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Department of Computer Science
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Education

Ph.D., Computer Science, Jan 2024 — University of Minnesota – Twin Cities, Minneapolis, MN
Advised by Dr. Daniel F. Keefe
Thesis Title: *Physical Rendering Processes for More Graspable Extended Reality Data Visualizations*

M.S., Computer Science, May 2020 — University of Minnesota – Twin Cities, Minneapolis, MN

B.S., Computer Science, May 2018 — University of Minnesota – Twin Cities, Minneapolis, MN

Study Abroad, Mar – Jul 2017 — University of Auckland, Auckland, NZ

Positions and Employment

Visiting Assistant Professor — Carleton College, Northfield, MN
Sep 2024 – Present

Visualization Scientist — University of Minnesota – Twin Cities, Minneapolis, MN
May 2024 – Aug 2024

Assistant Director for Systems and Software — Interactive Visualization Lab, University of Minnesota – Twin Cities, Minneapolis, MN
May 2021 – Jan 2024

R&D Engineer – Human Factors — Abbott Laboratories, Inc., Cardiac Division, Saint Paul, MN
May 2022 – Aug 2022

Software Development Intern — Bitwise IO, Inc., Minneapolis, MN
May 2018 – Aug 2018

Honors and Awards

2024 IEEE VIS Best Paper Honorable Mention Award (Top 3% of Submissions)

2022 Finalist at SuperComputing '22 Scientific Visualization & Data Analytics Showcase

2020 IEEE VIS Best SciVis Poster Award

Research Themes

- Data Physicalization
- Augmented, Mixed, and Virtual Reality User Interfaces
- Tangible and Embodied Interactions
- Scientific Visualization

Publications

My role in each publication is described as follows:

- **[lead]** – leading author, in terms of technical, intellectual, and writing contributions
- **[mentor]** – mentored student(s) in technical, intellectual, and writing contributions
- **[collab]** – worked with lead author(s) and added significant technical, intellectual, and/or writing contributions

Peer Reviewed Publications

2024 **B. Herman**, C. D. Jackson, and D. F. Keefe, "Touching the Ground: Evaluating the Effectiveness of Data Physicalizations for Spatial Data Analysis Tasks," *IEEE Transactions on Visualization and Computer Graphics*, pp. 1–11, 2024, doi: 10.1109/TVCG.2024.3456377.
****Best Paper Honorable Mention**

2021 **B. Herman**, M. Omdal, S. Zeller, C. A. Richter, F. Samsel, G. Abram, and D. F. Keefe, "Multi-Touch Querying on Data Physicalizations in Immersive AR," *Proc. ACM Hum.-Comput. Interact.*, vol. 5, no. ISS, pp. 1–20, Nov. 2021, doi: 10.1145/3488542. **[lead]**

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 *2020 IEEE VIS Arts Program (VISAP)*, Oct. 2020, pp. 19–28. doi: 10.1109/VISAP51628.2020.00009. **[lead]**

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. Visual. Comput. Graphics*, pp. 1–1, 2019, doi: 10.1109/TVCG.2019.2934260. **[collab]**

Book Chapters

2022 D. F. Keefe, **B. Herman**, J. W. Nam, S. Johnson, and D. Orban, "Hybrid Data Constructs: Interacting with Biomedical Data in Augmented Spaces," in *Making Data: Materializing Digital Information*, 1st ed., Bloomsbury Publishing Plc, 2022, pp. 169–182. Accessed: Mar. 28, 2023. [Online]. Available: http://dx.doi.org/10.5040/9781350133266.ch-011 **[collab]**

Posters, Exhibitions, and Workshops

2024 *(Workshop Papercx)* **B. Herman**, J. Rossi-Mastracci, H. Willy, M. Reichert, and D. Keefe, "Rain Gauge: Exploring the Design and Sustainability of 3D Printed Clay Physicalizations," Aug. 30, 2024. Preprint Available: 10.31219/osf.io/3nyrq. **[lead]**

2022 *(Poster)* M. L. Turner, **B. Herman**, M. Broske, and D. F. Keefe, "Linked Spatial and Temporal Normalization for Analysis of Cyclical 4D Skeletal Motion Data," 2022, [Online]. Available: https://ieeevis.b-cdn.net/vis_2022/posters/v-vis-posters-1046-summary.pdf **[collab]**

2022 *(Video Exhibition)* F. Samsel, G. Abram, S. Zeller, Z. Cao, P. Wolfram, **B. Herman**, and D. F. Keefe, "Cultivating Macroalgae for Biofuels: Visualizing the Chemistry," *International Conference for High Performance Computing Networking Storage and Analysis*, Nov. 2022, Accessed: Apr. 24, 2024. [Online]. https://par.nsf.gov/biblio/10378947-cultivating-macroalgae-biofuels-visualizing-chemistry **[collab]**
****Finalist at SuperComputing '22 Scientific Visualization & Data Analytics Showcase**

2020 *(Poster)* C. Weissman, **B. Herman**, S. Zeller, F. Samsel, and D. F. Keefe, "Automatic Generation of Data Legends for Multi-Variate Artist Driven Visualizations." 2020. **[mentor]**
****Best SciVis Poster**

2020 F. Samsel, D. F. Keefe, **B. Herman**, and G. Abram, "Human fingerprints and artistic vocabulary; rendering data, creating engagement, connection and context to earth system models." 2020.

2018 *(Workshop Paper)* **B. Herman** and D. F. Keefe, "Boxcars on Potatoes: Exploring the Design Language for Tangible Visualizations of Scalar Data Fields on 3D Surfaces," presented at the IEEE VIS Workshop: Toward a Design Language for Data Physicalization, Berlin, Germany, 2018. **[lead]**

Presentations

Conference Presentations

Oct 2024 IEEE VIS Full Paper Talk "Touching the Ground: Evaluating the Effectiveness of Data Physicalizations for Spatial Data Analysis Tasks." St. Pete Beach, Florida, USA. Virtual.

Oct 2024 IEEE VIS Workshop Talk "Rain Gauge: Exploring the Design and Sustainability of 3D Printed Clay Physicalizations." St. Pete Beach, Florida, USA. Virtual.

Nov 2021 ACM Interactive Surfaces and Space: "Multi-Touch Querying on Data Physicalizations in Immersive AR." Lódź, Poland, virtual.

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

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

Oct 2018 IEEE VIS Workshop Lightning Talk: "Boxcars on potatoes: Exploring the design language for tangible visualizations of scalar data fields on 3D surfaces." Berlin, Germany.

Workshops and Tutorials

July 2021 *(Workshop Organized)* D. F. Keefe, F. Samsel, and **B. Herman**, "Sculpting Vis: A Puzzle-piece approach to teaching scientific visualization." WeTeach_CS Summit Tutorial. Austin, Texas, USA, virtual.

Oct 2020 *(Tutorial Organized)* D. F. Keefe, F. Samsel, and **B. Herman**, "Artifact-Based Rendering: VR Visualization by Hand," IEEE VIS Tutorial. virtual.

Teaching Experience

Courses Taught at Carleton College (2024 – Present)

2024 – 2025

CS 111: Introduction to Computer Science
CS 208: Introduction to Computer Systems
CS 314: Data Visualization
CS 251: Programming Languages

University of Minnesota – Twin Cities (2015 – 2023)

Teaching Assistant
2018 – 2023

CSCI 4611: Programming Interactive Computer Graphics and Games
CSCI 5619: Virtual Reality and 3D Interaction

Assistant Instructor
Jan 2022 – May 2022

CSCI 5609: Visualization
Co-taught with Daniel F. Keefe, Distinguished Teaching Professor

Instructor
Sep 2020 – Dec 2020

CSCI 1133: Introduction to Computing and Programming Principles

Undergraduate Teaching Assistant
Sep 2015 – May 2018

CSCI 1133: Introduction to Computing and Programming Principles

Affiliations and Academic Service

Reviewing

2024 ACM Conference on Human Factors in Computing Systems (CHI)

2020 – Present IEEE Transactions on Visualization and Computer Graphics

2022 IEEE Conference on Virtual Reality and 3D User Interfaces

Professional Organizations

2021 – Present Association for Computing Machinery

Research Mentorship and Advising

2023 – Wanbo Geng (B.S.)
2020-2021 – Maxwell J. Omdal (M.S.)
2020 – Claire Weissman (B.S.)
2019 – Clara Richter (B.S.)
2018 – Irwin Sowah (B.S)

University of Minnesota – Twin Cities
Minneapolis, MN