

# Michael Thane

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ORCID — Google Scholar — GitHub — Website

## Profile

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I am a visual analytics and computer vision researcher with long-term experience in behavioural neurobiology, especially *Drosophila* larvae. I build computational tools to extract, analyse, visualise, and interpret large-scale behavioural datasets, and I have repeatedly worked at the interface between experimental neuroscience and computational method development.

## Technical Expertise

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- **Programming:** Python, R, JavaScript, SQL, C++, Bash; experience with Java
- **Scientific data analysis:** NumPy, pandas, Jupyter, statistical analysis, behavioural feature extraction, time-series analysis, clustering, dimensionality reduction
- **Computer vision:** OpenCV, image-based behavioural tracking, segmentation, object detection, motion analysis, preprocessing of video-derived trajectory data
- **Machine learning:** scikit-learn, PyTorch, supervised and unsupervised learning, embedding methods, classification workflows, model evaluation
- **Interactive visual analytics:** R Shiny, D3.js, Plotly, coordinated multiple views, graph-based visualisation, interactive exploration of biological datasets
- **Research software engineering:** Linux, Git/GitHub, Docker, reproducible analysis pipelines, version-controlled code, data preprocessing workflows, deployment of interactive research prototypes
- **Web-based research software:** HTML, CSS, JavaScript, Flask, Django

## Education

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### Ph.D. Candidate in Computer Science

Since Oct 2024

Institute of Visual Computing, Graz University of Technology, Graz, Austria  
Dissertation: *Visual Analytics for High-dimensional Behavioural Data in Neurobiology*

### M.Sc. in Computer Science

2021 – 2023

Otto von Guericke University Magdeburg, Magdeburg, Germany  
Thesis: *Visualization and Evaluation of Highdimensional Structures as Associations of Clusters in Subspaces*

### B.Sc. in Computer Science

2014 – 2021

Otto von Guericke University Magdeburg, Magdeburg, Germany  
Thesis: *Visual Analysis of Drosophila Locomotion Quantification*

Focus areas included learning systems and biocomputing, complemented by coursework in neuroscience and psychology.

## Research Experience

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### Research Associate

Mar 2025 – Present

Data Science in IoT group, Ostfalia University of Applied Sciences, Wolfenbüttel, Germany

- Supervise multiple applied student projects in computer science and data-driven system development
- Manage operational and technical tasks for the Open Mobility Lab, including hardware setup, system maintenance, and research infrastructure
- Coordinate hardware procurement for lab infrastructure and student project demonstrators
- Conduct research on visual analytics systems for high-dimensional behavioural and biological data
- Contribute to teaching and coursework in data engineering

**Visiting Researcher***Jun 2024 – Mar 2025*

Hokkaido University, Sapporo, Japan

- Continued research on visual analytics methods for neurobiological behavioural data, resulting in a VMV publication
- Worked on the analysis and interpretation of existing *Drosophila* larval behaviour datasets
- Discussed and developed computational approaches for behavioural data analysis with neurobiology researchers
- Presented research in interdisciplinary seminar settings with computational and experimental researchers

**Research Associate***Feb 2023 – Apr 2024*

Ostfalia University of Applied Sciences, Wolfenbüttel, Germany

- Conducted literature research on high-dimensional categorical and mixed-type data analysis for a research grant proposal
- Prepared teaching material for a Bachelor-level stream processing lecture
- Developed CatNetVis, a visual analytics system for categorical high-dimensional data, resulting in a EuroVis Short Paper publication
- Supervised an applied student project in computer science

**Research Assistant***Feb 2016 – Mar 2022*

Leibniz Institute for Neurobiology, Magdeburg, Germany

- Developed and applied data processing pipelines for large-scale behavioural experiments in *Drosophila* larvae
- Worked with computer vision-based tracking systems, including the Individual Maggot Behaviour Analyzer (IMBA)
- Performed quantitative analysis and visualisation of larval locomotion, microbehaviour, behavioural variability, learning, and memory
- Analysed and visualised behavioural tracking datasets in collaboration with experimental neuroscientists
- Conducted wet-lab experiments on learning and memory in *Drosophila* larvae
- Contributed to interdisciplinary research connecting behavioural experiments, computational analysis, and visual analytics
- Presented research in institute seminar settings and contributed to peer-reviewed publications on larval behaviour

**Industry Experience**

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**Data Science Working Student***Apr 2022 – Dec 2022*

IWD Market Research, Magdeburg, Germany

- Developed a full-stack controlling tool using Django and MongoDB
- Maintained and prepared databases for data analysis workflows using SQL
- Conducted data analysis using R and Python
- Created interactive dashboards and reporting tools using Shiny and Plotly

**Computer Science Intern***Oct 2021 – Dec 2021*

Infosys, Düsseldorf, Germany

- Developed a machine learning and visualisation project for fraud detection

**Teaching & Supervision**

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- Supervised team projects in Digital Technologies at M.Sc. level, Technical University of Clausthal
- Supervised computer science team projects at Ostfalia University of Applied Sciences
- Provided guest lectures and course support in Computer Vision at B.Sc. level
- Provided guest lectures and course support in Data Engineering at B.Sc. level
- Supported teaching in Stream Processing at B.Sc. level

## Academic Talks & Presentations

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- Presented *CatNetVis: Semantic Visual Exploration of Categorical High-Dimensional Data*, EuroVis 2023, Leipzig, Germany
- Presented *Uncovering Relations in High-Dimensional Behavioral Data*, Symposium on Vision, Modeling, and Visualization (VMV), 2025

## Academic Service

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- Invited Reviewer, *Journal of Experimental Biology* (2026)

## Grants & Academic Funding

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- GoCo Life Science Fellowship for 9-month research stay, Hokkaido University, Japan (2024–2025)
- International Mobility Funding, Ostfalia University (2025), research visit to Graz University of Technology

## Publications

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### Published

1. **Thane, M.**, Paisios, E., Stöter, T., Krüger, A.-R., Gläß, S., Dahse, A.-K., Scholz, N., Gerber, B., Lehmann, D. J., & Schleyer, M. (2023).  
High-resolution analysis of individual *Drosophila melanogaster* larvae uncovers individual variability in locomotion and its neurogenetic modulation.  
*Open Biology*, 13(4), 220308. doi:10.1098/rsob.220308
2. **Thane, M.**, Viswanathan, V., Meyer, T. C., Paisios, E., & Schleyer, M. (2019).  
Modulations of microbehaviour by associative memory strength in *Drosophila* larvae.  
*PLOS ONE*, 14(10), e0224154. doi:10.1371/journal.pone.0224154
3. Bormann, A., Körner, M. B., Dahse, A.-K., Gläß, S., Irmer, J., Lede, V., Alenfelder, J., Lehmann, J., Hall, D. C. N., **Thane, M.**, Schleyer, M., Kostenis, E., Schöneberg, T., Bigl, M., Langenhan, T., Ljaschenko, D., & Scholz, N. (2025).  
Intron retention of an adhesion GPCR generates 1TM isoforms required for 7TM-GPCR function.  
*Cell Reports*, 44(1), 115078. doi:10.1016/j.celrep.2024.115078
4. **Thane, M.**, Blum, K. M., & Lehmann, D. J. (2023).  
CatNetVis: Semantic Visual Exploration of Categorical High-Dimensional Data with Force-Directed Graph Layouts.  
*EuroVis Short Papers*. doi:10.2312/evs.20231049
5. **Thane, M.**, Blum, K. M., & Lehmann, D. J. (2025).  
Uncovering Relations in High-Dimensional Behavioral Data of *Drosophila melanogaster*.  
*VMV – Vision, Modeling and Visualization*. doi:10.2312/vmv.20251234
6. Kolms, J. L., Blum, K. M., **Thane, M.**, Kurczveil, T., & Lehmann, D. J. (2026).  
Energy Optimized Green Light Assist in Varying Traffic Scenarios Using Reinforcement Learning.  
*SUMO Conference 2026*. Accepted / to appear.

### Under Review / In Preparation

1. **Thane, M.**, & Lehmann, D. J.  
LarVA: Interactive Visual Analysis and Annotation of Behavioural Embeddings in *Drosophila* Larvae.  
*In preparation*. CGF fast-track resubmission.
2. Blum, K. M., Ferrato, A., **Thane, M.**, Doernbach, T., & Lehmann, D. J.  
Trust the Chart or Trust the Badge? How AI Advisory Badges Affect User Trust in Charts.  
*Under review*.
3. Blum, K. M., **Thane, M.**, Doernbach, T., & Lehmann, D. J.  
Projection-Based Piecewise Linear Classifier Using Voronoi Tessellation.  
*In preparation*. Resubmission planned.

## Research Systems & Demonstrations

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- **CatNetVis** – Interactive visual analysis system for categorical high-dimensional data using graph-based visualisation and semantic edge bundling.  
Publication: EuroVis Short Papers 2023  
Demo Video: [michael-thane.de/video\\_demos/CatNetVis.mp4](https://michael-thane.de/video_demos/CatNetVis.mp4)
- **RelationExplorer** – Interactive visual analytics system for exploratory analysis of high-dimensional behavioural data using coordinated views and relation-based exploration workflows.  
Publication: VMV 2025  
Demo Video: [michael-thane.de/video\\_demos/RelationExplorer.mp4](https://michael-thane.de/video_demos/RelationExplorer.mp4)

## References

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### **Prof. Dr. Dirk J. Lehmann**

Faculty of Computer Science  
Data Science in IoT / Institute for Information Engineering  
Ostfalia University of Applied Sciences, Germany  
Research areas: Visual Analytics, Visual Computing, Data Science  
[di.lehmann@ostfalia.de](mailto:di.lehmann@ostfalia.de)

### **Prof. Dr. Bertram Gerber**

Department of Genetics of Learning and Memory  
Leibniz Institute for Neurobiology, Germany  
Research area: Behavioural Neurobiology  
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### **Prof. Dr. Tobias Schreck**

Institute of Visual Computing  
Graz University of Technology, Austria  
Head of the Visual Analytics Research Group  
Research areas: Visual Analytics, High-Dimensional Data, Biomedical Data Visualization  
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### **Dr. Michael Schleyer**

Assistant Professor, Integrated Science Program (ISP), Faculty of Science  
Hokkaido University, Japan  
Research area: Behavioural Neurobiology  
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## Languages

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- German: native
- English: fluent
- Japanese: conversational