Bryce Barclay

Curriculum Vitae

Bryce.Barclay@asu.edu

Education

August 2018 – August 2023 **PhD Applied Mathematics**, Arizona State University, Tempe, AZ 85287
co-advisors: Alex Mahalov and Eric J. Kostelich

August 2015 – May 2018 **BS Mathematics**, Arizona State University, Tempe, AZ 85287
summa cum laude

Research Interests

My research interests include data-oriented mathematics, radar signal processing, harmonic analysis, and stochastic differential equations.

Research Experience, Positions, and Fellowships

May 2023 – Present Arizona State University, Postdoctoral Research Scientist

May 2020 – January 2023 Lawrence Livermore National Laboratory Scholar
Summer 2020 - Data Science Summer Institute
Summer 2021 - Computing Scholar Program

August 2019 – May 2020 Arizona State University Research Training Group in Data-Oriented Mathematical and Statistical Sciences Fellowship

May – August 2019 Arizona State University Block Grant Summer Research Award, University Graduate Fellowship. Topic: Optimal Sensor Location in Wave Propagation.

January – May 2019 Arizona State University, Research Assistant

Publications

Bryce M Barclay and Alex Mahalov. Transmission frequency estimation and sensor signal processing for nonlinear receiver motion in stratified media. USPTO Provisional Patent No. 63/863,327. Filed August 13, 2025

Bryce Barclay and Alex Mahalov. Spectral distortions of signals induced by nonlinear sensor motion: Acceleration, jolt, and relativistic effects. *IEEE 59th Annual Asilomar Conference on Signals, Systems and Computers: Signal Processing and Learning for Communication Systems*, 2025. To be published in IEEE Xplore, March 2026

Bryce M Barclay, Eric J Kostelich, and Alex Mahalov. Doppler effects of nonlinear sensor motion in 3D space: Curvature, torsion, jolts, and directional wave propagation. *IEEE Transactions on Antennas and Propagation*, 73(3):1840–1845, 2025

Bryce M Barclay, Eric J Kostelich, and Alex Mahalov. Physics-informed signal processing for time series data from accelerating sensors. *IEEE Transactions on Antennas and Propagation*, 73(1):528–538, 2025

Mohamed Moustaoui, Bryce M Barclay, and Eric J Kostelich. Semi-implicit computation of fast modes in a scheme integrating slow modes by a leapfrog method based on a selective implicit time filter. *Monthly Weather Review*, 151(12):3133–3149, 2023

Bryce M Barclay, Eric J Kostelich, and Alex Mahalov. Vectorial EM propagation governed by the 3D stochastic Maxwell vector wave equation in stratified layers. *Atmosphere*, 14(9):1451, 2023

Bryce M Barclay, Eric J Kostelich, and Alex Mahalov. Sensor placement sensitivity and robust reconstruction of wave dynamics from multiple sensors. *SIAM Journal on Applied Dynamical Systems*, 21(4):2297–2313, 2022

Teaching and Mentoring Experience

August 2024 – May 2025 Honors thesis committee member for Ashton Mitchell. Thesis: Inverse Kinematics for Serial Linked Mechanisms.

January 2023 – May 2024 Undergraduate research mentoring for Zachary Turner, NSF Graduate Research Fellowship recipient. Project: Acoustic wave propagation, sensing, and signal reconstruction.

August 2018 – May 2023 Arizona State University, Graduate Teaching Assistant:

Instructor of Record:

MAT 170 - Precalculus

MAT 265 - Calculus I for Engineers

MAT 266 - Calculus II for Engineers

Other TA Positions:

APM 502 - Partial Differential Equations

APM 525-MAE 598 - High-Performance Computing

Talks and Presentations

January 2026 Dynamics Days Conference at the University of Arizona. Invited Presentation Title: "The Dynamic Doppler Effects of Nonlinear Sensor Motion: 4-D Geometry and the Frenet-Serret Framework".

November 2025 Seminar at the University of Washington. Title: "Dynamic Doppler Effects: Spectral Distortions of Signals Induced by Nonlinear Motion in a Relativistic Framework".

October 2025 IEEE Asilomar Conference on Signals, Systems, and Computers. Title: "Spectral Distortions of Signals Induced by Nonlinear Sensor Motion: Acceleration, Jolt, and Relativistic Effects".

February 2025 AFOSR Mini-Conference at the Air Force Research Laboratory. Invited presentation title: "Vectorial EM Wave Propagation Governed by 3D Stochastic Maxwell in Inhomogeneous Shear Layers: Modeling and Simulation Beyond Paraxial Framework".

December 2024 — Analysis, Dynamics, and Applications seminar at the University of Arizona. Invited presentation title: "Dynamic Doppler Effects in 3D Space: Acceleration and Sensor Path Geometry".

October 2023 — Kavli Institute for Theoretical Physics Conference: Interfaces and Mixing in Fluids, Plasmas, and Materials. Invited presentation title: "Vectorial EM signal reconstruction in stochastic, inhomogeneous media and optimal observation times", doi:10.26081/K6QH5F.

May 2023 — SIAM Conference on Applications of Dynamical Systems 2023. Presentation title: "Stochastic Maxwell's Equations: Reconstruction of Waves from Time Series Data using Optimal Observation Time".

January 2023 — AMS Joint Mathematics Meetings 2023. Presentation title: "Stochastic Maxwell's Equations: Robust Reconstruction of Wave Dynamics from Multiple Sensors and Optimal Observation Time".

December 2019 — RTG: Data-Oriented Mathematical and Statistical Sciences Seminar at Arizona State University. Presentation title: "Sensor Placement for the Maxwell Vector Wave Equation in the Stratified Ionosphere".

August 2019 — Earth Systems Models at Arizona State University. Presentation title: "Data Assimilation: Kalman Filter and Applications".

January 2018 — AMS Joint Mathematics Meetings 2018. Presentation title: "Comparison of Simulated Models for ADR Systems to Idealized Models with Constant Reaction Propagation Speed".