

Heather Leffew, PhD

Data Science & Machine Learning Leadership | Enterprise AI Strategy | ML Systems Architecture & Team Building

Executive Data Science and ML Systems Architect with 20+ years leading enterprise AI strategy, digital transformation, and behavioral research. Proven builder of scalable Machine Learning and NLP systems that delivering multi-million-dollar outcomes. PhD Psychologist with specialization in quantitative predictive linguistics and the design of sound, responsible, rigorous, and ethical AI frameworks for high-stakes and regulated environments. Expert in end-to-end ML Ops, knowledge graphs, reinforcement learning, and agentic solutions to drive organizational impact.

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EMPLOYMENT HISTORY

Director of Data Science, Spokeo

Sep 2025 - Present

Founding technical leader who built and scaled Spokeo's Data Science and AI function, delivering production ML and NLP systems across search relevance, fraud detection, customer intelligence, and data procurement in partnership with ~80 engineers and product leaders across 8+ cross-functional squads.

- Owned the AI operating model with executive leadership, defining an OKR taxonomy and delivery mechanisms to translate strategy into measurable execution.
- Led end-to-end delivery of a proprietary 15-step ML intelligence pipeline combining knowledge graphs, graph ML, and weak supervision for entity resolution and data fusion across ~49TB of multi-vendor data.
- Set production standards for scale and iteration in partnership with engineering, reducing core processing time from 150+ hours to 24–36 hours and establishing A/B testing and model evaluation practices to support reliable, repeatable releases.
- Improved data procurement decisions by implementing source independence and ablation frameworks to quantify vendor redundancy and ROI.
- Delivered NLP-driven schema discovery via a semantic clustering engine that mapped thousands of vendor columns to 75 canonical attribute types, raising schema discovery coverage to 72%.
- Embedded Responsible AI and a 4-tier regulatory compliance system into the ML lifecycle for compliance-ready deployment.
- Developed recruitment strategy and nurtured a high-performing data science team, reinforcing technical rigor and strong cross-functional partnership.

Full-Stack Principal Data Scientist & Applied Researcher, TikTok USDS | ByteDance

Jul 2022 - Jul 2025

Owned the roadmap for ML measurement and detection capabilities and led cross-functional teams up to 25 (data science, engineering, policy), setting evaluation standards for accuracy, safety, and operational readiness.

- Launched an analytics product suite (text analysis pipeline + multi-signal detection frameworks) processing 1B+ records, improving brand-safety assurance and enabling data-driven content strategy optimization.
- Delivered measurement products identifying 400K+ violative accounts, enabling enforcement on 15K+ accounts without increasing appeals, and reducing manual review effort by 40%.
- Secured dedicated compute capacity and senior stakeholder alignment enabling scalable processing and improving reliability by reducing query failures.
- Leader for analytics as product initiatives, including resourcing for large initiatives, team allocation, hardware upgrades, and procurement of third-party software through enterprise compliance processes.
- Led collaborative research partnerships with educational institutions and research organizations, leading the creation of an industry first external IRB methodology for ethical review and legal approval of research initiatives.
- Deployed organization-wide automated detection systems with 95% accuracy, addressing highest-harm platform issues and protect brand safety and platform integrity.
- Strengthened technical rigor and enforcement of consistent practices via mentorship and coaching on statistics, measurement, methodology, and research design.

Head of Accreditation, National Emergency Responder and Public Safety Center

Nov 2020 - Jul 2022

Led a team of 8 with end-to-end ownership of product development, market analysis, and accreditation compliance for programs serving 1,000+ agencies, with full P&L responsibility.

- Drove B2B client acquisition by authoring winning RFPs, translating agency requirements into clear product scope and partnership strategy.
- Owned vision and roadmap for analytics products, enabling data-driven operational decision workflows targeting retention and expansion.
- Built strategic partnerships with industry-leading organizations to expand reach, strengthen credibility, and scale offerings.
- Presented to government officials and oversight bodies, communicating risk and compliance considerations to guide leadership decisions in regulated environments.

Director of Evaluations and Analytics, Brower Psychological Police and Public Safety Services

Jul 2019 - Jul 2022

Directed three product teams (18 total members), owning delivery of digital psychological assessment products, people analytics platforms, and wellness programs in regulated public safety environments. Set evaluation, quality, and compliance standards while partnering with executive stakeholders and oversight bodies to support trusted deployment.

- Increased operational throughput 5x by leading a digital transformation via cloud-based assessment products, while digitizing end-to-end workflows, improving speed, efficiency, and objectivity.
- Secured \$500K+ in grant funding by building data-driven roadmaps and demonstrating measurable DEI outcomes through proposals grounded in behavioral science and digital innovation.
- Built partnerships with the national regulatory bodies, aligned offerings with regulatory expectations to achieve compliance, accreditation, and endorsements.
- Won RFPs to expand a multi-state client portfolio, translating operational requirements into deliverable scope and driving revenue growth and market expansion.
- Developed predictive analytics for mental health service forecasting, applying evidence-based measurement to guide operational improvements to identify and serve the employees of all client agencies fairly and equitably.

Practicum, Doctoral, and Post-Doctoral Positions, Fielding Graduate University

May 2015 - Jul 2019

Led supervision and training for 12 master's-level clinicians and practicum students across clinical and public safety settings, while conducting research in predictive behavioral analytics and clinically grounded measurement.

- Diagnostic Psychological Evaluations: Cedar Springs Psychiatric Hospital.
- Forensic, Occupational, and Clinical Neuropsychological Assessment: Rocky Mountain Behavioral Health.
- Critical Incident Response, Fitness for Duty Evaluations, Psychotherapy: Brower Psychological Police and Public Safety Psychology.
- Assistant Disaster Coordinator: Comprehensive Clinical Services (Aurora Mental Health Center).
- Teaching Assistant: Theories of Psychotherapy.
- Research Assistant: Clinically Predictive Linguistic Analysis of Thematic Apperception Test Narratives.

Staff Data Scientist, QMS Infotech, Inc.

Mar 2008 - Oct 2019

Developed advanced analytics products to audit private-sector hiring practices, identifying systemic bias and establishing psychometric and statistical standards grounded in regulatory compliance for B2B clients.

- Delivered defensible analytics and audit frameworks enabling HR partners to implement bias-mitigating policies at scale while maintaining psychometric validity and legal compliance.
- Established repeatable statistical modeling practices for audit workflows, producing auditable analyses and actionable recommendations that improved client hiring strategies and diversity outcomes.

Additional Professional Experience

Mar 2002 - Aug 2015

- **Neurotherapist**, Unity Recovery Services, Inc. 08/2014 - 08/2015
- **Benefits Analyst**, Florida Department of Children and Families 06/2013 - 08/2014
- **Consultant**, Hope for Families 06/2013 - 08/2014
- **Professional Compliance**, Broward Sheriff's Office 03/2002 - 03/2008
 - *Led the digital transformation of the agency's comprehensive audit system within Court Services and Emergency Communications.*

SKILLS

Leadership & AI Strategy: Technical Leadership, Artificial Intelligence Strategy, Machine Learning Leadership, Product Strategy & Roadmap, Cross Functional Team Leadership, Team Leadership, People Management, Mentoring & Coaching, Talent Development, Hiring & Recruitment, Performance Management, Organizational Operating Models, OKR Taxonomy Development, AI Governance, Responsible AI, Regulatory Compliance (FCRA), Bias Mitigation, Ethical AI, Stakeholder Management

Machine Learning & Modeling: Machine Learning, Neuro-Symbolic AI, Graph Machine Learning, Knowledge Graphs, Entity Resolution, Entity Hubs, Weak Supervision, Reinforcement Learning, Agentic Systems, LLMs, Language Models, Natural Language Processing, Semantic Clustering, Predictive Modeling, XGBoost, Random Forest, Causal Inference, Ablation Studies

MLOps, Platform & Infrastructure: End-to-End Machine Learning Pipeline Architecture, Model Development, Model Deployment, Model Lifecycle Management, Distributed Computing, Scalable Cloud Infrastructure, AWS SageMaker, AWS Glue, AWS EMR, AWS EC2, Databricks, Delta Lake, Apache Spark, Airflow, Docker, Kubernetes, CI/CD

Advanced Research & Measurement: Experimental Design, A/B Testing, Psychometrics, Source Independence Analysis, Behavioral Typologies, Incrementality Testing, Media Mix Modeling, Lift Studies

Technical Stack & Tools: Python, Pandas, NumPy, Scikit-learn, PyTorch, TensorFlow, Hugging Face Transformers, PySpark, SQL, Scala, Kafka, Hive, Tableau, Power BI, Jira API Automation, AWS ML Services, Databricks MLflow

EDUCATION

Doctor of Philosophy (PhD), Psychology - Quantitative Predictive Linguistics, *Fielding Graduate University*

APA Accredited

Dissertation: [Instrumental and Affective Mass Murder: Establishing a Predictive Typology with Computer-Mediated Linguistic Analysis](#)

Conference Presentation: [Implicit Power Drives in the Manifestos Preceding Autogenic Massacres](#)

Master of Arts (MA), Psychology - Advanced Psychometrics, *Fielding Graduate University*

WSCUC Accredited | 4.14 GPA

Bachelor of Science (BS), Psychology - Emergency Management & Public Safety, *Liberty University*

SACSOC Accredited | *summa cum laude* - 4.00 GPA

SELECTED EXAMPLE PROJECTS

[Clinical AI for Autism Spectrum Disorder Assessment](#) Designed late-fusion multimodal system integrating visual and audio signals for behavioral analysis. Produced uncertainty-aware predictions and stakeholder-aligned reports, bridging advanced AI with clinical validity and scalability.

[Synthetic Data Pipeline for Bias Mitigation in Talent Acquisition](#) Constructed end-to-end synthetic data generation system with configurable bias injection (demographic, gender, accommodation). Enabled safe fairness testing, model validation, and equitable algorithm development using protected datasets.

[Credit Policy Fairness Simulation & Analysis](#) Developed 100,000+ synthetic applicant simulation to A/B test policy changes. Applied SHAP for explainability, fairness auditing, and statistical validation - identified 20.9% approval shift while confirming equitable outcomes across groups.

[Financial Data Collection Framework for LLM Training](#) Engineered scalable, cost-effective pipeline to curate high-quality SEC filing data for LLM training. Achieved 99% accuracy with 42% cost reduction through multi-stage qualification, tiered tasking, and dual QA layers.

[B2B Buyer Intent Prediction with XGBoost](#) Created dual-model attribution system (classification for conversion probability + regression for deal size) using XGBoost and Hive data. Generated priority scores that empowered sales teams to focus on high-value opportunities and maximize ROI.

[Agentic Reinforcement Learning for Behavioral Simulation](#) Developed agentic systems using Deep Q-Learning and reinforcement learning to model gig-worker adaptation under gamified incentives. Delivered robust simulation framework for risk-reduced strategy optimization and business forecasting.

[Rigorous A/B Testing Framework for Feature Validation](#) Designed and executed power-analyzed A/B test for "Optimal Outreach Timing" feature. Delivered causal lift measurement via hypothesis testing and segment analysis, informing clear go-to-market recommendations.

[AI-Powered Email Personalization Engine](#) Architected click-prediction model leveraging engagement and intent signals. Implemented tiered personalization logic (direct CTA vs. nurture) to scale targeted messaging and boost campaign engagement across segments.