Luke Delzer

PharmD | BS Computer Science (AI/ML) | BS Chemistry

Summary

Clinical pharmacist, chemist, and computer scientist with emerging research experience in AI and machine learning. Published in clinical pharmacology and computational drug discovery journals, with expertise in patient and high-dimensional data. Dedicated to advancing data-driven technologies across medicine and tech.

Technical Skills

Programming Languages: Python, Java, C++, C, R, Objective-C
Machine Learning Frameworks: PyTorch, TensorFlow, Keras
Data Tools and Formats: Pandas, NumPy, scikit-learn, JSON, CSV, Microsoft Excel
Scripting Automation: Bash, sed, awk/gawk, PowerShell
Distribution and Cloud Frameworks: Django, Git, basic AWS familiarity
Technologies: REST APIs, Docker, Linux (CLI proficiency), Epic Electronic Health Record
Architectures: RISC-V, x86 Assembly

Projects & Research

Drug Repurposing Using Deep Embedded Clustering and Graph Neural Networks Jan 2025 - Sep 2025
(`github.com/LDELZ/drug_repurposing`)

- Built a multi-stage pipeline combining **autoencoders**, **Deep Embedded Clustering (DEC)**, and **Graph Neural Networks (GNNs)** for drug-disease **link prediction**
- Integrated large-scale **multi-omics** data from **biochemical** and **natural language** sources, achieving superior predictive accuracy across 8.7 million relationships
- Evaluated performance using **clustering metrics**, **precision, recall, F1-score**, and **ROC-AUC**. Results to be presented at *ICMLA 2025*

Game Automation Using Reinforcement Learning with Stable Baselines3 Jan 2025 - Sep 2025
(`github.com/LDELZ/Stable-Entertainment-System`)

- Developed an on-policy **reinforcement learning agent** using **Stable Baselines3 (A2C)** to automate 2D gameplay in **SNES9x-rr**
- Designed a **Lua-Python image-action pipeline** for real-time control, integrating emulator memory data with learned policies
- Achieved a **29% win rate** in a classic game, outperforming the genetic-algorithm baseline (*MarI/O*) across reward and success metrics

Contextual Word Sense Disambiguation in Japanese-English Film Dialogue Aug 2024 - Dec 2024
(`github.com/LDELZ/japanese_wsd`)

- Fine-tuned a **Japanese BERT** model using a past-only conversational context window to improve **word sense disambiguation (WSD)** accuracy
- Integrated **Japanese and English WordNet synsets** and **cosine similarity** to evaluate contextual alignment between parallel translations
- Implemented a supervised evaluation framework achieving a **12% improvement in contextual alignment** over the most frequent sense baseline

Machine Learning Projects Jan 2025 - May 2025

- **Neural Network Comparisons:** Evaluated MLP, CNN, and ViT models on MNIST/CIFAR-10 to assess architecture and hyperparameter impacts on classification performance (`github.com/LDELZ/ml_neural_networks`)
- **Support Vector Machines Analysis:** Implemented manual and library SVMs (Scikit-Learn, LibSVM) on multiple datasets to study trade-offs in accuracy, speed, and regularization (`github.com/LDELZ/ml_support_vector_machines`)
- **Regression Analysis:** Compared manual and package-based linear, polynomial, and ridge regressions across real-world datasets to assess learning rate and regularization effects on model accuracy (`github.com/LDELZ/ml_regression`)

Natural Language Processing Projects Aug 2024 - Dec 2025

- **Text Classification with CNNs and Transformers:** Designed CNNs with variable architectures to study layer depth and word embeddings (Word2Vec, GloVe, BERT) in text classification against transformers (`github.com/LDELZ/nlp_neural_networks`)
- **Word Vector Analysis:** Built and evaluated co-occurrence-based word embeddings using PPMI and SVD to study context and dimensionality effects on semantic similarity (`github.com/LDELZ/nlp_wordvectors`)
- **N-Gram Poem Generator:** Developed a multilingual n-gram text generator in Python that produces structured poems and evaluates quality using perplexity and readability metrics (`github.com/LDELZ/nlp_ngrams`)

Core Programming, Algorithm, and Data Structures Projects Jun 2022 - Dec 2023

- **Linear Domination Game:** Developed a two-player Java board game using object-oriented programming and advanced data structures implementing linear algebraic rasterization principles (`github.com/LDELZ/linear_domination`)
- **T-Shirt Sales Manager:** Built a C-based console program for t-shirt sales with administrator configuration, user sales modes, validated input handling, and structured file output (`github.com/LDELZ/tshirt_sales_manager`)

Publications

Drug Repurposing Using Deep Embedded Clustering and Graph Neural Networks Sep 2025
2025 International Conference on Machine Learning and Applications (ICMLA). arXiv:2509.11493

Calcineurin Inhibitor and Nonsteroidal Anti-inflammatory Drug Interaction: Implications of Changes in Renal Function Associated with Concurrent Use May 2018
Journal of Clinical Pharmacology. DOI: 10.1002/jcph.1264

Technical & Research Experience

Lead Machine Learning & Data Engineering Researcher - Drug Repurposing Study Jan 2025 - Sep 2025
University of Colorado, Colorado Springs, CO

- Developed multi-stage AI/ML workflows integrating autoencoder dimensionality reduction, Deep Embedded Clustering, and Graph Neural Networks for link prediction

Lead NLP Researcher - Japanese Word Sense Disambiguation Study Aug 2024 - Dec 2024
University of Colorado, Colorado Springs, CO

- Fine-tuned Japanese BERT models using past-only conversational context for improved word sense disambiguation

Teaching Assistant - Department of Computer Science Aug 2023 - Dec 2023
University of Colorado, Colorado Springs, CO

- Evaluated student Java and data structure projects, guided coding practices, collaborated with instructor to enhance materials and student outcomes

Lead Data Engineering Researcher - Drug Interaction Study Aug 2015 - May 2018
University of Colorado Hospital, Aurora, CO

- Collected, engineered, and analyzed patient-level clinical data to evaluate calcineurin inhibitor-NSAID drug interactions on renal function; authored resulting publication

Computational Physical Chemistry Researcher, University of Colorado Colorado Springs, CO Aug 2011- May 2012
University of Colorado, Colorado Springs, CO

- Conducted Hartree-Fock molecular modeling and thermodynamic analysis of enzyme structures using remote Linux-based supercomputing systems

Employment Experience

Clinical Pharmacist — CommonSpirit St. Francis Hospital, Colorado Springs, CO Jan 2020 - Present

- *Comprehensive inpatient clinical pharmacy services, compounding and TPN training, decentralized support (ICU/NICU), and drug monitoring. Developed IV-room SOPs and analytic tools to enhance workflow efficiency and patient care*

Pharmacist — Safeway, Pueblo, CO May 2019 - Jan 2020

- *Dispensing operations, vaccine administration, and patient consultations*

Rx Review Pharmacist — Dept. of Health Care Policy & Financing, Colorado Springs, CO Nov 2018 - Nov 2019

- *Conducted MTM reviews, resolved medication issues, and prepared reports for state*

Clinical Pharmacist — Kaiser Permanente Briargate, Colorado Springs, CO Sep 2017 - Apr 2019
- *HMO outpatient pharmacy operations and patient counseling*

Pharmacist — Walgreens (multiple CO locations) Sep 2016 - Sep 2017
- *Conducted outpatient dispensing and compliance across many high-volume retail sites*

Education

BS in Computer Science: AI and Machine Learning Jan 2022 - May 2025
University of Colorado, Colorado Springs, CO | GPA: 3.94, Summa Cum Laude

Doctor of Pharmacy Aug 2012 - May 2016
University of Colorado Skaggs School of Pharmacy, Aurora, CO | GPA: 3.9, Rho Chi

BS in Chemistry Jun 2007 - May 2012
University of Colorado, Colorado Springs, CO | GPA: 3.9, Summa Cum Laude, Highest Honors

Professional Certifications

National Provider Identifier (NPI): *1447779897* Sep 2017 - Present
Colorado Pharmacist License: *PHA. 0021467* Aug 2016 - Present
NIH Office of Extramural Research: *"Protecting Research Participants"; Cert. #1935856* Dec 2015 - Present
CDC: *"Yellow Fever Vaccine Advising" Completion #: WB2367* Oct 2015 - Present
APhA: *Medication Therapy Management Certification* Aug 2015 - Present
APhA: *Immunization Training Certification* May 2013 - Present

Honors and Awards

Chancellor's Award – *University of Colorado Colorado Springs* Jan 2022
Clinical Practice Award – *University of Colorado Skaggs School of Pharmacy* Apr 2016
Top 5% Student Awards – *Porter Adventist, HealthSouth, St. Francis, and CU Hospitals* Aug 2015 - May 2016
Faculty & Alumni Scholarship – *University of Colorado Skaggs School of Pharmacy* May 2015
Rho Chi Pharmacy Honor Society – *Alpha Theta Chapter* May 2014
Highest Distinction Graduate – *University of Colorado Dept. of Chemistry & Biochemistry* May 2012
Top Student in Physical, Analytical, and Seminar Chemistry – *University of Colorado* May 2011 - May 2012
Hospital Volunteer Service Award – *Memorial Health System, Colorado Springs, CO* Jan 2012
Eagle Scout with Order of the Arrow Honors – *Boy Scouts of America* May 2004

Presentations

Resolving Data and Chemical Issues in NICU TPN Entry – *St. Francis NICU* (*seminar*) Aug 2025
Drug Repurposing Using Deep Embedded Clustering and GNNs – *UCCS* (*seminar*) May 2025
Game Automation: Reinforcement Learning with Stable Baselines3 – *UCCS* (*seminar*) May 2025
Contextual Word Sense Disambiguation for Japanese Conversations – *UCCS* (*seminar*) Dec 2024
RainForest: Scalable Decision-Tree Construction for Large Datasets – *UCCS* (*seminar*) Oct 2024
Attribute Reduction and the Curse of Dimensionality in Big Data – *UCCS* (*seminar*) Oct 2024
Implementing and Interpreting the t-Test in IBM SPSS – *UCCS* (*seminar*) Jul 2024
Implementing Dynamic Data Structures and Quality Practices in C – *UCCS* (*seminar*) Aug 2022
Calcineurin Inhibitor & NSAID Interactions – *ACCP* (*continuing ed. seminar*) Mar 2019
Healthcare Law – *HealthSouth Rehab Hospital* (*seminar*) Mar 2016
HIV and MAC Infection Pharmacotherapy – *HealthSouth Hospital* (*clinical seminar*) Feb 2016
Cases of Post-Spinal Stenosis Surgery – *HealthSouth Rehab Hospital* (*clinical seminar*) Jan 2016
CNI and NSAID Interactions on Renal Function – *ASHP Midyear* (*poster*) Dec 2015
Neonatal ICU Pharmacy Operations – *St. Francis Hospital* (*clinical seminar*) Dec 2015
Counseling Blind Patients on Medication Use – *Stout Street Health* (*clinical seminar*) Sep 2015
Research Data Gathering and Excel Programming – *CU Hospital, Aurora* (*tech. seminar*) Jul 2015
CNI and NSAID Drug Interaction, Revisited – *CU Hospital, Aurora* (*clinical seminar*) Jun 2015
Glucan Phosphates on C-Section Healing – *CU Skaggs School of Pharmacy* (*poster*) Oct 2014
Glucan Pharmacotherapy – *CU Skaggs School of Pharmacy* (*clinical seminar*) Apr 2014
DFT Analysis of PAD4 in Rheumatoid Arthritis – *CS Undergrad. Research Forum* (*poster*) Apr 2012