Mark Magsino

memagsino@gmail.com http://memagsino.github.io/

Education

2012 – 2018 **Ph.D. University of Maryland** Mathematics

2008 – 2012 **B.S. Carnegie Mellon University** Mathematics and Japanese Studies

Professional Experience

2022 – **Assistant Professor** U.S. Naval Academy

2018 – 2022 **Visiting Assistant Professor** The Ohio State University

Research Interests

My research is in applied harmonic analysis and the mathematics of data science, centered on structured representations of signals and data. Topics include frame theory and time-frequency analysis, line and subspace packings, CAZAC sequences and radar waveform design, spectral estimation, and machine learning with applications to network neuroscience.

Research Publications

Journal Articles

1. M. Magsino, D. G. Mixon, and H. Parshall, "Kesten–McKay law for random subensembles of Paley equiangular tight frames," *Constructive Approximation*, vol. 53, pp. 381–402, 2021.
2. M. Magsino, "Constructing tight Gabor frames using CAZAC sequences," *Sampling Theory in Signal and Image Processing*, vol. 16, pp. 73–99, 2017.

Refereed Conference Papers

3. B. Correll, J. Russo, C. N. Swanson, and M. Magsino, "Root-of-unity CAZAC sequences: Extensive search and Doppler tolerance," in *2025 IEEE Radar Conference (RadarConf25)*, IEEE, 2025, pp. 910–915.
4. D. Duong-Tran, M. Magsino, J. Goñi, and L. Shen, "Preserving human large-scale brain connectivity fingerprint identifiability with random projections," in *IEEE International Symposium on Biomedical Imaging 2024*, 2024.
5. M. Magsino and B. Correll, "A polar optimization search for CAZAC sequences," in *2024 IEEE Radar Conference (RadarConf24)*, 2024.
6. M. Magsino and Y. Xu, "A nonlinear sum of squares search for CAZAC sequences," in *2023 IEEE Radar Conference (RadarConf23)*, IEEE, 2023, pp. 1–6.
7. M. Magsino, D. G. Mixon, and H. Parshall, "A Delsarte-style proof of the Bukh–Cox bound," in *2019 13th International conference on Sampling Theory and Applications (SampTA)*, IEEE, 2019, pp. 1–4.

Conference Proceedings

8. M. Magsino and D. G. Mixon, "Biangular Gabor frames and Zauner's conjecture," in *Wavelets and Sparsity XVIII*, SPIE, vol. 11138, 2019, pp. 434–439.
9. M. Magsino, D. G. Mixon, and H. Parshall, "Linear programming bounds for cliques in Paley graphs," in *Wavelets and Sparsity XVIII*, SPIE, vol. 11138, 2019, pp. 440–447.

Books and Book Chapters

10 J. J. Benedetto, K. Cordwell, and M. Magsino, "CAZAC sequences and Haagerup's characterization of cyclic N-roots," in *New Trends in Applied Harmonic Analysis, Volume 2: Harmonic Analysis, Geometric Measure Theory, and Applications*, Springer, 2019, ch. 1, pp. 1–43.

Preprint

11 M. Magsino, "Cross-correlation periodograms with decaying noise floor for power spectral density estimation," 2026. URL: https://arxiv.org/pdf/2603.20624.

External Research Support

2024 – 2026 **Summer Research Support, U.S. Naval Research Laboratory** (renewed annually)
Emergent sensor characterization: spectral estimation, Koopman/DMD analysis, ML anomaly detection

Talks and Presentations

Invited Talks

Mar 2022 **CUNY GC Harmonic Analysis and PDE Seminar**
CUNY Graduate Center

Aug 2019 **Wavelets and Sparsity**
SPIE Optics + Photonics

Jul 2019 **Algebra, Geometry, and Combinatorics of Subspace Packings**
SIAM Conference on Applied Algebraic Geometry

Special Session on Frame Theory
Sampling Theory in Signal and Image Processing (SampTA)

Apr 2018 **Special Session on Wavelets, Frames, and Related Expansions**
AMS Spring Western Sectional Meeting

Mar 2018 **AMS Special Session on Recent Advances in Packing**
AMS Spring Central Sectional Meeting

Contributed and Local Talks

Nov 2026 **Introduction to Google Colab**
Teaching Seminar, U.S. Naval Academy

Oct 2023 **Artificial Neural Networks: The Brain Behind AI**
Basic Notions Seminar (expository), U.S. Naval Academy

May 2023 **Discrete Optimization for Radar Waveforms**
IEEE Radar Conference 2023 (RadarConf23)

Teaching

U.S. Naval Academy (2022 – Present)

SM121 Calculus I

SM208 Data Science for Decision Makers
Introductory Python course for humanities majors. Course coordinator, 6 semesters

SM223 Calculus III with Optimization

Teaching (continued)

SM263 Applied Linear Algebra
Core course tailored to the Data Science major

SM361 Linear Algebra II

The Ohio State University (2018 – 2022)

Math 1172 Engineering Mathematics A
Engineering calculus 2

Math 2255 Differential Equations and Their Applications

Math 2415 Ordinary and Partial Differential Equations

Math 3345 Foundations of Higher Mathematics
Introductory proof course

University of Maryland, Instructor of Record (2012–2018)

Math 111 Introduction to Probability

Math 246 Introduction to and Classification of Differential Equations

Stat 100 Elementary Probability and Statistics

Mentorship

Undergraduate Research Mentorship

Fall 2021	**Yixin Xu** A Nonlinear Sum of Squares Search for CAZAC Sequences *Refereed conference paper published in IEEE RadarConf23*
2017 – 2018	**Katherine Cordwell** CAZAC sequences and Haagerup's characterization of cyclic N-roots *Published as a book chapter. Co-mentored with John J. Benedetto.*

Institutional Service

2025	**Faculty Performance Committee**
2023 –	**Majors Curriculum Committee**
2025 –	**Service Curriculum Committee**
2023 –	**Academic Advisor** Operations Research *Approx. 15 midshipmen per year*
2022 –	**Faculty Awards Committee**

Professional Service

2016 – 2018	**Norbert Wiener Seminar** Organizer
Apr 2020	**Special Session on Optimization for Discrete Geometry** Co-organizer AMS Spring Central Sectional Meeting. *Cancelled due to COVID-19.*

Manuscript Reviewer

2026	IEEE Information Theory Workshop 2027
2025	IEEE Transactions on Information Theory
2023	Sampling Theory, Signal Processing, and Data Analysis