

Benjamin Holmgren

Montana State University

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Education

2018–present **Computer Science (Interdisciplinary) and Mathematics (Pure) Majors.**

Montana State University, Bozeman, MT

2018 **General Coursework with focus in Neuroscience and Economics.**

Middlebury College, Middlebury, Vermont

Technical Skills

Programming Languages Java, C, C++, Python, R, MATLAB, Fortran, Dart, Go, Lisp

Other Tools Git, Jekyll, Rcpp library, UML

Projects

November **Research in Discrete Morse Theory (DMT).**

2019 to **Title:** *If You Must Choose Among Your Children, Always Pick the Right One*

present **Description:** Proposal of new algorithms to generate Discrete Morse Functions with improved time complexity. Published in the 2020 Canadian Conference on Computational Geometry.

Title: *Using Hasse Diagrams to Compute a Gradient Vector Field*

Description: Poster Presentation accepted to NCUR 2020 (which was then cancelled) on the above topics.

Title: Poking a Simplicial Complex

Description: Multidisciplinary Research Project to make educational videos on the goals of DMT. Illustrates simplicial collapses.

Fall 2018 to **R Package 'TDA' Documentation.**

present **Description:** Generated documentation for the R package 'TDA'. Includes work on vignettes, various website tutorials, and a nationwide workshop funded by the NSF. Though cancelled due to COVID-19, the workshop is scheduled for Fall 2020. Tutorials presented in MSU undergraduate research poster session in Spring 2019.

Fall 2018 to **Relevant Course Projects.**

present **Graphics:** Programmed a maze game and various scenes using OpenGL and Ray-tracing.

Software Engineering: Created course registration software in a group setting

Multidisciplinary Engineering: Programmed and wired an RC vehicle to complete an obstacle course

Fall 2018 to **Other Side Projects.**

present Working currently on implementing persistent homology techniques in neural-mapping, and on economic data to model and distinguish growth in different sectors

Honors and Awards

- Montana State University Cameron Presidential Scholar
- John C. Felton Scholarship from the Norm Asjornson College of Engineering
- Phi Kappa Phi Member
- Pi Mu Epsilon Member
- 2019-2020 MSU School of Computing Undergraduate Researcher of the Year
- MSU Honors College
- MUS Scholarship Recipient
- 3.93 GPA