Johannes Knittel

Nationality: German
Research Interests: Data Science, ML, Information Visualization
Google Scholar: https://scholar.google.de/citations?view_op=list_works&user=ykgVCMAAAAAJ

Education

04/2018 – 05/2022
Dr. rer. nat., Informatik (PhD in Computer Science)
University of Stuttgart, Germany
Dissertation "Large-Scale Analysis of Textual and Multivariate Data Combining Machine Learning and Visualization". Date of defense: May 2nd, 2022.
Summa cum laude

11/2012 – 07/2015
Master of Science, Informatik (Computer Science)
University of Stuttgart, Germany
Vertiefungslinien ('majors'): Visualization and Interactive Systems, Distributed Systems
Excellent with Distinction

10/2009 – 11/2012
Bachelor of Science, Informatik (Computer Science)
University of Stuttgart, Germany
Excellent

Professional Experience

09/2023 – Present
Wojcicki Troper HDSI Postdoctoral Fellow
Harvard Data Science Initiative & Visual Computing Group, Harvard University, United States
Wojcicki Troper Postdoctoral Fellow at the Harvard Data Science Initiative and member of Hanspeter Pfister's Visual Computing Group at Harvard. My main research goals encompass developing new visual methods for interpreting and understanding black box machine learning models as well as leveraging AI for understanding data. I also led the group on behalf of Prof. Pfister during his sabbatical. Additionally, I am part of a research collaboration on in-vitro fertilization with computational biologists, embryologists, and medical doctors. One of the goals is to come up with new ML and visual analytics approaches for grading and selecting viable embryos.

02/2024 – 12/2024
Lecturer
Harvard University, United States
Instructor for the spring CS271 course at Harvard, which is a graduate-level course about recent research in visualization and data science. Instructor for the fall CS1710 Visualization course, spanning web development and principles of interactive visualizations.

04/2018 – 08/2023

(Post-)Doctoral Researcher

Institute for Visualization and Interactive Systems, University of Stuttgart, Germany

Full-time (doctoral, then post-doctoral) researcher in Thomas Ertl's Visual Analytics group at the Institute for Visualization and Interactive Systems at the University of Stuttgart. I participated in several research projects funded by the German Research Foundation and industry. I developed new methods for the real-time visual analysis of streams and massive text datasets (news reports, Twitter) as well as for extracting and visualizing nonlinear multidimensional relationships in multivariate data (collaboration with leading chip-testing hardware manufacturer Advantest GmbH). I was also responsible for assisting in teaching and supervising thesis projects.

08/2016 – 12/2023

Managing Director

FlickStuff GmbH, Germany

Spin-off company of the "FlickStuff" university project

2015 – 2017

Co-Founder

University of Stuttgart Spin-Off „FlickStuff", Germany

Co-Founder of a startup for second-screen apps that provide additional feeds based on what people are currently watching. Developed several technologies for the real-time audio, video, and text analysis of TV channels to derive relevant knowledge entities, played songs, products, and tweets.

05/2014 – 08/2014

Visiting Student Research Assistant

Cultural Communication and Computing Research Institute, Sheffield Hallam University, UK

Development of a web-based platform for interactive visualizations of museum visits, meSch EU research project

05/2012 – 09/2014

Student Research Assistant

Human-Computer-Interaction Department, University of Stuttgart, Germany

Research assistant in several research projects (customer experience – Daimler AG, IoT/interactive museum experiences – meSch EU research project)

Skills and Experience

- Proficient programming skills in Python, C#, Rust, JavaScript, TypeScript, HTML/CSS; knowledgeable in C and Java
- Experience in training ML models
- Leadership and project planning experience as a startup founder and as interim leader of the VCG lab at Harvard on behalf of Prof. Pfister
- Mentoring experience having supervised numerous student thesis projects
- Teaching experience both as a teaching assistant and as a lecturer

Languages

German (native), English (proficient), French (basic)

Peer-Reviewed Publications

- **J. Knittel**, S. Warchol, J. Troidl, C. D. Brumar, …, D. Ben-Josef, D. Needleman, H. Pfister
  EmbryoProfiler: A Visual Clinical Decision Support System for IVF
  IEEE Transactions on Visualization and Computer Graphics, 2026
- S. Warchol, G. Guo, **J. Knittel**, D. Freeman, U. Bhalla, J. L. Muhlich, P. K. Sorger, H. Pfister
  SEAL: Spatially-resolved Embedding Analysis with Linked Imaging Data
  IEEE Transactions on Visualization and Computer Graphics, 2026
- **J. Knittel**, T. Gangavarapu, H. Strobelt, H. Pfister
  GPT-2 Through the Lens of Vector Symbolic Architectures
  2nd NeurIPS Workshop on Attributing Model Behavior at Scale (ATTRIB), 2024
- J. Kim, Z. Shi, D. Jeong, **J. Knittel**, H. Yang, …, D. Ben-Josef, D. Needleman, H. Pfister
  Multimodal Learning for Embryo Viability Prediction in Clinical IVF
  International Conference on Medical Image Computing and Computer-Assisted Intervention, pp. 542-552, Springer Nature Switzerland, 2024
- C. Chen, J. Chen, W. Yang, H. Wang, **J. Knittel**, X. Zhao, S. Koch, T. Ertl, and S. Liu
  Enhancing Single-Frame Supervision for Better Temporal Action Localization
  IEEE Transactions on Visualization and Computer Graphics, 2024
- F. Huth, F. Beck, **J. Knittel**, S. Latif, S. Koch, and T. Ertl
  ViSCitR: Visual Summarization and Comparison of Hotel Reviews
  Proceedings of PacificVis 24, 2024
- M. Dück, **J. Knittel**, H. Strobelt, M. El-Assady
  Neighborhood traces: When your neighborhood changes one layer at a time
  6th Workshop on Visualization for AI Explainability (VISxAI), 2023
- A. Lalama, **J. Knittel**, S. Koch, D. Weiskopf, T. Ertl, S. Rottacker, R. Latty, and J. Rivoir
  Interactive Analysis of Post-Silicon Validation Data
  TestVis Workshop at the IEEE VIS Conference, 2022
- **J. Knittel**, S. Koch, T. Tang, W. Chen, Y. Wu, S. Liu, and T. Ertl
  Real-Time Visual Analysis of High-Volume Social Media Posts
  IEEE Transactions on Visualization and Computer Graphics, 28(1):879–889, 2022, **Honorable Mention**
- **J. Knittel**, A. Lalama, S. Koch, and T. Ertl
  Visual Neural Decomposition to Explain Multivariate Data Sets
  IEEE Transactions on Visualization and Computer Graphics, 27(2):1374–1384, 2021
- **J. Knittel**, S. Koch, and T. Ertl
  PyramidTags: Context-, Time- And Word Order-Aware Tag Maps to Explore Large Document Collections
  IEEE Transactions on Visualization and Computer Graphics, 27(12):4455–4468, 2021
- **J. Knittel**, S. Koch, and T. Ertl
  Efficient Sparse Spherical K-Means for Document Clustering
  Proceedings of the 21st ACM Symposium on Document Engineering, DocEng 2021, New York, NY, USA, 2021
- **J. Knittel**, S. Koch, and T. Ertl
  ELSKE: Efficient Large-Scale Keyphrase Extraction
  Proceedings of the 21st ACM Symposium on Document Engineering, DocEng 2021, New York, NY, USA, 2021

- F. Huth, M. Awad-Mohammed, **J. Knittel**, T. Blascheck, and P. Isenberg
  Online Study of Word-Sized Visualizations in Social Media
  Proceedings of the EuroVis 2021 Posters, The Eurographics Association, 2021
- T. Tang, R. Li, X. Wu, S. Liu, **J. Knittel**, S. Koch, T. Ertl, L. Yu, P. Ren, and Y. Wu
  Plotthread: Creating expressive storyline visualizations using reinforcement learning
  IEEE Transactions on Visualization and Computer Graphics, 27(2):294-303, 2020
- **J. Knittel**, S. Koch, and T. Ertl
  Pattern-Based Semantic and Temporal Exploration of Social Media Messages
  Proceedings of the 2019 IEEE Conference on Visual Analytics Science and Technology, VAST 2019, pages 134–135, 2019
- **J. Knittel**, S. Koch, and T. Ertl
  Interactive Hierarchical Quote Extraction for Content Insights
  Proceedings of the EuroVis 2019 Posters, The Eurographics Association, 2019
- **J. Knittel**, S. Koch, and T. Ertl
  Highlighting Text Regions of Interest with Character-Based LSTM Recurrent Networks
  Proceedings of the 2018 IEEE Conference on Visualization Posters, 2018
- **J. Knittel** and T. Dingler
  Mining subtitles for real-time content generation for second-screen applications
  In Proceedings of the 2016 ACM International Conference on Interactive Experiences for TV and Online Video, TVX 2016, pages 93-103, 2016
- **J. Knittel**, A. Sahami Shirazi, N. Henze, and A. Schmidt
  Utilizing contextual information for mobile communication
  CHI'13 Extended Abstracts on Human Factors in Computing Systems, CHI 2013, pages 1371-1376, 2013

Preprints

- J. Troidl, **J. Knittel**, W. Li, F Zhan, H Pfister, SC Turaga
  Global Neuron Shape Reasoning with Point Affinity Transformers
  bioRxiv Preprint, 2024.11. 24.625067, 2024
- R. Brath, D. Keim, **J. Knittel**, S. Pan, P. Sommerauer, and H. Strobelt
  The Role of Interactive Visualization in Explaining (Large) NLP Models: from Data to Inference
  arXiv Preprint, arXiv:2301.04528, 2023