Dreycey Albin, PhD

Machine Learning Engineer

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Professional Summary

ML engineer bridging research and production systems. I design and validate statistical/ML/deep learning models, build experimentation and evaluation frameworks, and ship low-latency, reliable inference and data pipelines. At Microsoft Azure, I work at the intersection of modeling and distributed services on Resource Central (core control-plane ML), serving all regions and processing 1M+ requests per day.

Technical Skills

ML: PyTorch, TensorFlow, scikit-learn, NumPy; tabular, time-series, and sequence modeling; uncertainty estimation and calibration; GPU training and inference (CUDA, DeepSpeed)
MLOps: Experiment tracking (Weights & Biases, MLflow); offline-to-online validation; model monitoring and drift detection; CI/CD
Systems: Distributed systems; model serving and inference (ONNX); Docker, Kubernetes; Azure, AWS; Spark; Linux, Git
Languages: Python; C++; C#; Rust; SQL

Work Experience

Microsoft Azure — **Redmond, WA**

Machine Learning Engineer, Level 62 — 03/2025 – Present

- **Technical Lead, Capacity Mitigation System ($100M/yr CapEx + Awards):** Cut regional capacity mitigation from ~1 week to ~4 hours across 50+ regions and ~1M VMs/containers with zero customer impact by architecting a telemetry-driven system and mentoring an engineer through end-to-end delivery. Earned Azure Core Impact and Builders Excellence awards.
- **Technical Lead, Heterogeneous Overprovisioning Engine ($350M/yr projected):** Leading a 4-person cross-functional team to predict and reclaim overprovisioned compute across Azure's fleet; building a low-latency multi-task PyTorch model with calibration, ablation, and offline-to-online validation pipelines; integrating into critical control-plane C# services with rollout guardrails, observability, and a ≤50 ms SLO.
- **Distributed Model Delivery & Serving Architecture (patent pending):** Designed a distributed system for automated A/B and shadow model evaluation across microservices, with canary releases, versioning, and auto-promote/rollback guardrails; standardized production inference risk controls; adopted as a broader team initiative.

Machine Learning Engineer, Level 61 — 07/2023 – 03/2025

- **Policy Changes ($50M+/yr CapEx):** Led platform-wide decisioning policy changes and built the automated validation and reporting framework including forecasting, regression checks, drift monitoring, and decision stability analysis used by finance and senior leadership to track impact.
- **LightGBM Production Model Improvement:** Overhauled evaluation methodology with thresholding tradeoff analysis and backtesting across cohorts and edge cases; reduced false negatives by 5% while preserving safety constraints and unlocking additional capacity headroom.

Medtronic — **Boulder, CO**

Research Engineer (Contract) — 09/2021 – 05/2022

- **Real-Time LSTM Catheter Pose Estimator (<20ms inference):** Developed an LSTM model from fiber-optic sensor streams for real-time surgical catheter pose estimation with evaluation harnesses covering latency/accuracy tradeoffs for edge deployment.
- **Autonomous Catheter Robot Software Stack:** Shipped full Python software stack for an autonomous catheter robot including clinical-facing GUI, real-time motor control, telemetry, and fail-safe behaviors; helped secure additional internal R&D funding.

Internships

Microsoft Azure | *Data Scientist Intern* — 06/2022 – 08/2022

- Analyzed spot-VM uptime and eviction patterns across a global fleet; surfaced key drivers and surfaced actionable insights to inform VM scheduling policy improvements at scale.

Inscripta (Genome Engineering) | *Computational Biologist Intern* — 06/2021 – 08/2021

- Designed and implemented a modular Python CLI pipeline for graph-genome edit detection; benchmarked alignment accuracy and runtime against tools such as Bowtie, documenting key performance tradeoffs.

OwlSpark Accelerator, Rice University | *Co-founder* — Summer 2020, Houston, TX

- Among three co-founders selected for Rice University's startup accelerator; led customer discovery, developed go-to-market strategy, and pitched to venture capitalists — gaining hands-on experience in pretotyping, branding, and early-stage product development.

Education

Ph.D. Computer Science | *University of Colorado Boulder* | NSF GRFP Fellow (GPA: 4.0) 2020 – 2023

- Dissertation: *Automating phage discovery using novel software & high-throughput tools*
- Advisor: Dr. Mirela Alistar

M.Sc. Systems, Synthetic & Physical Biology (SSPB) | *Rice University* 2018 – 2020

- Thesis: *Platform for sensitive, efficient nucleic acid screening*
- Advisor: Dr. Todd Treangen

NIH-PREP Postbaccalaureate | *University of Washington* 2017 – 2018

- Project: *Computational modeling of the 3D structure of Cyrano*
- Advisor: Dr. Gabriele Varani

B.S. Chemistry + B.S. Biology | *University of Northern Colorado* | McNair Scholar 2012 – 2017

- Thesis: *Immunohistochemistry of FP Receptors in the Bovine Corpus Luteum*
- Advisors: Dr. James Haughian, Dr. Patrick Burns

Selected Open Source Projects

S1 **PhageScanner** - Reconfigurable ML framework (9 model backends) for bacteriophage genomic and metagenomic feature annotation; modular pipeline supporting custom model integration and a GUI for visual genome browsing. Published in *Frontiers in Microbiology, 2024*.

S2 **PhageBox** - Open-source digital microfluidics extension integrating real-time ML inference, embedded hardware control (temperature ±0.2°C, electromagnetics), and a GUI-driven bio-protocol programming model. Published in *IEEE Transactions on Biomedical Engineering, 2023*.

S3 **PhageFilter** - High-performance Rust tool that uses a Sequence Bloom Tree (SBT) data structure to efficiently filter bacteriophage reads from metagenomic files; designed for scalable, memory-efficient metagenomic screening.

Selected Publications

P1 **PhageScanner: a reconfigurable machine learning framework for bacteriophage genomic and metagenomic feature annotation** - (*Frontiers in Microbiology, 2024*) - D. Albin, M. Ramsahoye, E. Kochavi, M. Alistar

P2 **PhageBox: an open source digital microfluidic extension with applications for phage discovery** - (*IEEE Transactions on Biomedical Engineering, 2023*) - D. Albin, L. Buecherl, E. Kochavi, et al.

P3 **Hidden genomic diversity of SARS-CoV-2: implications for qRT-PCR diagnostics and transmission** - (*Genome Research, 2021*) - N. Sapoval, ..., D. Albin, ..., T.J. Treangen

P4 **Methods developed during the first NCBI Structural Variation Codeathon at Baylor College of Medicine** - (*F1000, 2021*) - M. Mahmoud, ..., D. Albin, ..., F.J. Sedlazeck, B. Busby

P5 **Structure of the RNA specialized translation initiation element that recruits eIF3 to the 5'-UTR of c-Jun** - (*Journal of Molecular Biology, 2020*) - M.J. Walker, ..., D.D. Albin, ..., G. Varani

P6 **An evolutionarily-conserved RNA structure in the functional core of the long non-coding RNA Cyrano** - (*RNA, 2020*) - A. Jones, G. Pisignano, T. Pavelitz, ..., D. Albin, G. Varani

P7 **SeqScreen: accurate and sensitive functional screening of pathogenic sequences via ensemble learning** - (*Genome Biology, 2022*) - A. Balaji, B. Kille, A.D. Kappell, G.D. Godbold, M. Diep, R.A.L. Elworth, Z. Qian, D. Albin, D.J. Nasko, N. Shah, M. Pop, S. Segarra, K.L. Ternus, T.J. Treangen

P8 **SeqScreen: a biocuration platform for robust taxonomic and biological process characterization of nucleic acid sequences of interest** - (*IEEE BIBM, 2019*) - D. Albin, D. Nasko, R.A.L. Elworth, et al.

Selected Presentations

T1 **Meta-metagenomics: 3 minutes in the life of a microbe hunter** - (*Oral, 3-Minute Fast Pitch, Rice Annual SynBio Hangout, 2019*) - D. Albin, T.J. Treangen

T2 **Computational Techniques for Sensitive and Accurate Threat Screening of Oligonucleotides** - (*Poster, Rice Data Science Conference, 2019*) - D. Albin, D. Nasko, J. Lu, R.A.L. Elworth, A. Balaji, G. Godbold, K. Ternus, T.J. Treangen

T3 **Computational Modeling the 3D structure of Cyrano (OIP5-AS1)** - (*Poster, UW Research Symposium, 2018*) - D. Albin, T. Pavelitz, M. Shortridge, G. Varani

Awards and Honors

Azure Core Impact Award 2025
Microsoft Azure Builders Excellence Award 2025
NSF Graduate Research Fellowship (GRFP) 2018 – 2022
Dissertation Completion Fellowship (Link) 2023
Outstanding Service Award, CU Boulder CS Dept. (Link) 2023
CU Boulder's Engineering Excellence Fund (EEF) ($3000.00 Research Funding) 2022

Beverly Sears grant ($1,000 Research Funding) 2021
Helmsley Scholarship, Cold Spring Harbor Synthetic Biology Course (Link) 2018
The Dean's Prize ($10,000) | *Rice University* 2018
ABRCMS ABRF Best Poster Award 2017
FASEB DREAM Mentored Travel Award 2017
Undergraduate Academic Scholar Award | *University of Northern Colorado, Dept. of Chemistry* 2017