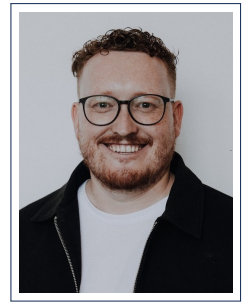


Matthias Miller

Curriculum Vitae



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Personal Information

Place and Date of Birth 74078 Heilbronn-Neckargartach 22.09.1992
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Employment & Self-Employed Work

- 2024–today **PostDoc Position, IVIA Lab**, ETH Zurich, IT Coordination & Research Engineer.
- 2021–2023 **Visual Data Analytics Consultant (Self-Employed Work)**, *EBZ Gruppe (Ravensburg)*, Process Automation of 3D/2D Product Manufacturing Information, *Steinbeis Competence Center for Data Analysis and Visualization*.
- 2018–2024 **Research and Teaching Associate, Data Analysis & Visualization Group**, University of Konstanz.
- Research Project Work:** Implementation, Coordination, Reporting
- **CoronaVis:** Interactive Visualization for the Analysis of ICU Bed Capacities for Covid-19 Patients (DBVIS), 2020,
 - **VICTORIA:** Video analysis for Investigation of Criminal and Terrorist Activities (EU Project), 2018–2020,
 - **BigGIS:** Prädiktive und -skriptive Geoinformationssysteme für hochdimensionale Datenstrukturen (BMBF), 2018,
 - **PEGASUS:** Polizeiliche Gewinnung und Analyse heterogener Massendaten zur Bekämpfung organisierter Kriminalitätsstrukturen (*Further Project Information*) | (BMBF), 2020–2023,
 - **RESUME:** Multikriterielle Optimierung: Auswirkungen von Recyclingpotentialen, kritischen Rohstoffen und Lieferkettenrisiken auf die Energiewende: Visuelle Analytik für verbesserte Entscheidungsfindung (BMWK), 2023–2024,
 - **CHDS:** Centre for Human | Data | Society (University of Konstanz), 2023–2024.
- Teaching & Courses:** Organization, Student Supervision, Lectures
- **Seminar Data Analysis and Visualization** (BA & MA) (Organization & Student Supervision), WS20/21–WS22/23,
 - **Visual Data Exploration Seminar** (Organization & Student Supervision), SS2020,
 - **Data Mining and Visualization Seminar** (Research Seminar Organization, Student Supervision), WS2019,
 - **Analysis & Visualization of Information** (AnaVis), WS2019,
 - **Information Visualization II** (InfoVis II), SS2018/19.
- 2015–2018 **Co-Founder / Developer, Implementation of HeartsArt (Magento)**, a market platform for artists to sell their artworks, the original project is available on WebArchive (heartsart.de), a small startup started in Konstanz.
- 2015–2018 **Student Research Assistant, Implementation (Web Programming: JS (D3), HTML, CSS) of EduClust** (*Improving Education for Clustering Algorithms*), Data Analysis & Visualization Group, University of Konstanz.
- 2015 **Process Optimization with Coding, elko Verbindungstechnik GmbH**, Kirchheim am Neckar.
- 2013–2014 **Teaching Assistance, Programming I (Java, OOP)**, University of Konstanz.
- 2013 **Teaching Assistance, Tutor for Programming II (Haskell, Prolog)**, University of Konstanz.

Education

- 2018–2024 **Ph.D. in Natural Sciences (Dr.rer.nat.)**, *Data Analysis & Visualization*, University of Konstanz.
Thesis: “Visual Sheet Music Analytics”.
Project: Visual Musicology (At the Intersection of Visual Analytics and Musicology).
Supervisors: Prof. Dr. Daniel Keim, Prof. Dr. Mennatallah El-Assady.
Date of Doctoral Defense: May 24, 2024, (*Recording of Defense Talk on YouTube*).
- 2016–2018 **Master of Computer and Information Science**, University of Konstanz, GPA: 1.2
Thesis: “Visual Analytics of Spatio-Temporal Event Predictions: Investigating Causes for Urban Heat Islands”(1.3).
Reviewers: Prof. Dr. Daniel A. Keim, Prof. Dr. Bela Gipp.
- 2011–2016 **Bachelor of Computer Science**, University of Konstanz, GPA: 1.7
Thesis: “Collaborative Object Positioning in Physically Separate Mixed Reality Environments” (1.3).
Reviewers: Prof. Dr. Daniel A. Keim, Prof. Dr. Harald Reiterer.
- 2002–2011 **Abitur**, Hölderlin Gymnasium, 74348, Lauffen am Neckar, GPA: 2.1.

Publications

- 2024 M. T. Fischer, Y. Metz, L. Joos, **M. Miller**, and D. A. Keim **MULTI-CASE: A Transformer-based Ethics-aware Multimodal Investigative Intelligence Framework**. *arXiv: Computer Science*, 2024, DOI: 10.48550/arXiv.2401.01955.
- 2024 J. Rauscher, R. Buchmüller, D. A. Keim, and **M. Miller** **SkiVis: Visual Exploration and Route Planning in Ski Resorts**. *IEEE Transactions on Visualization and Computer Graphics*, 2023, DOI: 10.1109/TVCG.2023.3326940.
- 2023 W. Jentner, F. Sperrle, D. Seebacher, M. Kraus, R. Sevastjanova, M. T. Fischer, U. Schlegel, D. Streeb, **M. Miller**, T. Spinner, E. Cakmak, M. Sharinghousen, P. Meschenmoser, J. Görtler, O. Deussen, F. Stoffel, H. J. Kabitz, D. A. Keim, M. El-Assady, J. Buchmüller. **Visualization of COVID-19 Incidences and Treatment Capacities with CoronaVis**. *Proc. of the Workshop on Visualization for Pandemic and Emergency Responses (Vis4PandEmRes) at IEEE VIS 2023*.
- 2023 F. L. Dennig, **M. Miller**, D. A. Keim, and M. El-Assady **FS/DS: A Theoretical Framework for the Dual Analysis of Feature Space and Data Space**. *IEEE Transactions on Visualization and Computer Graphics*, June 2023, DOI: 10.1109/TVCG.2023.3288356.
- 2023 V. Schetinger, S. Di Bartolomeo, M. El-Assady, A. McNutt, **M. Miller**, J. P. A. Passos, J. L. Adams **Doom or Deliciousness: Challenges and Opportunities for Visualization in the Age of Generative Models**. *Computer Graphics Forum*, 2023, DOI: 10.31219/osf.io/3jrcm.
- 2022 W. Jentner, F. Sperrle, D. Seebacher, M. Kraus, R. Sevastjanova, M. T. Fischer, U. Schlegel, D. Streeb, **M. Miller**, T. Spinner, E. Cakmak, M. Sharinghousen, P. Meschenmoser, J. Görtler, O. Deussen, F. Stoffel, H. Kabitz, D. A. Keim, M. El-Assady, J. Buchmüller. **Visualisierung der COVID-19-Inzidenzen und Behandlungskapazitäten mit CoronaVis**. In: *Resilienz und Pandemie: Handlungsempfehlungen anhand von Erfahrungen mit COVID-19*, Kohlhammer, 2022.
- 2022 M. T. Fischer, S. D. Hirsbrunner, W. Jentner, **M. Miller**, D. A. Keim, P. Helm. **Promoting Ethical Awareness in Communication Analysis: Investigating Potentials and Limits of Visual Analytics for Intelligence Applications**. *Proc. of the ACM Conf. on Fairness, Accountability, and Transparency*, 2022, DOI: 10.1145/3531146.3533151.
- 2022 **M. Miller**, J. Rauscher, D. A. Keim, M. El-Assady. **CorpusVis: Visual Analysis of Digital Sheet Music Collections**. *Computer Graphics Forum*, 2022, DOI: 10.1111/cgf.14540. <https://visual-musicology.com/corpus>.
- 2022 **M. Miller**, D. Fürst, H. Hauptmann, D. A. Keim, M. El-Assady. **Augmenting Digital Sheet Music through Visual Analytics**. *Computer Graphics Forum*, 2022, DOI: 10.1111/cgf.14436. <https://visual-musicology.com/sheetmusicvis>.
- 2021 **M. Miller** and D. Miller. **GraphStateVis: Interactive Visual Analysis of Qubit Graph States and their Stabilizer Groups**. *IEEE International Conference on Quantum Computing and Engineering (QCE)*, 2021, DOI: QCE52317.2021.00057.
- 2020 M. Kraus, T. Pollok, **M. Miller**, T. Kilian, T. Moritz, D. Schweitzer, J. Beyerer, D. A. Keim, C. Qu, W. Jentner. **Toward Mass Video Data Analysis: Interactive and Immersive 4D Scene Reconstruction**. *Sensors; Special Issue Selected Papers from the Int. Conf. on Imaging for Crime Detection and Prevention (ICDP-19)*, 2020, DOI: 10.3390/s20185426.
- 2020 D. Fürst, **M. Miller**, D. A. Keim, A. Bonnici, H. Schäfer, M. El-Assady. **Augmenting Sheet Music with Rhythmic Fingerprints**. *Proc. of the Workshop on Visualization for the Digital Humanities (VIS4DH) at IEEE VIS 2020*, DOI: 10.1109/VIS4DH51463.2020.00007.
- 2020 M. Kraus, **M. Miller**, J. Buchmüller, M. Stein, N. Weiler, D. A. Keim, M. El-Assady. **Breaking the Curse of Visual Analytics: Accommodating Virtual Reality in the Visualization Pipeline**. In *Computer Vision, Imaging and Computer Graphics Theory and Applications. Communications in Computer and Information Science*, volume 1182. Springer, Cham., 2020, DOI: 10.1007/978-3-030-41590-7_11.
- 2019 **M. Miller**, H. Schäfer, M. Kraus, M. Leman, D. Keim and M. El-Assady. **Framing Visual Musicology through Methodology Transfer**. *Proc. of the Workshop on Visualization for the Digital Humanities (VIS4DH) at IEEE VIS 2019*.
- 2019 **M. Miller**, A. Bonnici and M. El-Assady. **Augmenting Music Sheets with Harmonic Fingerprints (Best Paper Award)**. *DocEng '19: Proc. of the ACM Symposium on Document Engineering 2019*, DOI: 10.1145/3342558.3345395
- 2019 **M. Miller**, H. Schäfer, A. Bonnici and M. El-Assady. **Visual Pattern Analysis using Digital Sheet Music**. *Late Breaking/Demos of the Intl. Conf. on Music Information Retrieval (ISMIR)*, 2019.
- 2019 J. Fuchs, P. Isenberg, A. Bezerianos, **M. Miller** and D. Keim. **EduClust - A Visualization Application for Teaching Clustering Algorithms**. *IEEE Computer Graphics and Applications*, DOI: 10.2312/eged20191023 | WebApp
- 2019 D. Seebacher, **M. Miller**, T. Polk, J. Fuchs and D. Keim. **Visual Analytics of Volunteered Geographic Information: Detection and Investigation of Urban Heat Islands**. *IEEE Computer Graphics and Applications*, DOI: 10.1109/MCG.2019.2926242
- 2019 **M. Miller**, X. Zhang, J. Fuchs and M. Blumenschein. **Evaluating Ordering Strategies of Star Glyph Axes**. *Proc. of the IEEE Visualization Conf. (VIS)*; 91–95 (2019), DOI: 10.1109/VISUAL.2019.8933656
- 2019 T. Pollok, M. Kraus, C. Qu, **M. Miller**, T. Moritz, T. Kilian, D. Keim and W. Jentner. **Computer Vision Meets Visual Analytics: Enabling 4D Crime Scene Investigation from Image and Video Data**. *Int. Conf. on Imaging for Crime Detection and Prevention*, 2019.
- 2018 D. Seebacher, **M. Miller**, T. Polk, J. Fuchs and D. Keim. **Visual Analytics of Volunteered Geographic Information: Detection and Investigation of Urban Heat Islands**. *Symposium on Visualization in Data Science at IEEE VIS 2018*.
- 2018 **M. Miller**, J. Häubler, M. Kraus, D. Keim, and M. El-Assady. **Analyzing Visual Mappings of Traditional and Alternative Music Notation**. *Proc. of the Workshop on Visualization for the Digital Humanities (VIS4DH) at IEEE VIS 2018*.
- 2018 E. Cakmak, U. Schlegel, **M. Miller**, J. Buchmüller, W. Jentner and D. Keim. **Interactive Classification Using Spectrograms and Audio Glyphs**. *IEEE Conf. on Visual Analytics Science and Technology (VAST Challenge)*, DOI: 10.1109/VAST.2018.8802500

Language Skills

German	Mother tongue	
English	Proficient	(C2 Level)
Russian	Elementary	(A2 Level)
French	Basic	(A1 Level)
Spanish	Basic	(A1 Level)

Programming Skills

Advanced	JavaScript, Python, C#, Java, TypeScript, PostgreSQL, MySQL, $\LaTeX$
Intermediate	PHP, Haskell, R, Bash
Basic	Ruby on Rails, Matlab, C, C++
Framework/Library	Flask, Angular, React, Git, Bootstrap, Docker, K8s
Web Development	Advanced (Project) Expertise in General Web Programming (JS, HTML, CSS3)

Other Interests

Hobbies	Traveling, Reading, Technology
Music	Piano, Acoustic & Electric Guitar, Accordion, Singing
Sports	Swimming, Bicycling, Skiing, Hiking