

JAMES M. MURPHY

Department of Mathematics \diamond Tufts University \diamond Medford, MA 02155

jm.murphy@tufts.edu

EDUCATION

University of Maryland, College Park

Ph.D. in Mathematics (2015)

M.A. in Mathematics (2013)

Honors: Goldhaber Travel Grant Award, Azis/Osborn Gold Medal for Teaching Excellence

Ph.D. Advisors: John J. Benedetto and Wojciech Czaja

University of Chicago

B.S. in Mathematics (2011)

Honors: Phi Beta Kappa, Student Marshal (top 3% of graduating class), general and departmental honors

POSITIONS HELD

Tufts University

Assistant Professor of Mathematics

September 2018-present

Medford, MA

Johns Hopkins University

Assistant Research Scientist and Senior Lecturer

July 2016 - present

Baltimore, MD

Duke University

Visiting Assistant Professor

August 2015 - June 2016

Durham, NC

SELECTED RECENT PUBLICATIONS

- [10] A. Little, M. Maggioni, and **J.M. Murphy**, “Path-based spectral clustering: Guarantees, robustness to outliers, and fast algorithms,” *Journal of Machine Learning Research*, vol. 21, no. 6, pp. 1–66, 2020*.
- [9] **J.M. Murphy** and M. Maggioni, “Spectral-spatial diffusion geometry for hyperspectral image clustering,” *IEEE Geoscience and Remote Sensing Letters*, 2020.
- [8] M. Maggioni and **J.M. Murphy**, “Learning by unsupervised nonlinear diffusion,” *Journal of Machine Learning Research*, vol. 20, no. 160, pp. 1–56, 2019*.
- [7] M. Maggioni and **J.M. Murphy**, “Learning by active nonlinear diffusion,” *Foundations of Data Science*, vol. 1, no. 3, pp. 271–291, 2019*.
- [6] **J.M. Murphy** and M. Maggioni, “Unsupervised clustering and active learning of hyperspectral images with nonlinear diffusion,” *IEEE Transactions on Geoscience and Remote Sensing*, vol. 57, no. 3, pp. 1829–1845, 2019.
- [5] E. Gngang and **J.M. Murphy**, “Spectral analysis for non-Hermitian matrices and directed graphs,” *ArXiv:1812.04737*, 2018*.
- [4] W. Czaja and **J.M. Murphy** and D. Weinberg, “Single-image superresolution through directional representations,” *IEEE Geoscience and Remote Sensing Letters*, no. 12, pp. 1837 – 1841, 2018*.
- [3] W. Czaja, B. Manning, **J.M. Murphy**, and K. Stubbs, “Discrete directional Gabor frames,” *Applied and Computational Harmonic Analysis*, vol. 45, no. 1, pp. 1–21, 2018*.

- [2] **J.M. Murphy**, J. L. Moigne, and D. Harding, “Automatic image registration of remotely sensed data with global shearlet features,” *IEEE Transactions on Geoscience and Remote Sensing*, vol. 54, no. 3, pp. 1685–1704, 2016.
- [1] W. Czaja, B. Manning, L. McLean, and **J.M. Murphy**, “Fusion of aerial gamma-ray survey and remote sensing data for a deeper understanding of radionuclide fate after radiological incidents: examples from the Fukushima Dai-Ichi response,” *Journal of Radioanalytical and Nuclear Chemistry*, vol. 307, no. 3, 2016*.

*Authors listed alphabetically

SELECTED RECENT PRESENTATIONS

- **Seminar Talks:** Boston University Prob/Stats Seminar; Amherst College Math Colloquium; Schlumberger-Doll Research Data Science Seminar; UMass Lowell Machine Learning Seminar; MIT Applied Math Colloquium; UW Madison Statistics Seminar; UCLA Applied Math Colloquium; UT Knoxville Data Science Seminar; Naval Research Laboratory Machine Learning Seminar; Goucher College Mathematics Colloquium; University of Alabama Mathematics Colloquium.
- **Conference Presentations:** INFORMS Annual Meeting; IEEE International Geoscience and Remote Sensing Symposium; Large Scale Scientific Computing Conference '19; International Conference on Approximation Theory; AMS Sectional Meeting at Auburn University; NSF ATD+AMPS Workshop; NIH Symposium on Advanced Computational Methods in Biomedical Imaging; .

TEACHING EXPERIENCE

- **Tufts University:** MATH 123 (Math Aspects of Data Analysis), MATH 165 (Statistics), MATH 260 (Foundations of Statistical and Machine Learning).
- **Johns Hopkins University:** MATH 106 (Calculus I for Biology and Social Sciences), MATH 202 (Calculus III), MATH 302 (ODE and PDE).
- **Duke University:** MATH 353 (ODE and PDE), MATH 790 (Graduate topics course in anisotropic harmonic analysis).

GRANTS AND AWARDS

Grants:

- NSF DMS 1924513, “ATD: Landscape Networks and Nonlinear Diffusions for Anomaly Detection and Active Learning” (PI, 2019-2022)
- NSF DMS 1912737, “Collaborative Research: Data-driven Path Metrics for Machine Learning” (PI, 2019-2021)
- Tufts Collaborates, “Decoding the Complexity of Commuting Networks in the United States,” (Co-PI, 2019-2020)

Awards: Professor Joel Dean Award for Excellence in the Teaching of Mathematics (JHU, 2018); Aziz/Osborn Gold Medal for Teaching (UMD, 2013); Student Marshall (top 3 % of undergraduate class) (UChicago, 2011); Phi Beta Kappa (UChicago, 2010).

MENTORSHIP OF STUDENTS

Ph.D. Student Advisor: Marshall Mueller, Sam Polk.

Undergraduate Research Mentor: Sebastian Coates, Jonathan Conroy, Miriam Goldman, Nathan Kapsin, Kevin Stubbs, Bhushan Suwal, Shukan Zhang.