David Merrell

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Employment

Broad Institute; Getz Lab — July 2023–present

Computational Biologist II. Led bioinformatics & downstream analysis for 6 different cancer genomics projects.

Skills: software engineering, machine learning, statistics (Bayesian and frequentist), Google Cloud, Docker, Snakemake, Python package development, scanpy, R, Git, Linux, bash, GATK, samtools, GSEA, bwa, cellranger

DataChat — Summer 2019

ML Engineer Intern. Built machine learning infrastructure for a chatbot-based data analysis startup.

RAND Corporation — 2014–2016

Research assistant. Wrote simulation and analysis code for DoD operations research projects.

Sandia National Laboratories — Summer 2013; Summer 2014

Intern. Developed material heterogeneity models for the ALEGRA shock and multiphysics simulation code.

Pacific Northwest National Laboratory — Summer 2012

Intern. Validated a computer vision model for the NIFFTE nuclear fission experiment.

Education

PhD Computer Sciences — 2018–2023

University of Wisconsin–Madison. Dissertation: *Probabilistic Machine Learning with Omics Data and Biological Prior Knowledge*. Advised by Tony Gitter.

MS Computer Sciences — 2016–2018

University of Wisconsin–Madison. Research: Probabilistic and logical inference. Advised by Aws Albarghouthi and Loris D'Antoni

BS Mathematics — 2014

Brigham Young University. Minor in Physics. 3.90 GPA. *Cum Laude*.

Publications

J. Ghannam, . . . , D. Merrell, ... "Tumor Transcriptional Subtype Is a Key Axis of Immune Checkpoint Blockade Response in Glioblastoma". *Nature Cancer*. Under review.

H. Parsons, . . . , D. Merrell, ... "Detection of Heterogeneous Resistance Mechanisms to Tyrosine Kinase Inhibitors from Cell-free DNA". *Cell Genomics*. Forthcoming.

B. Anderson, . . . , D. Merrell, ... "Barcoded Viral Tracing Identifies Immunosuppressive Astrocyte-Glioma Interactions". *Nature*. June 2025.

D. Merrell, T. Chandereng, Y. Park. "A Markov Decision Process for Response-Adaptive Randomization in Clinical Trials". *Computational Statistics and Data Analysis*. Feb 2023.

D. Merrell, A. Gitter. "Inferring Signaling Pathways with Probabilistic Programming". *European Conference on Computational Biology*. 2020.

D. Merrell, A. Albarghouthi, L. D'Antoni. "Weighted Model Integration with Orthogonal Transformations". *International Joint Conference on Artificial Intelligence*. 2017.

Software

PathMatFac.jl — Julia

A matrix factorization model for multiomic data. Uses curated gene sets to regularize the factorization.
https://github.com/dpmerrell/PathMatFac.jl

TCGA Pipeline — Python; Snakemake

A pipeline that downloads multiomic TCGA data and merges them into a form suitable for machine learning.
https://github.com/dpmerrell/tcga-pipeline

Sparse Signaling Pathway Sampling (SSPS) — Julia; Snakemake

A method that infers signaling pathway structure from time series phosphoproteomic data.
https://github.com/dpmerrell/ssps

TrialMDP — C++; R

An algorithm that designs clinical trials with optimal response-adaptive randomization.
https://github.com/dpmerrell/TrialMDP

*See **github.com/dpmerrell** for a more complete list of software projects.*

Skills

Programming languages: Python; Julia; C++; R; MATLAB; Rust; bash.

Packages: numpy, scipy, pytorch, pandas, scikit-learn, statsmodels, scanpy, seaborn, plotly, argparse, ChainRules.jl

Other tools: git, Snakemake, Linux, vim, Docker, Google Cloud, SQL, LaTeX, GATK, samtools, IGV, Cursor.

Data modalities: Whole genomes; whole exomes; bulk RNA-seq; scRNA-seq; *Hs* & *Mm*; multiomics; time series.

Non-technical: Writing, public speaking, event planning, teaching.

Service and Leadership

Broad Cancer Program Bootcamp — April 2025

Teacher. Taught python programming to early-career cancer researchers.

UW-Madison Student ACM chapter (SACM) — 2018

President. Increased budget by 50% through fundraising. Planned & executed numerous events.

CS Welcome Weekend Committee — 2018

Chair. Organized a weekend of activities for prospective CS graduate students. Led a team of 10 volunteers.

Eagle Scout — 2007 – present

Personal Interests

Running, biking, swimming, hiking, reading, writing, listening to podcasts, personal coding projects.