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 using interactive data visualization and inverse graphics for applications in computational neuroscience. In particular, my research focuses on building scalable visual analysis tools & machine-learning algorithms to study synapse-level wiring diagrams of neuronal tissue.

Education

Harvard University — Cambridge, MA
Ph.D. in Computer Science, Advisor: Prof. Hanspeter Pfister — 2021–2027

- Focus: Data Visualization, Inverse Graphics, Computational Neuroscience

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

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

Experience

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

- Visualization of Large-Scale Biomedical Data
- Towards Efficient and Scalable Analysis 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

Publications

[1] 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.

[2] 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", *bioRxiv*, pp. 2023–07, 2023.

[3] 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.

[4] **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.

[5] 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 2022 Participants, "Addressing Persistent Challenges in Digital Image Analysis of Cancerous Tissues", Preprint, 2023, pp. 2023–07.

[6] 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.

[7] 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.*

[8] **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.

[9] 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.

Teaching

- **Head Teaching Fellow** for Extension School Students (DCE) at Harvard University — Fall 2022, 2023
  CS171 - Visualization
- **Teaching Fellow** at TU Wien — Fall 2020
  Selected Chapters from Medical Visualization
- **Teaching Fellow** at TU Wien — Spring 2017, 2018
  Introduction to Visual Computing
- **Teaching Fellow** at TU Wien — Fall 2017
  Introduction to Computer Engineering

Skills

- **Coding:** Python, PyTorch, Java-Script
- **Tools:** GCloud, Unity, QT, CMake, Latex

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 (9.100$) — 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 (3.100$) 2020
- Merit Based Scholarship, TU Wien (1.000$) 2018

Talks

- **Motif Analysis in Connectomes** at KAUST, Saudi Arabia Spring 2023
  Seminar Talk
- **The State of the Art in Neural Rendering** at Harvard University Spring 2023
  Seminar Talk
- **Scalable Spatial Neighborhood Analysis in Connectomes** in Rome, Italy Summer 2022
  Conference Presentation at EuroVis
- **The State of the Art in Connectome Visualization** in Rome, Italy Summer 2022
  Conference Presentation at EuroVis
- **Visual Neuronal Motif Analysis in Connectomes** in Berlin, Germany Summer 2022
  Poster Presentation at the International Connectomics Conference

References

- **Hanspeter Pfister**, An Wang Professor of Computer Science, Harvard University
  pfister@g.harvard.edu
- **Eduard Gröller**, Full Professor, TU Wien
  groeller@cg.tuwien.ac.at
- **Markus Hadwiger**, Full Professor, KAUST
  markus.hadwiger@kaust.edu.sa