Jakob Troidl

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About

I am a Ph.D. candidate in computer science at Harvard University, advised by Hanspeter Pfister. I am broadly interested in applied machine learning and data visualization, especially with applications in connectomics. Specifically, my research focuses on building representation learning approaches and scalable interactive visual analysis tools to analyze the hidden architecture of the brain.

Education

Harvard University — Cambridge, MA
Ph.D. in Computer Science, Advisor: Prof. Hanspeter Pfister — 2021–2025 (expected)

- Focus: Applied ML, Connectomics, Data Visualization

TU Wien — Vienna, Austria
M.Sc. & B.Sc (with Honors) in Computer Science, Advisor: Prof. Eduard Gröller — 2015–2021

- Focus: Biomedical Imaging, Computer Vision, Data Visualization
- GPA: 1.1/1.0

Experience

E11 Bio — Alemeda, CA
Machine Learning Fellow — 04/2025 - present

- Learning Automated Error Correction in Connectomics

HHMI Janelia — Ashburn, VA
Visiting Researcher with Dr. Srinivas Turaga — 05/2024 - present

- Building Generative Models of Neuronal Morphology

Harvard University — Cambridge, MA
Research Assistant with Prof. Hanspeter Pfister — 09/2021 - present

- Efficient and Scalable Analysis & Reconstruction Tools for Connectomics

King Abdullah University of Science & Technology (KAUST) — Thuwal, Saudi Arabia
Research Intern with Prof. Markus Hadwiger — 02/2019 - 05/2019

- Observer Relative Flow Visualization in Curved Spaces
- Co-authored a publication which won the SciVis Best Paper Award at IEEE VIS 2020

Brainlab AG — Munich, Germany
Research Intern — 08/2018 - 01/2019

- Path Tracing for Realtime 3D Medical Visualization
- Mixed Reality for 3D Medical Visualization

Peer Reviewed Publications

[1] S. Dorkenwald, C. M. Schneider-Mizell, D. Brittain, A. Halageri, C. Jordan, N. Kemnitz, M. A. Castro, W. Silversmith, J. Maitin-Shephard, **J., Troidl**, *et al.*, "CAVE: Connectome Annotation Versioning Engine", *Nature Methods*, 2025.

[2] S. Prabhakaran, C. Yapp, G. J. Baker, J. Beyer, Y. H. Chang, A. L. Creason, R. Krueger, J. Muhlich, N. H. Patterson, K. Sidak, D. Sudar, A. J. Taylor, L. Ternes, **J., Troidl**, Y. Xie, A. Sokolov, D. R. Tyson, and the Cell Imaging Hackathon Participants, "Addressing persistent challenges in digital image analysis of cancer tissue: Resources developed from a hackathon", *Molecular Oncology*, pp. 2025–02, 2025.

[3] A. Shapson-Coe, M. Januszewski, D. R. Berger, A. Pope, Y. Wu, T. Blakely, R. L. Schalek, P. H. Li, S. Wang, J. Maitin-Shepard, N. Karlupia, S. Dorkenwald, E. Sjostedt, L. Leavitt, D. Lee, **J. Troidl**, F. Collman, L. Bailey, A. Fitzmaurice, R. Kar, B. Field, H. Wu, J. Wagner-Carena, D. Aley, J. Lau, Z. Lin, D. Wei, H. Pfister, A. Peleg, V. Jain, and J. W. Lichtman, "A petavoxel fragment of human cerebral cortex reconstructed at nanoscale resolution", *Science*, vol. 384, no. 6696, 2024.

[4] S. Warchol, **J. Troidl**, J. L. Muhlich, R. Krueger, J. Hoffer, T. Lin, J. Beyer, E. Glassman, P. K. Sorger, and H. Pfister, "psudo: Exploring Multi-Channel Biomedical Image Data with Spatially and Perceptually Optimized Pseudocoloring", *Computer Graphics Forum (Proceedings Eurographics/IEEE Symposium on Visualization, Eurovis 2024*, vol. 43, no. 3, 2024.

[5] Z. Chen, C. Zhang, Q. Wang, **J. Troidl**, S. Warchol, J. Beyer, N. Gehlenborg, and H. Pfister, "Beyond Generating Code: Evaluating GPT on a Data Visualization Course", *IEEE VIS Workshop on Visualization Education, Literacy, and Activities*, 2023.

[6] P. Harth, A. Bast, **J., Troidl**, B. Meulemeester, H. Pfister, J. Beyer, M. Oberlaender, H.-C. Hege, and D. Baum, "Rapid Prototyping for Coordinated Views of Multi-scale Spatial and Abstract Data: A Grammar-based Approach", in *Eurographics Workshop on Visual Computing for Biology and Medicine (VCBM)*, 2023.

[7] **J. Troidl**, S. Warchol, J. Choi, J. Matelsky, N. Dhanyasi, X. W. Wang, B. Wester, D. Wei, J. Lichtman, H. Pfister, and J. Beyer, "Vimo: Visual Analysis of Neuronal Connectivity Motifs", *IEEE Transactions on Visualization and Computer Graphics*, 2023.

[8] P. Velicky, E. Miguel, J. M. Michalska, J. Lyudchik, D. Wei, Z. Lin, J. F. Watson, **J., Troidl**, J. Beyer, Y. Ben-Simon, *et al.*, "Dense 4D nanoscale reconstruction of living brain tissue", *Nature Methods*, pp. 1–10, 2023.

[9] J. Beyer*, **J. Troidl***, S. Boorboor, M. Hadwiger, A. Kaufman, and H. Pfister, "A Survey of Visualization and Analysis in High-Resolution Connectomics", in *Computer Graphics Forum*, Wiley Online Library, vol. 41, 2022, **indicates equal contribution.*

[10] **J. Troidl**, C. Cali, E. Gröller, H. Pfister, M. Hadwiger, and J. Beyer, "Barrio: Customizable Spatial Neighborhood Analysis and Comparison for Nanoscale Brain Structures", *Computer Graphics Forum (Proceedings Eurographics/IEEE Symposium on Visualization, Eurovis 2022*, vol. 41, no. 3, 2022.

[11] P. Rautek, M. Mlejnek, J. Beyer, **J. Troidl**, H. Pfister, T. Theußl, and M. Hadwiger, "Objective Observer-Relative Flow Visualization in Curved Spaces for Unsteady 2D Geophysical Flows", *IEEE Transactions on Visualization and Computer Graphics*, 2020.

Preprints

[1] **J. Troidl**, J. Knittel, W. Li, F. Zhan, H. Pfister*, and S. Turaga*, "Global Neuron Shape Reasoning with Point Affinity Transformers", Preprint, 2025, **indicates equal contribution.*

[2] M. D. Petkova, M. Januszewski, T. Blakely, K. J. Herrera, G. F. Schuhknecht, R. Tiller, J. Choi, R. L. Schalek, J. Boulanger-Weil, A. Peleg, Y. Wu, S. Wang, **J. Troidl**, S. K. Vohra, D. Wei, *et al.*, "A connectomic resource for neural cataloguing and circuit dissection of the larval zebrafish brain", Preprint, 2025, pp. 2025–06.

[3] M. Shewarega*, **J. Troidl***, O. Alvarado Rodriguez, M. Dindoost, P. Harth, H. Haberkern, J. Stegmaier, D. Bader, and H. Pfister, "MoMo: Combining Neuron Morphology and Connectivity for Interactive Motif Analysis in Connectomes", Preprint, 2025, **indicates equal contribution.*

[4] **J. Troidl**, Y. Liang, J. Beyer, M. Tavakoli, J. Danzl, M. Hadwiger, H. Pfister, and J. Tompkin, "niiv: Fast Self-supervised Neural Implicit Isotropic Volume Reconstruction", Preprint, 2024, pp. 2024–09.

Teaching

- **(Head) Teaching Fellow** (for Extension School Students) at Harvard University — Fall 2022, 2023, 2024
  CS171 - Visualization
- **Teaching Fellow** for Professional & Executive Education at Harvard University — 2023, 2024
  Data Visualization: Communicating Data and Complex Ideas Visually
- **Teaching Fellow** at TU Wien — 2017 - 2020
  Medical Visualization, Intro to Visual Computing, Intro to Computer Engineering

Scholarships and Awards

- ILW Best Master Thesis Award in informatics for life sciences, German Informatics Society and German Association for Medical Informatics, Biometry and Epidemiology. — 2022
- Best SciVis Paper, IEEE VIS 2020 (among the best 3 papers out of 211 accepted papers) — 2020
- Scholarship, Austrian Marshall Plan Foundation — 2020
- Bachelor with Honors, TU Wien (among the top 5% of CS students at TU Wien) — 2020
- Short-term grant for scientific work abroad, TU Wien — 2020
- Merit Based Scholarship, TU Wien — 2018

References

- **Hanspeter Pfister, PhD**, An Wang Professor of Computer Science, Harvard University
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- **Srinivas Turaga, PhD**, Group Leader, HHMI Janelia
  turagas@janelia.hhmi.org
- **Forrest Collman, PhD**, Associate Director, Data and Technology, Allen Institute
  forrestc@alleninstitute.org