Michael Poplin

Product Engineer | ML & Data | E-commerce & Retail Systems

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Summary

Product engineer with 15+ years shipping e-commerce and retail systems — web platforms, distributed architectures, ML/data infrastructure, and analytics. Track record spanning platform architecture, predictive modeling, cross-functional leadership, and production operations in highly regulated environments. M.S. candidate in Industrial & Systems Engineering at Montana State University with graduate training in statistical modeling, regression, and design of experiments; published research applying computational methods to healthcare and neuroscience (IEEE, IISE, HFES).

Technical Expertise

Platform Architecture & Systems Design
- Distributed systems architecture (microservices, event-driven, RabbitMQ, MQTT)
- API design and third-party system integration (compliance, ERP, payment, CMS)
- Database architecture and optimization (PostgreSQL, MySQL)
- Serverless and edge computing (AWS Lambda, Vercel, CloudFlare)
- System reliability and performance optimization

Software Development
- JavaScript/TypeScript ecosystem (Next.js, React, Node.js)
- Python (data pipelines, automation, predictive modeling, ML applications)
- Elixir/Phoenix (API development, admin interfaces, background workers)
- PHP (legacy systems, API development)
- Mobile development (Cordova, Java, Cocoa; AppleTV, kiosk systems)
- Real-time systems (WebSockets, chat, live updates)

Data Engineering & Machine Learning
- ETL pipeline development and data modeling (Apache Airflow, batch processing)
- Predictive modeling and recommender systems (embeddings, cosine similarity, autoencoders)
- Statistical modeling and hypothesis testing (regression, DOE, A/B testing)
- Computer vision and media processing (MediaPipe, OpenCV, OCR)
- Time-series analysis (EEG, audio synchronization, multimodal data)
- Marketing attribution and revenue optimization

Tools & Platforms
- Languages: Python, SQL, JavaScript/TypeScript, Elixir, PHP
- ML/Data: PyTorch, scikit-learn, pandas, NumPy, SciPy, Jupyter
- Pipeline & Orchestration: Apache Airflow, pgvector, ETL automation
- Infrastructure: PostgreSQL, AWS (Lambda/S3), Docker, GitHub Actions, CircleCI
- CV/Media: OpenCV, MediaPipe, pytesseract, pdfplumber

DevOps & Infrastructure
- Cloud platforms (AWS, Vercel)

- Containerization and deployment (Docker, Nginx, serverless)
- CI/CD pipeline design and implementation (CircleCI, GitHub Actions)
- Observability and monitoring (Datadog, logging, alerting)
- Linux systems administration

Leadership & Research
- Technical leadership: architecture review, code review, engineering standards, mentorship
- Cross-functional collaboration with product, marketing, operations, and executive stakeholders
- Product strategy, roadmap development, and requirements gathering
- Technical due diligence and strategic vendor management
- Grant writing and federal funding proposals
- Technical writing, conference presentation, and peer review
- User research and human factors analysis

Professional Experience

Systems Engineer | Publicly Traded Multi-State Retailer | Remote
April 2022 - Present

Technical lead for web platform serving publicly traded multi-state retail operator (20+ locations, 5+ brand properties, highly regulated compliance environment).

- Architected product recommendation system using autoencoder embeddings and cosine similarity matching; built ETL pipeline with Apache Airflow processing 3,000+ lab documents via OCR (pytesseract, pdfplumber) into pgvector database; trained on 150K+ product dataset
- Architected serverless, statically-built CMS integration serving multiple brand properties with edge caching
- Led team of 3 engineers through full project lifecycle: code reviews, architectural guidance, technical mentorship
- Drove third-party vendor integrations from technical evaluation through contract negotiation and production deployment
- Built HubSpot CRM integration for wholesale team: serverless functions syncing B2B order data to deals, React UI extension, caching layer with exponential backoff retry logic, automated tampering detection for line item integrity
- Setting engineering priorities and technical roadmap in partnership with product/marketing leadership; translating business objectives into technical execution
- Established engineering standards and deployment practices across the web platform

Research Engineer | Montana State University BioReD Hub | Bozeman, MT
August 2024 - Present

Research engineer for Montana State University's Biomedical Innovation for Research and Development Hub (BioReD Hub), an interdisciplinary center advancing life-saving technologies through engineering, neuroscience, nursing, and computer science collaboration.

- Establishing software engineering standards in research environment: version control, testing, documentation, reproducibility, code review
- Contributing to statewide trauma network proposal addressing Montana's rural healthcare access challenges (competing for Department of Health and Human Services $50B rural health funding)
- Architecting EMS coordination platform prototype: real-time hospital capacity APIs, predictive routing, satellite failover for rural coverage
- Built end-to-end ML pipeline for EEG/ERP analysis: signal preprocessing, feature extraction, and predictive modeling for autism and ADHD research
- Developed Python-based CV/audio segmentation system achieving sub-frame precision (<2ms alignment) for multimodal synchronization; accepted to IEEE ACDSA 2026
- Conducting statistical analysis across multiple studies using regression, ANOVA, and experimental design (n=50+ participants)

- Building interactive data collection system capturing behavioral and biometric signals for pediatric research
- Contributing to post-sternotomy recovery protocol optimization research in partnership with Billings Clinic
- Authoring grant proposals for healthcare systems optimization and biomedical research initiatives
- Lead author on three peer-reviewed publications; presenting interdisciplinary research findings at national conferences with live technical Q&A

Senior Developer / Technical Lead | Vertically Integrated Retail Company | Denver, CO

July 2016 - April 2022

Technical lead for software engineering at Colorado's largest independent retailer in regulated industry (20+ locations, 300+ employees, highly regulated compliance environment).

- Built SEO architecture achieving #1 rankings for high-value keywords; maintained search dominance for 5+ years driving measurable foot traffic to 23 locations
- Shipped iOS/Android loyalty app (Cordova, native Cocoa/Java) to App Store: points system, check-ins, referral program, push notifications, personalized promotions
- Co-architected RabbitMQ-based microservices platform supporting 20+ retail locations and real-time inventory management for 300+ employees
- Led distributed development team: hiring, code reviews, technical mentorship, engineering standards
- Designed and shipped flagship web property and in-store kiosk experience from scratch
- Core developer on custom Point-of-Sale system: real-time chat functionality, hardware integrations, standalone kiosk deployments
- Built marketing attribution and revenue optimization models tracking customer acquisition across channels
- Designed ETL pipelines integrating data from 10+ systems: compliance, ERP (NAV Dynamics), POS, and retail operations
- Partnered with executive team and department leaders to gather requirements, prioritize initiatives, and translate business questions into technical architecture

Application Engineer | Gaia | Boulder, CO

July 2013 - July 2016

Full-stack developer on streaming media platform serving global audience.

- Led development of AppleTV streaming application from concept to production
- Built analytics integrations tracking user engagement and content performance
- Developed features and data pipelines for web platform using PHP and JavaScript
- Collaborated with product team on architecture decisions and user experience optimization

Earlier Roles

Additional experience in web development: University of Kentucky, Able Engine, and eLink Design (2010-2013)

Education

Montana State University | Bozeman, MT
Master of Science, Industrial & Systems Engineering (In Progress; Expected December 2026)
Coursework: Statistical modeling, regression analysis, design of experiments, machine learning, optimization, queueing theory, human factors and ergonomics
Research Focus: Healthcare systems optimization, rural healthcare access, biomedical data analysis, neurotechnology

Montana State University | Bozeman, MT
Bachelor of Science, Industrial & Management Systems Engineering
Graduated with Honors | GPA: 3.64

Tau Beta Pi Engineering Honor Society | TBP Scholarship Recipient | Tau Beta Pi Treasurer
Founded MSU chapter, Society of Manufacturing Engineers (SME)

Publications

Peer-reviewed work applying computational methods, statistical modeling, and human factors research to healthcare and neuroscience domains.

Lead Author: Poplin, M., Ma, J., Aviles Zuniga, T., Modyanova, N., Johnson, E. A., & McCrory, B. (2025). "Using Electroencephalography to Understand Learning Engagement with User-Centered Human-Computer Interaction in a Multimodal Online Learning Environment." *Proceedings of the IISE Annual Conference & Expo 2025*. [Paper](#)

Lead Author: Poplin, M., Hughes, M., McCrory, B., & Modyanova, N. "Achieving Sub-Frame Precision Speech Segmentation Through Computational Multimodal Analysis: Bridging Neuroscience Requirements with Engineering Solutions." *IEEE Artificial Intelligence, Computer, Data Sciences and Applications (ACDSA) 2026 (Accepted)*. [Paper](#)

Lead Author: Poplin, M., Tafelmeyer, J., Riemann, L.A., Chamberlin, M., & McCrory, B. (2026). "Keep your move in the tube: An evaluation of longitudinal patient outcomes and readiness for change amongst staff." *International Symposium on Human Factors and Ergonomics in Health Care, New York, NY*. (Abstract accepted).

Professional Certifications

Fundamentals of Engineering (FE) — Passed 2025