Bridger **Herman** — Ph.D. Candidate

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Education

2018-2023 (expected) | **Ph.D., Computer Science** — University of Minnesota – Minneapolis, MN
- Advisor: Daniel F. Keefe
- Specializations: Data visualization, mixed reality, data physicalization

2018-2020 | **M.S., Computer Science** — University of Minnesota – Minneapolis, MN
- Specializations: Data visualization, mixed reality, data physicalization

2014-2018 | **B.S., Computer Science** — University of Minnesota – Minneapolis, MN
- Specializations: Computer graphics, virtual reality
- Minor in mathematics

Spring 2017 | **Study Abroad** — University of Auckland – Auckland, New Zealand
- Courses: Computer Graphics, User Interface Design, New Zealand Conservation, Māori Language

Research Experience

Dissertation title: *Creating Touch-Enabled Augmented Physicalizations to Enrich Data Conversations*

Research interests: using virtual and augmented reality to visualize data; using digital fabrication techniques to make data tangible; making visualizations accessible to more people through artist-curated, nature-inspired artifacts and diverse display media

2018-Present | **Research Assistant** — University of Minnesota – Minneapolis, MN
- Developed and evaluated sensing techniques for multi-touch input on data physicalizations
- Led a software team of 5 graduate and undergraduate students for developing cross-platform user interfaces and graphics techniques for use by artists to create engaging data visualizations
- Created a software architecture for mixed reality visualizations with artist-made visual media
- Collaborated on 3 multi-disciplinary projects involving teams at the University of Minnesota Twin Cities, the University of Texas at Austin, and other universities

C# | C++ | Unity Engine | Python | JavaScript | jQuery | CSS | HTML | Blender | Motive | ParaView

2016-2018 | **Undergraduate Research Assistant** — University of Minnesota – Minneapolis, MN
- Proposed a set of design guidelines for 3D printing a field of glyphs on top of a data-driven surface
- Built a toolkit of Python scripts for generating 3D-printed data visualizations

Blender | Python | MeshLab | 3D Printing

Spring 2017 | **Undergraduate Research Assistant** — University of Auckland – Auckland, NZ
- Developed a series of scripts to automate the process of capturing 3D models from photographs

C++ | C# | Python

Professional Experience

Summer 2018 | **Software Development Intern** — Bitwise IO, Inc. – Minneapolis, MN
- Developed a blockchain consensus algorithm in Rust based on prior published work
- Made contributions to open-source projects Hyperledger Sawtooth and Sawtooth PBFT Consensus

Rust | Protobuf | Git | Docker | Blockchain | Consensus Algorithms

Publications

2022 D. F. Keefe, **B. Herman**, J. W. Nam, D. T. Orban, and S. Johnson, "Hybrid data constructs: Interacting with biomedical data in augmented spaces," in *Making Data: The Creative Practice of Materialising Digital Information (in publication)*, London, England: Bloomsbury, 2022

2021 **B. Herman**, M. Omdal, S. Zeller, C. A. Richter, G. Abram, F. Samsel, and D. F. Keefe, "Multi-touch querying on data physicalizations in immersive AR," in *Proceedings on Human Computer Interaction*, ACM, 2021

2020 **B. Herman**, F. Samsel, A. Bares, S. Johnson, G. Abram, and D. F. Keefe, "Printmaking, puzzles, and studio closets: Using artistic metaphors to reimagine the user interface for designing immersive visualizations," in *Transactions on Visualization and Computer Graphics*, IEEE, 2020

C. Weissman, **B. Herman**, S. Zeller, F. Samsel, and D. F. Keefe, "Poster: Automatic generation of data legends for multi-variate artist driven visualizations." IEEE SciVis Posters, 2020. SciVis Best Poster Award

2019 S. Johnson, F. Samsel, G. Abram, D. Olson, A. J. Solis, **B. Herman**, P. J. Wolfram, C. Lenglet, and D. F. Keefe, "Artifact-based rendering: Harnessing natural and traditional visual media for more expressive and engaging 3d visualizations," *IEEE Trans. on Visualization and Computer Graphics*, vol. 11, no. 1, pp. 492–502, 2019

2018 **B. Herman** and D. F. Keefe, "Workshop paper: Boxcars on potatoes: Exploring the design language for tangible visualizations of scalar data fields on 3d surfaces." Toward a Design Language for Data Physicalization: Workshop at IEEE VIS 2018, 2018

Conference Presentations

November 2021 Presenting author, "Multi-Touch Querying on Data Physicalizations in Immersive AR." Paper talk at ACM Interactive Surfaces and Spaces. Łódź, Poland, virtual.

July 2021 Presenter, "Sculpting Vis: A Puzzle-piece approach to teaching scientific visualization." Tutorial at WeTeach_CS Summit 2021. Austin, Texas, USA, virtual.

October 2020 Presenting author, "Printmaking, Puzzles, and Studio Closets: Using artistic metaphors to reimagine the user interface for designing immersive visualizations." Paper talk at IEEE VIS Arts Program 2020. Salt Lake City, Utah, USA, virtual.

October 2020 Presenter, "Artifact-Based Rendering: VR Visualization by Hand ." Tutorial at IEEE VIS 2020. Salt Lake City, Utah, USA, virtual.

October 2019 Poster presentation: "Linked View Visualization Using Clipboard-Style Mobile VR: Application to Communicating Forestry Data." Poster session at IEEE VIS 2019. Vancouver, British Columbia, Canada.

October 2018 Presenting author, "Boxcars on potatoes: Exploring the design language for tangible visualizations of scalar data fields on 3d surfaces." Lightning talk at workshop "Toward a Design Language for Data Physicalization," IEEE VIS 2018. Berlin, Germany.

Teaching Experience

Spring 2022 | Assistant Instructor — University of Minnesota – Minneapolis, MN

Course: CSCI 5609 – Visualization

- Designed and taught class sessions for 75 students in hybrid virtual/in-person mode
- Created course assignments that integrate with my own research in artist-driven visualization
- Led in-class critique for student project submissions

Fall 2019, 2021 | **Teaching Assistant** — University of Minnesota – Minneapolis, MN

Course: CSCI 4611 – Programming Interactive Computer Graphics and Games

- Created new written assignments to accompany existing programming projects with the purpose of emphasizing understanding of computer graphics concepts
- Graded written and programming assignments
- Revitalized grading scripts for the course

C++ | Markdown | Python

Fall 2020 | **Instructor** — University of Minnesota – Minneapolis, MN

Course: CSCI 1133 – Introduction to Computing and Programming Principles

- Designed and taught remote lectures for 40 students
- Created learning assessment materials
- Administered remote oral exams
- Managed a team of undergraduate TAs

Python | Markdown | OBS Studio | Zoom | gather.town | reveal.js

Fall 2018 | **Teaching Assistant** — University of Minnesota – Minneapolis, MN

Course: CSCI 5619 – Virtual Reality and 3D Interaction

- Wrote three tutorials on developing virtual reality applications with Unity and Unreal game engines
- Led aforementioned tutorials for two-hour sessions with about 50 students
- Graded student programming assignments

C# | Unity Engine | Unreal Engine | LaTeX

2015-2018 | **Undergraduate Teaching Assistant** — University of Minnesota – Minneapolis, MN

Course: CSCI 1133 – Introduction to Computing and Programming Concepts

- Taught lab sections of about 30 students
- Formulated new course material for labs
- Graded weekly programming assignments, quizzes, exams
- Developed collaborative Python homework-grading script

Python

Volunteering

2019-Present | **Fleet Manager** — Minnesota Brass, Inc. – St. Paul, MN

- Managed a pool of drivers to ensure that equipment trailers got to their destinations each weekend
- Recruited and taught new truck drivers the basics of driving a rig

2018-Present | **Percussion Instructor** — Minnesota Brass, Inc. – St. Paul, MN

- Led music and performance rehearsals for small groups of students
- Designed and set up a new speaker and microphone arrangement