

CONTACT

contact@pilesofsand.com
pilesofsand.com
github.com/dcgentile
linkedin.com/in/dcgentile

David Gentile, PhD

EDUCATION

PhD, Mathematics

2019 – 2026

Tufts University, advised by Prof. James M. Murphy

- Defended April 2026. Dissertation on optimal transport and the geometry of families of probability measures: barycentric coding on graphs and discrete metric spaces.
- Central problem is a variance minimization on a Riemannian manifold, solved with non-smooth saddle-point and Riemannian optimization methods implemented from the primary literature.
- Related work on change point detection via transport distances, applied to molecular dynamics trajectories for Markov state model construction.

MS, Mathematics

2019 – 2021

Tufts University, advised by Prof. Bruce M. Boghosian

- Candidacy exam: “Stochastic Analysis of Random Asset Exchange Models” — statistical physics applied to distributional dynamics: stochastic differential equations, Fokker-Planck equations, and kinetic theory.

BA, Liberal Arts (Concentration in Mathematics & Computer Science)

2014 – 2018

Sarah Lawrence College

PUBLICATIONS & WRITING

- D. Gentile, J. M. Murphy. “Static and Dynamic Approaches to Computing Barycenters of Probability Measures on Graphs.” Under review (arXiv:2603.26940).
- D. Gentile, J. Huang, J. M. Murphy. “Wasserstein-Based Identification of Metastable States in Time Series Data via Change Point Detection and Segment Clustering.” Under review (arXiv:2603.01989).
- D. Gentile, J. M. Murphy. “Regularized 2-Wasserstein Barycenters on Discrete Metric Spaces.” SampTA 2025, Vienna.
- D. Gentile, L. T. Fialkowski, R. M. Oba. Signal Classification via OT and ML for Non-uniformly Sampled Data. Technical Report NRL/7160/MR-2025/6.

SOFTWARE

- GraphTransportation.jl — open-source Julia library for barycenters of measures on graphs: test suite, generated docs, CI. github.com/dcgentile/GraphTransportation.jl
- MFpy — Scikit-learn-compatible Python library for transport-based change point detection.

EXPERIENCE

Naval Research Enterprise Internship Program

Summer 2025

Naval Research Laboratory

- Applied optimal transport and segment-based clustering to classify non-uniformly sampled underwater acoustic signals; authored technical report NRL/7160/MR-2025/6.

Senior Data Scientist Intern

Summer 2023

Analysis Group, Inc.

- Built an LLM-based classification pipeline for systematic literature review in industrial drug design; benchmarked it against a colleague’s support vector machine on the same corpus.

SKILLS

Mathematics: optimal transport, Wasserstein geometry, information geometry, Riemannian optimization, non-smooth convex analysis, statistical physics (SDEs, Fokker-Planck, kinetic theory)

Languages: Julia (primary), Python (incl. PyTorch, Scikit-learn, NumPy), MATLAB, Rust

REFERENCES

Available on request.