Samuel **Gratzl**

DATA VISUALIZATION ENGINEER · RESEARCH SCIENTIST

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Toolsmith for explorers of the information landscape on their treasure hunt for valuable insights

Summary

Data Visualization Engineer and Full Stack Developer with 9+ years experience specializing on visual data exploration of big heterogeneous data in research and development environments. Senior Software Engineer with the heart of a researcher that is quickly adaptable to new technologies and environments depending on the project's needs. Analytical and independent thinker with excellent problem solving skills and high passion about his work. Efficient worker with a high sense for product quality to reduce maintenance costs and increase customer satisfaction.

Education

Johannes Kepler University   *Linz, Austria*

PHD. IN COMPUTER SCIENCE   *Oct. 2012 – Apr. 2017*

- Thesis: Visually Guiding Users in Selection, Exploration, and Presentation Tasks
- Graduated *Promotio sub auspiciis Praesidentis rei publicae* – highest possible graduation in Austria.
- Won Award for Excellence for best dissertation given by the state of Austria in 2017.

MSC. IN PERVASIVE COMPUTING   *Apr. 2010 – Oct. 2012*

- Graduated with highest distinctions.
- Received scholarships for excellent performance as a student in 2010 and 2012.

BSC. IN COMPUTER SCIENCE   *Oct. 2006 – Apr. 2010*

- Graduated with highest distinctions.
- Received scholarships for excellent performance as a student in 2007, 2008, and 2009.

Professional Experience

Truveta Inc.   *Remote*

DATA VISUALIZATION RESEARCHER - DATA SCIENTIST   *Aug. 2021 – current*

- Being part of the research team analyzing healthcare data and providing feedback on current product developments.
- Curated datasets based on the internal Truveta Platform.
- Developed processes and templates for effective healthcare studies, speeding up our study creation
- Created dashboards for Vaccine Effectiveness and Adverse Events of COVID-19 Vaccines
- Identified data quality issues and supported clinical informatics in tracking them down.
- Initiated and specified product features for advanced researcher experience.

Carnegie Mellon University   *Remote*

RESEARCH SOFTWARE ENGINEER CONTRACTOR   *Jul. 2020 – Sep. 2021*

- Main front end developer of COVIDcast, a project by the Delphi Group collecting, publishing, and visualizing COVID-19 data..
- Converted the front end from a research prototype to a production-ready product.
- Enforced code quality and best practices throughout the project.
- Improved usability, maintainability, and performance of COVIDcast.
- Designed and implemented new views such as the National Survey Results View, the most popular COVIDcast view.
- Designed and implemented a new version of the COVIDcast API with increased maintainability, scalability, and robustness.
- Developed and deployed a new deployment infrastructure for the Delphi group.

Self Employed   *Linz, Austria*

FREELANCE DATA EXPLORATION AND VISUALIZATION CONSULTANT   *Oct. 2016 – Mar. 2022*

- I specialize in the design and implementation of customized visual exploration web applications.
- In close collaboration with the customer, I develop specialized visual exploration platforms that not only allow the customer to answer their questions but even those they haven't thought about yet.
- In addition, I provide freelance service for integrating my open-source libraries, such as LineUp-lite, LineUp.js, or UpSet.js

Kitware Inc.   *Clifton Park, NY, USA*

SENIOR R&D ENGINEER TRAINING   *Sep. 2019 – Dec. 2019*

- Designed and implemented critical scalable visualizations and backend analysis algorithms for the Metabolomics project.
- Migrated the Slicer CLI Girder plugin in 25% of the planned time.
- Designed and implemented a visual analysis application that allows analysts to efficiently explore the submissions of the International Skin Imaging Collaboration challenge.

datavisyn GmbH   *Linz, Austria*

Co-founder and Chief Technology Officer (CTO)   *Nov. 2016 – Apr. 2019*

- Designed the architecture and implemented the Target Discovery Platform (TDP) with a focus on high extensibility and customizability. TDP is the foundation of all products of datavisyn and one of the three pillars of its business model.
- Built and deployed overall CI/CD infrastructure both in-house and on-premise focusing on high-availability, fault tolerance, and low maintenance.
- Lead on-site customer workshops focusing on requirements engineering, customer training, and initial prototype implementation.
- Was the product owner for two agile customer projects which ended both in time and budget with highest customer satisfaction.
- Implemented critical features in all (4+) customer projects of datavisyn.
- Made customers happy through continuous customer support via Slack and quick response times.
- Lead, trained, and mentored the three junior developers.
- Did code reviews, introduced style guidelines, and introduced continuous testing to improve overall code quality.
- Ensured the headstart of the company over competitors through integrating new technologies and frameworks.

Research and Teaching Experience

Immersive Analytics Lab, Monash University   *Melbourne, Australia*

Visiting Researcher   *Apr. 2019 – Jun. 2019*

- Led the project on the online visual interaction of the MiniZinc constraint programming language.
- Visualized and analyzed study results of different performance measurement refactorings.

Institute for Computer Graphics, Johannes Kepler University   *Linz, Austria*

Pre- and Postdoctoral Associate   *Nov. 2012 – Dec. 2017*

- Researched on Guided Visual Exploration with a focus on the biomedical domain.
- Published award winning publications in high profile conferences and journals.
- Collaborated with national and international partners in the Caleydo project.
- Designed and conducted user studies.
- Presented my work at conferences.
- Wrote research project grants.
- Taught Computer Graphics, Information Visualization, and Visual Analytics lab.
- Designed and implemented the Phovea Web Analytics platform.

Hagenberg University of Applied Sciences   *Hagenberg, Austria*

Lecturer for Big Data Analytics and Visualization class   *Nov. 2016 – Jan. 2019*

Salzburg University of Applied Sciences   *Urstein, Austria*

Lecturer of Web Visualization class   *Nov. 2016 – Jan. 2018*

Pfister Lab, Harvard University   *Cambridge, MA, USA*

Research Fellow and Teaching Assistant for CS171   *Winter 2015*

Skills

Programming	TypeScript, JavaScript, Python, R, SQL
Frontend	React, Material UI, Vue.js, Vuetify, Vuex, Svelte, D3, Vega, Redux, MobX, HTML5, Bootstrap, CSS, SASS, Webpack, Rollup.js, Eslint, Jest, Cypress
Backend	Node.js, Express, Flask, FastAPI, Django, REST API, OpenAPI, GraphQL, SQLAlchemy, py.test, MyPy, py.lint
Data Science	Python, Numpy, Pandas, Matplotlib, R, tidyverse, ggplot2
Databases	Postgres, MongoDB, Redis, Neo4j, ElasticSearch
DevOps	Docker, Docker Compose, Kubernetes, AWS, Google Cloud, CircleCI
Tools	GitHub, Git, Toggl, Trello, Slack, VS Code, Jupyter, RStudio, GitHub Actions, CircleCI, Travis
Profound in	Information Visualization, Data Science, Software Architecture, Design Pattern, Test Driven Development (Unit, End-to-End), Agile Project Management (SCRUM), Healthcare data, Biomedical Data
Learning	Machine Learning, Deep Learning, High Performance Computing, Rust, PyTorch, Tensorflow
Languages	German (native), English (fluent)

Honors & Awards

PERSONAL

2018	**Excellence Scholarship**, Ministry for Science and Research of Austria	*Vienna, Austria*
2018	**Promotio sub auspiciis Praesidentis rei publicae**, Ministry for Science and Research of Austria	*Vienna, Austria*
2017	**Award of Excellence**, State of Austria	*Vienna, Austria*
2015	**Human Technology Interface Award**, State of Styria	*Graz, Austria*
2015	**Dissertation Scholarship**, State of Upper Austria	*Linz, Austria*
2014	**Marshallplan Scholarship**, Austrian Marshallplan Foundation	*Vienna, Austria*

RESEARCH

2017	**Best Poster Award**, IEEE Information Visualization (InfoVis'17)	*Phoenix, USA*
2016	**Honorable Mention Best Paper Award**, EG/VGTC Conference on Visualization (EuroVis'16)	*Groningen, NL*
2015	**Honorable Mention Best Poster Award**, IEEE Information Visualization (InfoVis'15)	*Chicago, USA*
2014	**Honorable Mention Best Paper Award**, IEEE Information Visualization (InfoVis'14)	*Paris, France*
2013	**Best Paper Award**, IEEE Information Visualization (InfoVis'13)	*Atlanta, USA*

Peer-reviewed Journal Publications

An open repository of real-time COVID-19 indicators
  Alex Reinhart, Logan Brooks, Maria Jahja, Aaron Rumack, Jingjing Tang, Sumit Agrawal, Wael Al Saeed, Taylor Arnold, Amartya Basu, Jacob Bien, Ángel A. Cabrera, Andrew Chin, Eu Jing Chua, Brian Clark, Sarah Colquhoun, Nat DeFries, David C. Farrow, Jodi Forlizzi, Jed Grabman, Samuel Gratzl, Alden Green, George Haff, Robin Han, Kate Harwood, Addison J. Hu, Raphael Hyde, Sangwon Hyun, Ananya Joshi, Jimi Kim, Andrew Kuznetsov, Wichada La Motte-Kerr, Yeon Jin Lee, Kenneth Lee, Zachary C. Lipton, Michael X. Liu, Lester Mackey, Kathryn Mazaitis, Daniel J. McDonald, Phillip McGuinness, Balasubramanian Narasimhan, Michael P. O'Brien, Natalia L. Oliveira, Pratik Patil, Adam Perer, Collin A. Politsch, Samyak Rajanala, Dawn Rucker, Chris Scott, Nigam H. Shah, Vishnu Shankar, James Sharpnack, Dmitry Shemetov, Noah Simon, Benjamin Y. Smith, Vishakha Srivastava, Shuyi Tan, Robert Tibshirani, Elena Tuzhilina, Ana Karina Van Nortwick, Valérie Ventura, Larry Wasserman, Benjamin Weaver, Jeremy C. Weiss, Spencer Whitman, Kristin Williams, Roni Rosenfeld, Ryan J. Tibshirani
  Proceedings of the National Academy of Sciences 118.51 (2021). National Academy of Sciences, 2021

MaterialNet: A web-based graph explorer for materials science data
  Roni Choudhury, Muratahan Aykol, Samuel Gratzl, Joseph Montoya, Jens Hummelshøj
  Journal of Open Source Software 5.47 (2020) p. 2105. 2020

Viime: Visualization and Integration of Metabolomics Experiments
  Roni Choudhury, Jon Beezley, Brandon Davis, Jared Tomeck, Samuel Gratzl, Lilian Golzarri-Arroyo, Jun Wan, Daniel Raftery, Jeff Baumes, Thomas M. O'Connell
  Journal of Open Source Software 5.54 (2020) p. 2410. 2020

Uplift: A Tangible and Immersive Tabletop System for Casual Collaborative Visual Analytics
  B. Ens, S. Goodwin, A. Prouzeau, F. Anderson, F. Y. Wang, S. Gratzl, Z. Lucarelli, B. Moyle, J. Smiley, T. Dwyer
  IEEE Transactions on Visualization and Computer Graphics (2020) pp. 1–1. 2020

Supporting the Problem-Solving Loop: Designing Highly Interactive Optimisation Systems
  Jie Liu, Tim Dwyer, Guido Tack, Samuel Gratzl, Kim Marriott
  IEEE Transactions on Visualization and Computer Graphics (2020) pp. 1–1. 2020

Taggle: Combining Overview and Details in Tabular Data Visualizations
  Katarina Furmanova, Samuel Gratzl, Holger Stitz, Thomas Zichner, Miroslava Jaresova, Martin Ennemoser, Alexander Lex, Marc Streit
  Information Visualization (2019). Sage, 2019

Ordino: visual analysis tool for ranking and exploring genes, cell lines, and tissue samples
  Marc Streit, Samuel Gratzl, Holger Stitz, Andreas Wernitznig, Thomas Zichner, Christian Haslinger
  Bioinformatics 35.17 (2019) pp. 3140–3142. Oxford University Press, 2019

KnowledgePearls: Provenance-Based Visualization Retrieval
  Holger Stitz, Samuel Gratzl, Harald Piringer, Marc Streit
  IEEE Transactions on Visualization and Computer Graphics (2018). 2018

From Visual Exploration to Storytelling and Back Again
  Samuel Gratzl, Alexander Lex, Nils Gehlenborg, Nicola Cosgrove, Marc Streit
  Computer Graphics Forum (EuroVis '16) (2016). 2016

Pathfinder: Visual Analysis of Paths in Graphs
  Christian Partl, Samuel Gratzl, Marc Streit, Anne Mai Wassermann, Hanspeter Pfister, Dieter Schmalstieg, Alexander Lex
  Computer Graphics Forum (EuroVis '16) (2016). 2016

ThermalPlot: Visualizing Multi-Attribute Time-Series Data Using a Thermal Metaphor
  Holger Stitz, Samuel Gratzl, Wolfgang Aigner, Marc Streit
  IEEE Transactions on Visualization and Computer Graphics (2016). 2016

Domino: Extracting, Comparing, and Manipulating Subsets across Multiple Tabular Datasets
  Samuel Gratzl, Nils Gehlenborg, Alexander Lex, Hanspeter Pfister, Marc Streit

IEEE Transactions on Visualization and Computer Graphics (InfoVis '14) 20.12 (2014) pp. 2023–2032. 2014

Opening the Black Box: Strategies for Increased User Involvement in Existing Algorithm Implementations
    Thomas Muhlbacher, Harald Piringer, Samuel Gratzl, Michael Sedlmair, Marc Streit
    IEEE Transactions on Visualization and Computer Graphics (VAST '14) 20.12 (2014) pp. 1643–1652. 2014

Furby: Fuzzy Force-Directed Bicluster Visualization
    Marc Streit, Samuel Gratzl, Michael Gillhofer, Andreas Mayr, Andreas Mitterecker, Sepp Hochreiter
    BMC Bioinformatics 15.Suppl 6 (2014) S4. 2014

Guided visual exploration of genomic stratifications in cancer
    Marc Streit, Alexander Lex, Samuel Gratzl, Christian Partl, Dieter Schmalstieg, Hanspeter Pfister, Peter J. Park, Nils Gehlenborg
    Nature Methods 11.9 (2014) pp. 884–885. 2014

LineUp: Visual Analysis of Multi-Attribute Rankings
    Samuel Gratzl, Alexander Lex, Nils Gehlenborg, Hanspeter Pfister, Marc Streit
    IEEE Transactions on Visualization and Computer Graphics (InfoVis '13) 19.12 (2013) pp. 2277–2286. 2013

Entourage: Visualizing Relationships between Biological Pathways using Contextual Subsets
    Alexander Lex, Christian Partl, Denis Kalkofen, Marc Streit, Samuel Gratzl, Anne Mai Wasserman, Dieter Schmalstieg, Hanspeter Pfister
    IEEE Transactions on Visualization and Computer Graphics (InfoVis '13) 19.12 (2013) pp. 2536–2545. 2013

Peer-reviewed Conference and Workshop Publications

VisArch: visualisation of performance-based architectural refactorings
    Catia Trubiani, Aldeida Aleti, Sarah Goodwin, Pooyan Jamshidi, André van Hoorn, Samuel Gratzl
    Software Architecture, 2020

CloudGazer: A Divide-and-Conquer Approach for Monitoring and Optimizing Cloud-Based Networks
    Holger Stitz, Samuel Gratzl, Michael Krieger, Marc Streit
    Proceedings of the IEEE Pacific Visualization Symposium (PacificVis '15), 2015