

# Michail Albert Schwab

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## Mission

My mission is to bring more fairness and science to the web. I've been making the web more data-centric by scaling data visualizations to small devices and more data through efficient interaction and smooth performance.

## Education

2016 - present **PhD Candidate in Computer Science**  
Northeastern University (NEU) in Boston, MA.

2010 - 2013 **B.S. in Physics, GPA 3.7/4.0**<sup>1</sup>  
University of Konstanz (UniKN) in Germany, and  
Massachusetts Institute of Technology (MIT) in Cambridge, MA.

## Research Experience

2016 - present **PhD Candidate in Borkin Visualization Group at NEU**

Selection of 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](http://ssvg.io).
- **Picture Penguin:** An Android application for a visual overview of one's large personal photo collection. Picture Penguin uses timelines and geo-spatial maps and applies clustering techniques for data summarization. To be released to the Play Store.
- **EasyPZ Pan & Zoom Evaluation and Libraries:** 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](http://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](http://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.

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<sup>1</sup> Conversion from German grade 2.3 according to [http://en.wikipedia.org/wiki/Grading\\_\(education\)#Germany](http://en.wikipedia.org/wiki/Grading_(education)#Germany) and <http://www.morris.umn.edu/services/registrar/gpacalc.html>

## Publications

- 2019 Schwab et. al: **EasyPZ.js: Interaction Binding For Pan and Zoom Visualizations**. Accepted short paper in IEEE Visualization in Vancouver, Canada. To appear.
- 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. <https://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**. Accepted Workshop Submission at ACM CHI Conference on Human Factors in Computing Systems. See [workshop program](#) including our work, 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. <https://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. <https://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

- 2017 Smithsonian Magazine: **The Forgotten Women Scientists Who Fled the Holocaust for the United States**. <https://smithsonianmag.com/history/forgotten-women-scientists-who-fled-holocaust-united-states-180967166/>
- 2017 Northeastern University News: **Professors uncover lost stories of WWII Refugee-Scholars** at <https://news.northeastern.edu/2017/10/professors-uncover-lost-stories-of-wwii-refugee-scholars/>

## Industry Experience

- 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 the 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 - present* **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/](https://michaschwab.github.io/humidflow/). Physical formulas used for calculations in the background, D3 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

- 2018 **Program Committee** for the [LEipzig symposium on Visualization In Applications \(LEVIA\)](#)
- 2017 - now **Reviewer** for IEEE Transactions on Visualization and Computer Graphics
- 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

- 2018 **Guest Lecturer** for two 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

- 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.**
- 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.
- Techniques* **Machine Learning, Image Recognition**
- Web Skills* **Typescript** (Angular), **Javascript** (D3, node.js), MongoDB, SQL, PHP, HTML5, CSS3 and more.
- Programming* C++, Java.
- Languages* Fluent: **German, English**. Conversational: French, Farsi, Spanish.