Frederick Stock

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+1-860-759-5072 https://scholar.google.com/citations?user=VzJruXwAAAAJ

Experience

University of Massachussets Lowell Fall 2023 – Spring 2024

Teaching Assistant

- Three sections
- Recitation, Office hours, Grading, Managing graders

Education

University of Massachussets Lowell 2022 – 2026

Ph.D. in Computer Science

Rochester Institute of Technology 2017 – 2021

Bachelor of Science in Applied Mathematics

Service

Technical and Adminstrative Support: Fall Workshop on Computational Geometry (FWCG) 2024
Sub-Reviewer: International Symposium on Distributed Computing (DISC) 2025
Sub-Reviewer: International Symposium on Computational Geometry (SoCG) 2025, 2024
Sub-Reviewer: Journal on Computational Geometry (JoCG) 2025
Sub-Reviewer: The Canadian Conference on Computational Geoemtry (CCCG) 2024
Sub-Reviewer: International Symposium on Algorithms and Computation (ISAAC) 2024
Sub-Reviewer: Journal of Information Processing (JCDCGGG Special Issue) (JIP) 2024

Publications

Upcoming Publications

1. "Super Guarding and Dark Rays in Art Galleries" (Joint work with MIT CompGeom Group, Hugo A. Akitaya, Erik D. Demaine, Adam Hesterberg, Anna Lubiw, Jayson Lynch & Joseph O'Rourke), *Discrete Mathematics & Theoretical Computer Science (DMTCS)*, TBA
2. "A Universal In-Place Reconfiguration Algorithm for Sliding Cube-Shaped Robots in a Quadratic Number of Moves" (Joint work with Zachary Abel, Hugo A. Akitaya, Scott Duke Kominers & Matias Korman), *The Journal of Computational Geometry (JoCG)*, TBA
3. "Agent Motion Planning as Block Asynchronous Cellular Automata: Pushing, Pulling, Suplexing, and More" (Joint work with MIT Hardness Group, Hayashi Ani, Josh Brunner, Erik D. Demaine, Jenny Diomidova, Timothy Gomez, Della Hendrickson, Yael Kirkpatrick, Jeffery Li, Jayson Lynch & Ritam Nag), *Natural Computing (NACO)*, TBA
4. "Connectivity Augmentation for Planar Graphs and Beyond-Planar Graphs" (Joint work with Hugo Akitaya, Justin Dallant, Erik Demaine, Michael Kaufmann, Linda Kleist, Csaba D. Tóth & Torsten Ueckerdt), *The 33rd International Symposium on Graph Drawing and Network Visualization (GD)*, 2025
5. "Sliding Squares in Parallel" (Joint work with Hugo Akitaya, Sándor Fekete, Peter Kramer, Saba Molaei, Christian Rieck & Tobias Wallner), *The European Symposium on Algorithms (ESA)*, 2025

Journal Papers

6. "Minimum Plane Bichromatic Spanning Trees" (Joint work with Hugo Akitaya, Ahmad Biniaz, Erik Demaine, Linda Kleist & Csaba D. Tóth), *ACM Transactions on Algorithms (Transactions on Algorithms)*,

2024

7. "Physical Visitor Access Control and Authentication Using Blockchain, Smart Contracts and Internet of Things" (Joint work with Yesem Kurt Peker, Alfredo J. Perez & Jarel Hearst), *Cryptography (MDPI), Special Issue on Emerging Topics in Blockchain Security and Privacy (Cryptography)*, 2022

Conference Proceedings

8. "Input-Sensitive Reconfiguration of Sliding Cubes" (Joint work with Hugo Akitaya & Matias Korman), *The Canadian Conference on Computational Geometry (CCCG)*, 2025
9. "Quasigeodesics on the Cube" (Joint work with MIT CompGeom Group, Hugo A. Akitaya, Erik D. Demaine, Adam Hesterberg, Thomas C. Hull, Anna Lubiw, Jayson Lynch, Klara Mundilova, Chie Nara, Joseph O'Rourke, Josef Tkadlec & Ryuhei Uehara), *The Canadian Conference on Computational Geometry (CCCG)*, 2025
10. "On Inside-out Dissections of Polygons and Polyhedra" (Joint work with Reymond Akpanya & Adi Rivkin), *The Canadian Conference on Computational Geometry (CCCG)*, 2025
11. "Brief Announcement: Broadcast via Mobile Agents in a Dynamic Network: Interplay of Graph Properties & Agents" (Joint work with William K. Moses Jr. & Amanda Redlich), *4th Symposium on Algorithmic Foundations of Dynamic Networks (SAND)*, 2025
12. "Finding Shortest Reconfiguration Sequences for Modular Robots" (Joint work with UML Modular Robotics Group, Hugo A. Akitaya, Andrew Clements, Sam Downey, Jonathan Eisenbies, Soham Samanta & Gabriel Shahrouzi), *41st International Symposium on Computational Geometry Media Exposition (SoCG:ME 2025)*, 2025
13. "Navigation in dynamic graphs: How to defeat the Acme Graph Exploder" (Joint work with Amanda Epping Redlich & William K Moses Jr.), *2025 Spring Eastern Sectional Meeting of the American Mathematical Society (AMS Spring 2025)*, 2025
14. "Minimum Plane Bichromatic Spanning Trees" (Joint work with Hugo A. Akitaya, Ahmad Biniaz, Erik D. Demaine, Linda Kleist & Csaba D. Tóth), *35th International Symposium on Algorithms and Computation (ISAAC)*, 2024
15. "Easier Ways to Prove Counting Hard: A Dichotomy for Generalized #SAT, Applied to Constraint Graphs" (Joint work with MIT Hardness Group, Josh Brunner, Erik D. Demaine, Jenny Diomidova, Timothy Gomez, Markus Hecher & Zixiang Zhou), *35th International Symposium on Algorithms and Computation (ISAAC)*, 2024
16. "Agent Motion Planning as Block Asynchronous Cellular Automata: Pushing, Pulling, Suplexing, and More" (Joint work with MIT Hardness Group, Hayashi Ani, Josh Brunner, Erik D. Demaine, Jenny Diomidova, Timothy Gomez, Della Hendrickson, Yael Kirkpatrick, Jeffery Li, Jayson Lynch & Ritam Nag), *21st International Conference on Unconventional Computation and Natural Computation (UCNC)*, 2024
17. "A Universal In-Place Reconfiguration Algorithm for Sliding Cube-Shaped Robots in a Quadratic Number of Moves" (Joint work with Zachary Abel, Hugo A. Akitaya, Scott Duke Kominers & Matias Korman), *40th International Symposium on Computational Geometry (SoCG)*, 2024
18. "Deltahedral Domes over Equiangular Polygons" (Joint work with MIT CompGeom Group, Hugo Akitaya, Erik Demaine, Adam Hesterberg, Anna Lubiw, Jayson Lynch, Joseph O'Rourke & Josef Tkadlec), *40th International Symposium on Computational Geometry (EuroCG)*, 2024
19. "Super Guarding and Dark Rays in Art Galleries" (Joint work with MIT CompGeom Group, Hugo A. Akitaya, Erik D. Demaine, Adam Hesterberg, Anna Lubiw, Jayson Lynch & Joseph O'Rourke), *The Canadian Conference on Computational Geometry (CCCG)*, 2023
20. "Blockchain Ensured Physical Visitor Access Control and Authentication" (Joint work with Jarel Hearst & Yessem Kurt Peker), *IEEE International Conference on Mobile Ad Hoc and Smart Systems, REUNS (IEEE MASS REUNS)*, 2022

Other Publications

21. "Open Problems from CCCG 2025" (Joint work with Hugo Akitaya), *The Canadian Conference on Computational Geoemtry (CCCG)*, 2025
22. "Hardness Table Layout Hardness Table" (Joint work with MIT Hardness Group, Josh Brunner, Andy Tockman, Della Hendrickson, Hayashi Layers, Timothy Gomez, Erik D. Demaine & Jenny Diomidova), *SIGTBD*, 2025
23. "Open Problems from CCCG 2024" (Joint work with Reymond Akpanya & Bastien Rivier), *The Canadian Conference on Computational Geoemtry (CCCG)*, 2024

Preprints

Reconfiguration of 3D Pivoting Modular Robots DOI 2023

Presentations

1. "Input-Sensitive Reconfiguration of Sliding Cubes" *The Canadian Conference on Computational Geometry*, 2025
2. "On Inside-out Dissections of Polygons and Polyhedra" *The Canadian Conference on Computational Geometry*, 2025
3. "Finding Shortest Reconfiguration Sequences for Modular Robots" *41st International Symposium on Computational Geometry Media Exposition*, 2025
4. "Minimum Plane Bichromatic Spanning Trees" *35th International Symposium on Algorithms and Computation*, 2024
5. "Easier Ways to Prove Counting Hard: A Dichotomy for Generalized #SAT, Applied to Constraint Graphs" *35th International Symposium on Algorithms and Computation*, 2024
6. "A Universal In-Place Reconfiguration Algorithm for Sliding Cube-Shaped Robots in a Quadratic Number of Moves" *40th International Symposium on Computational Geometry*, 2024
7. "Super Guarding and Dark Rays in Art Galleries" *The Canadian Conference on Computational Geometry*, 2023
8. "Reconfiguration of 3D Pivoting Modular Robots" *SoCG Young Researchers Forum*, 2023
9. "Blockchain Ensured Physical Visitor Access Control and Authentication" *IEEE International Conference on Mobile Ad Hoc and Smart Systems, REUNS*, 2022

Accolades

Magnum Cum Laude 2021