Daniel DeLayo

Fourth-Year Computer Science Ph.D. Student

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Education

2021 – **Ph.D. Student, Computer Science,** Stony Brook University.
Research Interests: *Parallel Algorithms, Cache and Memory Management, Theory & Practice*
Advisor: *Michael A. Bender*

2017 – 2021 **B.S. Computer Science,** Stony Brook University.
Honors: *Summa Cum Laude, Honors College, Honors Computer Science*.
GPA: 3.95/4.0

Employment History

2019 – **Research Assistant,** Stony Brook University, *Computer Science.*

2021 – 2024 **Intern,** Sandia National Labs, *Cyber Security & Analytics*.

2018 – 2018 **Research Assistant,** Stony Brook University, *Physics*.

Research Interests

My work straddles theory and practice; I solve hard theoretical problems motivated by real problems and build state of the art parallel systems with strong theoretical foundations. I design efficient and practical parallel algorithms primarily through memory-based optimizations, whether it's memory movement in a cache or data contention in a parallel system. Through theoretical analysis and performance engineering, I overcome these memory-based bottlenecks to produce high-performance and practical algorithms.

Research Publications

Journal Articles

1. D. Tench, E. West, V. Zhang, M. A. Bender, A. Chowdhury, **D. DeLayo**, J. A. Dellas, M. Farach-Colton, T. Seip, and K. Zhang. "GraphZeppelin: How to Find Connected Components (Even When Graphs Are Dense, Dynamic, and Massive)". In: *ACM Transactions on Database Systems* 49 (3 Sept. 2024), pp. 1–31. DOI: 10.1145/3643846.

2. J. Vorobyeva, **D. R. DeLayo**, M. A. Bender, M. Farach-Colton, P. Pandey, C. A. Phillips, S. Singh, E. D. Thomas, and T. M. Kroeger. "Using advanced data structures to enable responsive security monitoring". In: *Cluster Computing* 25 (4 Aug. 2022), pp. 2893–2914. DOI: 10.1007/s10586-021-03463-5.

Conference Proceedings

3. D. Tench, E. T. West, K. Zhang, M. A. Bender, **D. DeLayo**, M. Farach-Colton, G. Gill, T. Seip, and V. Zhang. "Exploring the Landscape of Distributed Graph Sketching". In: *2025 Proceedings of the Symposium on Algorithm Engineering and Experiments (ALENEX)*. Society for Industrial and Applied Mathematics, Jan. 2025, pp. 133–146. DOI: 10.1137/1.9781611978339.11.

4. M. A. Bender, **D. DeLayo**, B. C. Kuszmaul, W. Kuszmaul, and E. West. "Increment-and-Freeze: Every Cache, Everywhere, All of the Time". In: *Proceedings of the 35th ACM Symposium on Parallelism in Algorithms and Architectures*. ACM, June 2023, pp. 129–139. DOI: 10.1145/3558481.3591085.

5 **D. DeLayo**, K. Zhang, K. Agrawal, M. A. Bender, J. W. Berry, R. Das, B. Moseley, and C. A. Phillips. "Automatic HBM Management". In: *Proceedings of the 34th ACM Symposium on Parallelism in Algorithms and Architectures*. ACM, July 2022, pp. 147–159. DOI: 10.1145/3490148.3538570.

Pending Publication

6 M. A. Bender, A. Conway, **D. DeLayo**, M. Farach-Colton, J. Han, L. Han, R. Johnson, S. Kannan, W. Kuszmaul, D. Porter, and E. West. "Don't Melt Your Cache: Low-Associativity with Heat-Sink". Submitted to SPAA 2025.

7 Q. De Man, Q. Jafri, **D. DeLayo**, E. West, D. Tench, and M. A. Bender. "CUPCaKE: Fast and Compact Dynamic Connectivity". Pending Submission to SIGMOD 2026.

Awards

2024 **NSF Student Travel Grant**, Symposium on Parallelism in Algorithms and Architectures (SPAA).
2023 **CLSAC Invited Student Poster**, Chesapeake Large-Scale Analytics Conference.
2022 **GAANN Fellowship**, Stony Brook University.

Talks and Presentations

2024 **PhD Prelim**, Increment-and-Freeze: Every Cache, Everywhere, All of the Time.
2023 **CLSAC,** Stateful Streaming with External Memory On Workstations.
2022 **SPAA,** Automatic HBM Management: Models and Algorithms.
MAPSP, Automatic HBM Management: Models and Algorithms.

Teaching Experience

2025 **Honors Algorithms,** Probability Lecture.
2023 **Graduate System Security,** Teaching Assistant.
2021 **Honors Algorithms**, Teaching Assistant.
2018 **Intro to Computer Science**, Teaching Assistant.

Professional Service

2025 **Peer Review**, SPAA.
2024 **Artifact Evaluation**, ALENEX.
2023 **Peer Review**, ESA.
2022 **Peer Review**, IPDPS.