

KEVIN WILLIAMS

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TECHNICAL SKILLS

AI/ML Systems: PyTorch, TensorFlow, LLMs, RAG, Transformers, Hugging Face, CLIP, FAISS, LangChain, Vector Databases, AI Certification & Governance, Autonomous System Verification, Data Intelligence Pipelines

Safety & Evaluation: Membership Inference Attacks, Differential Privacy (DP-SGD/Opacus), Adversarial Robustness, Red-Teaming, Requirements Traceability, V&V

Engineering: Python, SQL, JavaScript, Django, Flutter, MySQL, Git, AWS, FastAPI, Docker

Methods: Black Belt Six Sigma, Requirements Traceability, Systems Lifecycle (V&V), MBSE, CAD

PROFESSIONAL COMPETENCIES

AI Safety Evaluation Design • System Engineering • AI Integration in Safety Critical Environments • CrossFunctional Collaboration

EXPERIENCE

Software Engineer — Barrios Technology Feb 2025 – Present

- Architected and deployed Cortex, a SQL-backed enterprise data platform that replaced multiple legacy SharePoint workflows with a unified system for operational data management, business intelligence extraction, and cross-team reporting
- Designed dynamic schema architecture (Entity-Attribute-Value pattern) enabling non-technical users to define custom data structures without code changes, reducing IT backlog by ~40%
- Built intelligent validation pipelines that transform unstructured inputs into validated, structured data improving downstream analytics accuracy by ~30%
- Developed cross-platform Flutter application automating report generation, eliminating ~20 hours/week of manual formatting across multiple teams

AI System Engineer — Human Space Flight — NASA Johnson Space Center Oct 2023 – Feb 2025

- Pioneered first-generation AI safety certification framework for human-rated spacecraft, establishing measurable safety and reliability standards now guiding AI deployment across 2+ Artemis mission elements
- Designed and executed evaluation coverage analysis mapping AI-specific requirements to NASA software engineering standards (NPR 7150.2), identifying gaps and ensuring verifiable compliance pathways for autonomous systems
- Developed applied threat models for AI integration into crewed missions, systematically assessing failure modes and balancing autonomous capability with crew safety requirements across multiple commercial programs
- Executed full systems engineering lifecycle requirements development through verification testing for missioncritical systems using MBSE methodologies
- Published open-source AI Requirements framework formalizing evaluation criteria for human-AI teaming in spaceflight

Engineering Specialist — Ford Motor Company Jun 2022 – Sep 2023

- Led eMotor materials laboratory team of 20, establishing testing protocols and quality standards for electrified powertrain programs
- Developed and deployed deep learning models for automated quality decisions, reducing manual inspection time by ~90% and earning Ford Technical Excellence Award
- Designed end-to-end computer vision pipeline combining Kalman filtering with PyTorch deep learning models for quantitative surface measurement on stator cross-sections
- Created automation scripts replacing hundreds of manual engineering workflows, improving testing accuracy across eMotor validation programs
- Coordinated with tier suppliers and cross-functional teams to resolve integration challenges in electrification vehicle development

Research Assistant — *University of Michigan*

Sep 2019 – Jun 2022

- Developed novel electrochemical detection method for $\Delta 9$ -THC (1–20 μM) achieving 0.13 μM limit of detection with $R^2 = 0.995$ —third-lowest detection limit among comparable SPCE devices
- Published peer-reviewed findings demonstrating viability for in-field law enforcement applications

Materials & Chemical Technician — *Hyundai-Kia, General Motors, Quaker Chemicals*

2012 – 2017

Metallurgical analysis, material validation, and quality testing across automotive OEMs. Established GM Flint Engine metallurgical lab; led supplier corrective actions at Hyundai-Kia; trained personnel on QA protocols.

RESEARCH PROJECTS

Privacy-Preserving Cognitive Twin: Membership Inference Attacks & Defenses

M.S. AI — CIS 545

- Designed complete adversarial evaluation pipeline studying model vulnerability to membership inference attacks (confidence-based, label-only, and shadow model variants)
github.com/kevinjohnwilliams/CIS_545_Project
- Implemented and benchmarked three defense strategies—DP-SGD (via Opacus), Model Confidence Exclusion, and a fusion defense—sweeping ϵ values to empirically map privacy–utility tradeoffs
- Produced structured evaluation coverage analysis comparing baseline vs. defended models across attack success rate, AUROC, accuracy, and calibration metrics

μ Struct — AI-Powered Microstructure Identification System

Personal Project

- Built ensemble classifier combining CLIP zero-shot inference with FAISS similarity-weighted voting across 6,000+ micrographs, live demo: kevwil-microstructure-classifier.hf.space
- Designed and validated grading accuracy methodology evaluating ensemble weighting (40/60 zeroshot/similarity split) against ground-truth phase labels across 16 steel microstructural phases
- Productionized into FastAPI backend with Docker deployment on Hugging Face Spaces; REST API for retrieval, classification, and evaluation

Disaster Infrastructure Damage Recognition via Computer Vision

M.S. AI — CIS 583

- Developed CNN-based binary classifier (disaster/non-disaster) for infrastructure damage assessment in postevent aerial and ground imagery
- Conducted empirical evaluation of model performance metrics to establish classification confidence thresholds for first-responder deployment readiness

EDUCATION

M.S. in Artificial Intelligence — University of Michigan (Expected May 2026)

B.S. in Mechanical Engineering — University of Michigan (2021)

PUBLICATIONS

Differential pulsed voltammetry of $\Delta 9$ -THC on disposable screen-printed carbon electrodes: A potential in-field method to detect $\Delta 9$ -THC in saliva (2023)

AWARDS

Ford Technical Excellence: Implementation of Deep Learning Model Technology for Quality Decisions

NASA Silver Bear: Certification of Artificial Intelligence on Human-Rated Space Flight Systems