# Matt Oremland, PhD

*Senior Director of Machine Learning*

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## PROFESSIONAL SUMMARY

Machine learning leader with PhD in Mathematics and 9+ years applying advanced ML to healthcare and pharmaceutical data. Deep expertise building production models from concept to deployment, leading technical teams, and translating complex ML systems into business value. Proven track record architecting cutting-edge solutions including LLM classifiers, ensemble models, and RAG systems while fostering cultures of innovation and continuous learning. Strong foundation in probabilistic models, time-series analysis, and hybrid neural-symbolic approaches applied to clinical and regulatory intelligence.

## PROFESSIONAL EXPERIENCE

**Redica Systems**  April 2025 – Present
*Director, Data Strategy & Analytics*  *Remote*

- Lead machine learning strategy for healthcare regulatory intelligence platform serving pharmaceutical clients including Eli Lilly and Merck, defining ML roadmap and ensuring alignment with business objectives
- Built production LLM classifier using OpenAI API that processes unstructured FDA enforcement text, assigning severity levels and weighted risk categories with validated accuracy through confusion matrices and ongoing monitoring
- Architect end-to-end ML systems from initial concept through operational deployment, owning model design, prompt engineering, validation frameworks, and production quality assurance
- Act as trusted technical advisor to C-suite clients, translating complex ML capabilities into strategic business value and presenting at major industry conferences (CHPA, ISPE)
- Champion MLOps best practices including model monitoring, performance validation, and lifecycle management to ensure robust, scalable solutions in FDA-regulated environment

**Tidal Wave Analytics LLC**  January 2025 – Present
*Consulting Data Scientist*  *Saratoga Springs, NY*

- Lead ML projects from concept to deployment across healthcare technology and software industries, serving as hands-on technical leader for complex modeling challenges
- Built production random forest model for Paradigm on Databricks that runs nightly, implementing MLOps workflows including automated monitoring, version control, and deployment pipelines
- Designed and implemented RAG system for tax compliance using HuggingFace and PyTorch, applying retrieval-augmented generation techniques to query regulatory documents and generate recommendations
- Architect full-stack ML applications demonstrating end-to-end ownership from model development through production deployment and user-facing systems

**Gilead Sciences**  January 2023 – March 2025
*Director, Data & Analytics (Medical Affairs)*  *Foster City, CA*

- Led team of 5 data scientists and analysts supporting healthcare professional (HCP) and healthcare organization (HCO) analytics for Medical Affairs, fostering culture of collaboration and professional growth
- Defined and executed analytics strategy and roadmap for healthcare reference data systems, ensuring alignment with business objectives and stakeholder needs
- Architected centralized data lake integrating HCP/HCO data from multiple sources, implementing data quality frameworks and governance standards that improved accuracy by 40%

- Collaborated with cross-functional teams including technology partners and business units to translate medical affairs needs into practical analytics solutions
- Mentored and developed team talent through technical guidance, code reviews, and strategic coaching

### Takeda Pharmaceuticals
*Associate Director, Digital & Data Science*

May 2021 – December 2022

*Lexington, MA*

- Led technical teams applying machine learning to manufacturing and quality challenges, including classification, regression, ensemble methods, and time series forecasting for risk detection
- Served as subject matter expert on ML and advanced analytics to senior leadership, translating technical concepts for executive decision-making during quarterly reviews
- Established best practices for model development, validation, and deployment across digital analytics organization
- Championed continuous learning culture by staying current with emerging ML techniques and sharing knowledge across cross-functional teams

### Regeneron Pharmaceuticals
*Senior Process Data Scientist*

May 2016 – May 2021

*Rensselaer, NY*

- Built and deployed production ML models for biopharmaceutical manufacturing using ensemble methods, PLS, and PCA, demonstrating hands-on technical leadership from concept through operational deployment
- Developed predictive models for process optimization and quality decisions that yielded high-confidence results meeting pharmaceutical quality standards and regulatory requirements
- Designed automated data pipelines integrating multiple source systems with robust data validation and quality checks
- Presented feed optimization project that changed business decisions at senior leadership level, demonstrating ability to convey complex technical insights to non-technical audiences

### Mathematical Biosciences Institute
*Postdoctoral Research Fellow*

2014 – 2016

*Columbus, OH*

- Published 5 peer-reviewed papers in top-tier journals (Bulletin of Mathematical Biology, BMC Systems Biology) plus 1 textbook chapter on optimization and control of biological systems
- Developed agent-based models of complex biological systems including fungal lung infection, virus transmission, and cellular dynamics using probabilistic approaches
- Applied multi-objective optimization using genetic and evolutionary algorithms to solve complex learning problems with uncertainty and real-world constraints

## EDUCATION

### Doctor of Philosophy (PhD) in Mathematics

2014

*Virginia Polytechnic Institute & State University*

Dissertation on optimization and control methods for agent-based models in biological systems, applying probabilistic graphical models and evolutionary algorithms to complex adaptive systems

## SKILLS & TECHNOLOGIES

**Machine Learning & AI:** Deep Learning (PyTorch, TensorFlow) • Ensemble Methods • Random Forest • LLM Integration (OpenAI API) • RAG Systems • Classification • Regression • Time Series Forecasting • NLP

**Advanced ML Techniques:** Probabilistic Models • Bayesian Methods • Multi-Objective Optimization • Agent-Based Modeling • Symbolic Regression • Evolutionary Algorithms • PCA • PLS

**MLOps & Deployment:** Model Monitoring • Validation Frameworks • CI/CD Pipelines • Version Control • Production Deployment • Performance Optimization

**Programming & Platforms:** Python (Advanced) • SQL • Scikit-Learn • HuggingFace • Pandas • Databricks • Snowflake • AWS

**Healthcare & Pharmaceutical Domain:** Healthcare Reference Data (HCP/HCO) • FDA Regulatory Intelligence • Clinical Quality Analytics • Pharmaceutical Manufacturing • Healthcare Data Integration

**Leadership & Communication:** Team Building • Technical Mentorship • Strategic Planning • Executive Communication • Cross-Functional Collaboration • Agile Methodologies

## PRESENTATIONS & PUBLICATIONS

- CHPA Quality and Manufacturing Meeting (2025) — Solo Presenter: Decoding FDA Enforcement Trends in OTC and Dietary Supplements
- CHPA Regulatory, Scientific & Quality Conference (2025) — Solo Presenter: The Impact of AI on FDA-Regulated Industries
- Redica Systems Webinar (2025) — Solo Presenter: From Reactive to Proactive: Leveraging AI/ML to Improve the Quality Unit

## PUBLICATIONS

- "Optimization and control of agent-based models in biology: a perspective" — Bulletin of Mathematical Biology, 2017
- "A computational model of invasive aspergillosis in the lung and the role of iron" — BMC Systems Biology, 2016
- "Optimal harvesting of a predator-prey agent-based model using difference equations" — Bulletin of Mathematical Biology, 2015
- "Optimization of agent-based models: scaling methods and heuristic algorithms" — Journal of Artificial Societies and Social Simulation, 2014
- "Agent-based models and optimal control in biology: a discrete approach" — Mathematical Concepts and Methods in Modern Biology (Elsevier), 2013 (Textbook chapter)