on Cloud Run; Phase 5 in progress adds a **VVUQ** (verification / validation / uncertainty quantification) layer for engineering-simulation reproducibility.
- **Security Vulnerability Classifier** — Repository scanner classifying code against CVE mappings.

TECHNICAL SKILLS

AI/ML

- scikit-learn; TensorFlow; KNN; RNN; CNN; LSTM; LLM; SVM; Linear Regression; Random Forest; Naive Bayes; Feature Engineering

LANGUAGES

- Python; C#; Java; JavaScript; Bash; PowerShell; T-SQL; C++; Node.js

TOOLS

- Azure; AWS; Docker; FastAPI; Streamlit; PostgreSQL; SQL Server; VS Code; PyCharm; Wireshark

PLATFORMS

- Windows; Linux; IIS; Apache; Tomcat