Morgan Byers

morgan.byers@colorado.edu | mbyers31.github.io

Education

Ph.D. in Computer Science August 2021 - ongoing

University of Colorado - Boulder

GPA: 3.97 / 4.0

Advised by Dr. Liz Bradley and Dr. Jim Meiss

Master of Science in Computer Science August 2025

University of Colorado - Boulder

Bachelor of Science in Computer Science and Mathematics August 2017 - May 2021

Texas State University

GPA: 4.0 / 4.0, Graduated Summa Cum Laude

Honors Thesis: Topological Data Analysis for Anxiety Detection in Text, Advised by Dr. Vangelis Metsis

Awards

Computer Science Department Conference Support Fellowship Spring 2025, Spring 2026
Dynamics Days Poster Presentation Award January 2026
Computer Science Departmental Service Award Spring 2025
Center for Teaching and Learning Best Should Teach Silver Award Spring 2025

Publications

Journal Articles

G. Gharooni-Fard*, **M. Byers***, V. Deshmukh* et al., "A Computational Topology-based Spatiotemporal Analysis Technique for Honeybee Aggregation." NPJ Complexity 1, 3 (2024). https://doi.org/10.1038/s44260-024-00003-1
*co-first authors

M. Byers, M. Trahan, E. Nason, C. Eigege, N. Moore, M. Washburn, V. Metsis. "Detecting Intensity of Anxiety in Language of Student Veterans with Social Anxiety Using Text Analysis," Journal of Technology in Human Services, pp. 1 – 21, March 2023. [Online] available: https://www.tandfonline.com/doi/pdf/10.1080/15228835.2022.2163452

Conference Papers

M. Byers, L. Hinkle, V. Metsis, "Topological Data Analysis of Time-Series as an Input Embedding for Deep Learning Models," in The 17th International Conference on Artificial Intelligence Applications and Innovations, Greece, 2022.

M. Byers, V. Metsis, "Text Analysis for Understanding Symptoms of Social Anxiety in Student Veterans," in The Thirty-Fifth AAAI Conference on Artificial Intelligence proceedings of the Undergraduate Consortium, virtual, 2021.

Selected Presentations

Conference Talks

M. Byers, E. Garling, E. Bradley, K. A. Gibbs, J. D. Meiss, "The Spatiotemporal Dynamics of *Proteus Mirabilis* Swarming" in SIAM Conference on Applications of Dynamical Systems (DS25), Denver, CO, 2025.

M. Byers, B. Kirkpatrick, N. Skillin, E. Bradley, "Topological Data Analysis of Myoblast Self-Assembly" in SIAM Conference on Applications of Dynamical Systems (DS23), Portland, OR, 2023.

M. Byers, V. Metsis, "The Hidden Shape of Data: Topological Data Analysis for Stress Detection in Text," in Texas State University Honors Thesis Symposium, San Marcos, TX, 2021.

Poster Presentations

M. Byers, E. Garling, E. Bradley, K. A. Gibbs, J. D. Meiss, "A Multi-Scale Spatial Analysis of *Proteus mirabilis* Swarm Dynamics" in Dynamics Days 2026, Tucson, AZ, 2026.

M. Byers, E. Garling, E. Bradley, K. A. Gibbs, J. D. Meiss, "The Spatiotemporal Dynamics of *Proteus Mirabilis* Swarming" in Dynamics Days 2025, Denver, CO, 2025.

M. Byers, J. Chittidi, E. Bradley, M. MacGregor, J. D. Meiss, "Computational Topology Techniques for Detecting Exoplanet Signatures" in Dynamics Days 2025, Denver, CO, 2025.

M. Byers, Z. Kirkpatrick, N. Skillin, L. Bradley, J. Meiss, "Topological Data Analysis of Myoblast Self-Assembly" in Dynamics Days 2023, virtual, 2023.

Seminars

M.Byers, E. Garling, E. Bradley, K. A. Gibbs, J. D. Meiss, "Spatiotemporal Analysis of *Proteus Mirabilis* Swarming" in the Department of Mathematics BioMath Seminar Series, The College of William & Mary, Williamsburg, VA, November 2025.

M.Byers, S. Wood, D. Carr, R. Raj, "Teaching to non-majors" in the Center for Teaching and Learning Fall Intensive, The University of Colorado - Boulder, Boulder, CO, August 2024. *Joint presentation.*

M.Byers, J. Chitidi, E. Bradley, M. MacGregor, "A Topology-Informed Approach to Protoplanet Discovery" in the Computer Science Graduate Student Research Colloquia Series, The University of Colorado - Boulder, Boulder, CO, November 2023.

Teaching

CSCI 2270: Data Structures

Instructor of Record (3 semesters)

Prepared course content and lecture materials for classes of 40 - 150 students. Managed course staff comprised of teams of up to eight graduate TAs, two graders and up to five undergraduate course assistants. Course content includes an overview of dynamic memory management in C++, data structures and basic algorithms.

Co-lecturer (1 semester)

Prepared lecture materials for a class of approximately 100 students in conjunction with the instructor of record. Collaborated with the instructor to provide a seamless experience for students by designing a lecture schedule that weaved conceptual topics with implementation examples.

TA (2 semesters)

Prepared course materials, held office hours, and conducted recitation for approximately 35 students.

CSCI 5446: Chaotic Dynamics

Grader (1 semester)

Assisted students with homework on topics in nonlinear dynamics including fractal analysis, attractor characterization, and Runge-Kutta methods.

Provided feedback at the graduate level for weekly student assignments.

CSCI 2275: Programming and Data Structures

TA (1 semester)

Prepared course materials, held office hours, and conducted recitation for approximately 25 students in an accelerated learning environment. Course content includes C++ syntax and an overview of data structures and basic algorithms.

CSCI 1300: Starting Computing

TA (3 semesters)

Prepared course materials, held office hours, and conducted recitation for approximately 40 students. Course content covers computational thinking and C++ programming skills.

Service

Pedagogy Committee Student Representative Spring 2025 - ongoing

Provided pedagogical guidance to instructors affiliated with the department including advice on teaching in the age of AI and managing large teams of course staff. Conducted TA exit surveys and collated information into actionable reports for all undergraduate courses in the department.

Center for Teaching and Learning (CTL) Lead TA Fall 2024 - Spring 2025

Conducted monthly trainings for approximately 70 TAs in the Department of Computer Science, as well as an intensive eight-week training for approximately 30 first-time TAs and a three-day orientation for approximately 70 new instructional staff members (TAs, graders, and course managers). Conducted three teaching observations for the CTL.

Technical Skills

Programming Languages, Libraries, and APIs

C & C++ | Cuda, OpenMP, MPI, pthreads, GTest

Python | Gudhi, Persim, Ripser, scikit-learn, NumPy, NetworkX

Tools and Services

Cmake

Linux | Slurm, Make

Git