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 8+ 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 Computer Science *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

## Carnegie Mellon University Remote

### Research Software Engineer Contractor Jul 2020 – current

* Main front end developer of [COVIDcast](https://delphi.cmu.edu/covidcast/), a project by the [Delphi Group](https://delphi.cmu.edu) 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](https://delphi.cmu.edu/covidcast/survey-results), 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 – current

* 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](https://lineup-lite.netlify.app), [LineUp.js](https://lineup.js.org), or [UpSet.js](https://upset.js.org).

## 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.

## Johannes Kepler University Linz, Austria

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

* Implemented research prototypes in an industrial quality that are used by companies such as Microsoft or Boehringer Ingelheim.
* Wrote, published, and presented research papers on Information Visualization that won best paper awards.
* Supervised Bachelor and Master students through all phases of their thesis projects.
* Wrote grant applications resulting in four projects with a budget of 1.5 million Euros in total.
* Designed, taught, and graded lab classes on Computer Graphics and Information Visualization.

# Research and Teaching Experience

## Monash University Melbourne, Australia

### Visiting Researcher Immersive Analytics Lab 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.

## 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 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

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| --- | --- |
| **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, Numpy, Pandas, py.test, MyPy, py.lint |
| **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, CircleCI, Travis |
| **Profound in** | Information Visualization, Software Architecture, Design Pattern, Test Driven Development (Unit, End-to-End), Agile Project Management (SCRUM), Biomedical Data |
| **Learning** | Machine Learning, Deep Learning, High Performance Computing, Go, 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

*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

*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