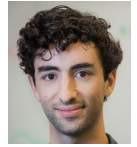


Michail "Micha" Schwab, PhD

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Mission

My mission is to help people learn through technology and empower them with data. Expertise: web technology, visualization, human-computer interaction, responsiveness, collaborative systems, and performance.

Education

- 2016 - 2020 **PhD in Computer Science**
Northeastern University (NEU) in Boston, MA.
- 2010 - 2013 **B.S. in Physics**
University of Konstanz (UniKN) in Germany, and
Massachusetts Institute of Technology (MIT) in Cambridge, MA.

Research Experience

- 2016 - 2020 **PhD Candidate in Borkin Visualization Group at NEU**
Selected projects:
- **Scalable Scalable Vector Graphics:** Using my knowledge of the web browser rendering architecture, I am developing a TypeScript library to automatically render interactive SVGs in a multi threaded canvas application to improve performance 5X: ssvg.io.
 - **VisConnect:** A TypeScript library to automatically enable real-time distributed collaboration on web-based websites and visualizations. VisConnect scales to dozens of simultaneous collaborators and does conflict resolution with an element-level lock system. visconnect.us
 - **EasyPZ Pan & Zoom Evaluation and Library:** Evaluation of panning and zooming techniques on timelines in a mechanical turk study. Published EasyPZ.js, a library to bring multiscale interaction techniques from human-computer interaction research into visualization practice today, and to standardize pan and zoom techniques for better evaluation reproducibility: easypz.io.
- 2014 - 2016 **Research Scholar in Visual Computing Group at Harvard University**
Development of non-linear online learning platform by exploring visualization techniques to enable non-linear learning of hierarchically organized learning concepts. Implementation, expert & user interviews, design iterations, real-world realization, evaluation with real users and experts: booc.io.
- 2013 **Student Researcher in MIT Photovoltaic Laboratory**
Simulations and algorithmic pattern recognition of a data set containing 3-D atom positions of silicon sample for understanding solar cell material imperfections, implemented in C++. Developed a web-based system for planning mass spectroscopy measurements used at MIT and Harvard.
- 2011 - 2013 **Student Researcher in Photovoltaic Division of Physics at UniKN**
Investigated the effects of crystal defects on precipitation behavior of transition metal contaminants in silicon materials. See publication in Solid State Phenomena.
- 2010 - 2013 **Interdisciplinary Researcher for Visual Exploration at University of Konstanz**
Image recognition for biological cells and 3D reconstructions of bulk material using sequenced focused ion beam (FIB) cuts using Fourier Transforms in Java.

Publications

- 2021 Schwab et. al: **Scalable Scalable Vector Graphics: Automatic Translation of Interactive SVGs to a Multithread VDOM for Fast Rendering**. Paper in IEEE Transactions on Visualization and Visual Computing (TVCG). doi.org/10.1109/TVCG.2021.3059294.
- 2021 Schwab et. al: **Evaluation of 1D Selection Techniques for Mobile Visualizations**. Late-Breaking Work at CHI Conference on Human Factors in Computing Systems. DOI Pending.
- 2020 Schwab: **Performance, Interactivity, and Collaboration: Scalability Improvements to the Data Visualization Ecosystem**. PhD Dissertation. See [online](#).
- 2020 Schwab et. al: **VisConnect: Distributed Event Synchronization for Collaborative Visualization**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of InfoVis 2020) dx.doi.org/10.1109/TVCG.2020.3030366.
- 2020 South, Schwab et. al: **DebateVis: Visualizing Political Debates for Non-Expert Users**. Short paper at IEEE Visualization in Salt Lake City, Utah. doi.org/10.31219/osf.io/8bsf6
- 2019 Schwab et. al: **EasyPZ.js: Interaction Binding For Pan and Zoom Visualizations**. Short paper at IEEE Visualization in Vancouver, Canada. doi.org/10.1109/VISUAL.2019.8933747.
- 2019 Schwab et. al: **Evaluating Pan and Zoom Timelines and Sliders**. In CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019), May 4–9, 2019, Glasgow, Scotland Uk. ACM, New York, NY, USA, 12 pages. doi.org/10.1145/3290605.3300786.
- 2018 Schwab et. al: **EasyPZ.js: A Library For Pan and Zoom Visualizations**. Poster at the IEEE Visualization conference in Berlin. See [demo video](#).
- 2018 Schwab et. al: **Maximizing Resolvable Items: A Mantra for Mobile Data Visualization**. Workshop Paper at ACM CHI Conference on Human Factors in Computing Systems. See [workshop program](#) and [paper](#).
- 2018 Schwab et. al: **The Diverging Paths of Leonore Brecher and Hilda Geiringer during WWII**. Accepted Storytelling Contest Submission at the IEEE Pacific Visualization Symposium. See [program](#).
- 2017 Schwab et. al: **booc.io: An Education System with Hierarchical Concept Maps and Dynamic Non-linear Learning Plans**. IEEE Transactions on Visualization and Computer Graphics (Proceedings of InfoVis 2016) Vol. 23, Issue 1, pp. 571 - 580, 2017. dx.doi.org/10.1109/TVCG.2016.2598518.
- 2014 Zuschlag, Schwab, et. al: **Transition Metal Precipitates in mc Si: a New Detection Method Using 3D-FIB**. Solid State Phenomena Vol. 205-206 (2014), pp 136-141. doi.org/10.4028/www.scientific.net/SSP.205-206.136.
- 2013 Schwab: **Investigations toward the Application of Atom Probe Tomography and Crystallography in Photovoltaic Research**. B.S. Thesis, University of Konstanz, 2013.

In the News

- 2020 Northeastern University News: **Will the vice presidential debate tell us more than Trump and Biden did?** news.northeastern.edu/tag/debatevis
- 2017 Smithsonian Magazine: **The Forgotten Women Scientists Who Fled the Holocaust for the United States**. See Smithsonian [article](#).
- 2017 Northeastern University News: **Professors uncover lost stories of WWII Refugee-Scholars** at news.northeastern.edu/2017/10/professors-uncover-lost-stories-of-wwii-refugee-scholars/

Industry Experience

- 2021 - now* **Software Engineer at Google**
Develop tooling to ensure the smooth rollout of Android across millions of devices, while monitoring and analyzing device performance metrics such as battery life.
- Fall 2019* **Student Researcher at Google**
While working at the university, I worked 50% part time at Google. I brought the new Chrome User Action Sequencer visualization system to production by working with users, solving analysis problems, and conducting user interviews to evaluate and improve the work.
- Summer 2019* **Software Development Intern at Google**
Created a new dashboard to analyze Chrome user action sequences to understand user behavior. Identified user needs with survey and interviews, implemented the frontend with polymer and D3.js, and developed a backend to fetch massive amounts of data with SQL.
- Summer 2018* **Software Development Intern at Google**
Core role in creating the [Perfetto](#) UI, a new Trace Viewer for Chrome and Android, to facilitate performance improvements and bug finding. Investigated and used new technologies such as compositor scrolling ([demo](#)), multithreading in JS, and web assembly.
- 2014 - 2019* **Simulation of Heating and Humidifying Processes for C.A.T.S. Software**
Visual exploration for industrial HVAC planning on the web: michaschwab.github.io/humidflow/. Physical formulas used for calculations in the background, D3.js and AngularJS used for front-end.
- 2014* **Development Coordinator at NJ Center for Teaching and Learning**
Conceptualized and engineered the NJCTL Android app for accessing learning materials offline and synchronizing them. User testing, creation of front-end and back-end.

Service and Volunteering

- 2020* **Mentor** for 20 people learning web development, with career and coding guidance.
- 2018* **Program Committee** for the [LEipzig symposium on Visualization In Applications \(LEVIA\)](#).
- 2017 - now* **Reviewer** for IEEE Transactions on Visualization and Computer Graphics, Eurovis, and TVCG.
- 2009 - 2010* **Research Assistant & System Administrator** at [KATALYSE Environmental Inst.](#)
- 2013 - 2018* **Member of the Board of Directors** of MIT's Outing Club to get people outside and do sports.
- 2006 - 2013* **Project Lead** at [ClanSphere](#) Content Management System (150.000+ downloads, team of ~20).

Teaching

- 2020* **Teaching Assistant** for the NEU Data Visualization Evaluation course (PhD level).
- 2018 - 2020* **Guest Lecturer** for three visualization courses at NEU (undergraduate and PhD level).
- 2017* **Teaching Assistant** for Network Visualization NEU Course (PhD Level).
- 2017* **Teaching Assistant** for Introduction to Data Visualization NEU Course (undergraduate Level).
- 2016* **Coding Teacher** at [Each One Teach One](#).

Talks

- 2020 **Conference talk at IEEE VIS (InfoVis):** VisConnect: Distributed Event Synchronization for Collaborative Visualization.
- 2019 **Doctoral Colloquium talk at IEEE VIS:** Future-Proofing InfoVis: Scaling Visualizations to Small Devices and More Data through Efficient Interaction and Smooth Performance.
- 2019 **Conference talk at IEEE VIS (InfoVis):** EasyPZ.js: Interaction Binding For Pan and Zoom Visualizations.
- 2019 **Conference talk at ACM CHI:** Evaluating Pan and Zoom Timelines and Sliders.
- 2019 **Session Chair at ACM CHI:** Touch and Typing.
- 2018 **EasyPZ: Make your visualizations interactive via pan and zoom!** Invited Northeastern University Visualization Consortium "Snippet" talk.
- 2016 **Conference talk at IEEE VIS (InfoVis):** booc.io: An Education System with Hierarchical Concept Maps and Dynamic Non-linear Learning Plans.
- 2016 **Invited talk at the Boston Visualization Symposium at Tufts University:** booc.io: An Education System with Hierarchical Concept Maps and Dynamic Non-linear Learning Plans.

Additional Skills

- User Studies* Semi-structured **in-person evaluations, Open Coding**, Amazon **Mechanical Turk** Studies.
- Web Skills* **Typescript & Javascript** (D3.js, node.js), MongoDB, SQL, PHP, HTML5, CSS3 and more.
- Programming* C++, Java.
- Languages* Native: **German, English**. Conversational: French, Farsi, Spanish.