

# Alexander Lex

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**Assistant Professor**, SCI Institute  
School of Computing, University of Utah  
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Visualization Design Lab: <http://vdl.sci.utah.edu>

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## Research Interest

Interactive data visualization, data analysis methods for scientists and experts,  
visual analytics, visualization for biology, human computer interaction, data science.

## Professional Appointments

### University of Utah

*Since 07/2015*

*Faculty Member* at the Scientific Computing and Imaging Institute  
*Assistant Professor* at the School of Computing

### Harvard University

*10/2012 – 05/2015*

*Post-Doctoral Fellow* at the Visual Computing Group at the School of Engineering & Applied Sciences. Research on interactive analysis of heterogeneous and large data for scientists and experts.

*Leading the visualization group, 07/2014 – 05/2015*

*Lecturer*, teaching CS 171, Visualization, *01/2015 – 05/2015*

### Graz University of Technology

*03/2012 – 09/2012*

*Post-Doctoral Researcher*. Senior researcher in the information visualization group. Co-leader of the Caleydo project. Research in visualization and HCI with a focus on molecular biology applications, such as pathway analysis, cancer subtype analysis, heterogeneous and multiple datasets.

### Center for Biomedical Informatics at Harvard Medical School

*08/2011 – 09/2011*

*Visiting Researcher*. Designed and implemented visualization and interaction techniques for cancer subtype analysis.

### Graz University of Technology

*08/2010 – 09/2012*

*Lecturer* (“Universitätsassistent”). Teaching courses on visualization, distributed systems, computer graphics. Student supervision.

### Graz University of Technology

*08/2008 – 03/2012*

*Research Assistant*. Designed and developed the Caleydo Visualization framework. Focus on microarray data analysis and pathway visualization.

## Education

### Post-Doctoral Training

*10/2012 – 05/2015*

Harvard University  
Mentor: Prof. Hanspeter Pfister

### Doctoral Program in Computer Science

*09/2008 – 03/2012*

Graz University of Technology  
Thesis: Visualization of Multidimensional Data with Applications in Molecular Biology  
Advisor: Prof. Dieter Schmalstieg  
graduated with highest distinction

### Visiting PhD Student

*08/2011 – 09/2011*

Harvard Medical School  
Advisors: Prof. Peter Park, Dr. Nils Gehlenborg

<b>Master's Program</b> ("Dipl.-Ing.") <i>Software Development and Business Management</i> Graz University of Technology graduated with highest distinction	09/2006 – 07/2008
<b>Visiting Graduate Student</b> McMaster University, Hamilton, ON, Canada	09/2006 – 05/2007
<b>Bachelor's Program</b> ("Bakk.rer.soc.oec") <i>Software Engineering and Knowledge Management</i> Graz University of Technology	09/2002 – 09/2006

## Funding at the University of Utah

*CAREER: Enabling Reproducibility of Interactive Visual Data Analysis*, PI: Alexander Lex, NSF IIS 1751238, 2018-2023. \$ 512,245.

*Lineage: Integrating Clinical and Genetic Data with Genealogical Records*, PI: Alexander Lex, Utah Genome Project Seed Grant, 2018-2019. \$ 46,454.

*Utah DID - Initial Grant*, PI: Greg Jones, Co-PI, Department of Defense, 2016-2018. \$ 3,792,367 (\$ 172,961).

*Visual Analysis of Genomic and Clinical Data from Large Patient Cohorts*, PI: Peter Park, NIH U01 CA198935, Co-Investigator, Subcontract, 2015-2018. \$ 1,524,006, (\$ 243,966).

## Sponsored Research Agreements at the Univeristy of Utah

*Visualizing Copy Number Data*. Funded by ARUP Laboratories, 2017. \$ 47,218.

*Visualizing Outcome Scores Associated with Orthopedic Surgery*. Funded by the Department of Orthopaedics, University of Utah, 2017. \$ 12,400.

*Visualizing Survey Data*. Funded by the College of Nursing, University of Utah, 2016. \$ 12,400.

*Visualizing Patient Referral Flow*. Funded by the University Hospital, University of Utah, 2016. \$ 12,400.

## Prior Funding

*Integrative Pathway-Based Visualization of Heterogeneous Data*, PI: Hanspeter Pfister, sponsored research agreement with Novartis Institutes for Biomedical Research, 2014-2016.

*Diagnostics of Tumor Heterogeneity - a new Steering Factor for Colorectal Cancer?*, PI: Gerald Höfler, funded by the state of Styria, Austria, 2012-2014.

*CaleydoPLEX - Information Exploration in Teams*, PI: Dieter Schmalstieg, funded by the Austrian Science Fund (FWF), Grant no. P22902, 2011-2014.

*InGeneious - Visualization of biomolecular and clinical data*, PI: Dieter Schmalstieg, funded by the Austrian Research Promotion Agency (FFG), BRIDGE program, Grant no. 385567, 2009.

## Scholarships and other Personal Grants

Erwin Schrödinger Scholarship awarded by the Austrian Science Fund: *Visual Analysis of Heterogeneous Data using Semantic Subsets*. Funding two years at Harvard University and one-year return phase at Graz University of Technology. 2013-2016.

Scholarship for short time academic research and expert courses abroad (KUWI). Granted by the Graz University of Technology. 2011.

Research grant for students ("Förderstipendium") awarded by the Faculty of Computer Science, Graz University of Technology. 2007.

Joint Study scholarship for student exchange with McMaster University, Hamilton, On, Canada. 2006.

## Honors and Awards

**Honorable Mention Award** (top 3 paper out of 183 submissions), EG/VGTC EuroVis, 2016.

**Human Technology Interface Award** for the work on cancer subtype visualization (StratomeX), awarded by the State of Styria, 2015.

**Honorable Mention Award** (top 3 paper out of 196 submissions), IEEE InfoVis, 2014.

**Honorable Mention Award** (top 5% paper, 3200 submissions), ACM CHI, 2014.

**Best Paper Award** (of 152 submissions), IEEE InfoVis, 2013.

**Honorable Mention Award**, IEEE BioVis Contest, 2013.

**Excellence in Teaching Scholarship**, funding a guest lecture at JKU Linz, awarded by the state of Upper Austria, 2013.

**Best Dissertation Award** by the “Forum Technology and Society”, Graz University of Technology, 2012.

**Best Paper Award** (of 32 submissions), IEEE BioVis, 2012.

**3rd Best Paper Award** (of 202 submissions), IEEE/EG EuroVis, 2012.

**Best Paper Award** (of 172 submissions), IEEE InfoVis, 2011.

**Best Student Paper Award** (of 88 submissions), ACM Graphics Interface, 2010.

**Award for excellent performance as a student** (“Leistungsstipendium”) granted by the Faculty of Computer Science, Graz University of Technology, 2007.

## Peer-reviewed Journal Publications

*Students primarily supervised by me at the University of Utah are underlined, other students at the University of Utah are italic.*

1. Carolina Nobre, Nils Gehlenborg, Hilary Coon, **Alexander Lex**, *Lineage: Visualizing Multivariate Clinical Data in Genealogy Graphs*. IEEE Transactions on Visualization and Computer Graphics, to appear, 2018.
2. Michael Kern, **Alexander Lex\***, Nils Gehlenborg, Chris R. Johnson, *Interactive Visual Exploration And Refinement Of Cluster Assignments*. BMC Bioinformatics, vol. 18, no. 1, pp. 406, 2017. *\*corresponding author*
3. Jake R. Conway, **Alexander Lex**, Nils Gehlenborg, *UpSetR: An R Package For The Visualization Of Intersecting Sets And Their Properties*. Oxford Bioinformatics, vol. 33, no. 18, pp. 2938-2940, 2017.
4. *Ethan Kerzner*, **Alexander Lex**, Crystal Lynn Sigulinsky, Timothy Urness, Bryan William Jones, Robert E. Marc, Miriah Meyer, *Graffinity: Visualizing Connectivity In Large Graphs*. Computer Graphics Forum (EuroVis '17), vol. 36, no. 3, pp. 251-260, 2017.
5. Christian Partl, Samuel Gratzl, Marc Streit, Anne Mai Wassermann, Hanspeter Pfister, Dieter Schmalstieg, and **Alexander Lex**, *Pathfinder: Visual Analysis of Paths in Graphs*. Computer Graphics Forum (EuroVis '16), vol. 35, no. 3, pp. 71-80, 2016. **Honorable Mention Award**.
6. Samuel Gratzl, **Alexander Lex**, Nils Gehlenborg, Nicola Cosgrove, and Marc Streit, *From Visual Exploration to Storytelling and Back Again*. Computer Graphics Forum (EuroVis '16), vol. 35, no. 3, pp. 491-500, 2016.
7. Hendrik Strobel, Bilal Alsallakh, Joseph Botros, Brant Peterson, Mark Borowsky, Hanspeter Pfister, and **Alexander Lex**, *Vials: Visualizing Alternative Splicing of Genes*. IEEE Transactions on Visualization and Computer Graphics (InfoVis '15), vol. 22, no. 1, pp. 399-408, 2016.
8. Marc Streit\*, **Alexander Lex\***, Samuel Gratzl, Christian Partl, Dieter Schmalstieg, Hanspeter Pfister, Peter J. Park, and Nils Gehlenborg, *Guided visual exploration of genomic stratifications in cancer*. Nature Methods, vol. 11, no. 9, pp. 884-885, 2014. *\*equal contribution*

9. **Alexander Lex**, Nils Gehlenborg, Hendrik Strobel, Romain Vuillemot, and Hanspeter Pfister, *UpSet: Visualization of Intersecting Sets*. IEEE Transactions on Visualization and Computer Graphics (InfoVis '14), vol. 20, no. 12, pp. 1983–1992, 2014.
10. Christian Partl, **Alexander Lex**, Marc Streit, Hendrik Strobel, Anne Mai Wasserman, Hanspeter Pfister, and Dieter Schmalstieg, *ConTour: Data-Driven Exploration of Multi-Relational Datasets for Drug Discovery*. IEEE Transactions on Visualization and Computer Graphics (VAST '14), vol. 20, no. 12, pp. 1883–1892, 2014.
11. Samuel Gratzl, Nils Gehlenborg, **Alexander Lex**, Hanspeter Pfister, and Marc Streit, *Domino: Extracting, Comparing, and Manipulating Subsets across Multiple Tabular Datasets*. IEEE Transactions on Visualization and Computer Graphics (InfoVis '14), vol. 20, no. 12, pp. 2023–2032, 2014. **Honorable Mention Award**.
12. Cagatay Turkyay, **Alexander Lex**, Marc Streit, Hanspeter Pfister, and Helwig Hauser, *Characterizing Cancer Subtypes using the Dual Analysis Approach in Caleydo*. IEEE Computer Graphics and Applications, vol. 34, no. 2, pp. 38–47, Mar. 2014.
13. **Alexander Lex**, Christian Partl, Denis Kalkofen, Marc Streit, Anne Mai Wasserman, Samuel Gratzl, Dieter Schmalstieg, and Hanspeter Pfister, *Entourage: Visualizing Relationships between Biological Pathways using Contextual Subsets*. IEEE Transactions on Visualization and Computer Graphics (InfoVis '13), vol. 19, no. 12, pp. 2536–2545, 2013.
14. Samuel Gratzl, **Alexander Lex**, Nils Gehlenborg, Hanspeter Pfister, and Marc Streit, *LineUp: Visual Analysis of Multi-Attribute Rankings*. IEEE Transactions on Visualization and Computer Graphics (InfoVis '13), vol. 19, no. 12, pp. 2277–2286, 2013. **Best Paper Award**.
15. Christian Partl, **Alexander Lex**, Marc Streit, Denis Kalkofen, Karl Kashofer, and Dieter Schmalstieg, *enRoute: Dynamic Path Extraction from Biological Pathway Maps for Exploring Heterogeneous Experimental Datasets*. BMC Bioinformatics, vol. 14, no. Suppl 19, p. S3, Nov. 2013.
16. **Alexander Lex**, Marc Streit, Hans-Jörg Schulz, Christian Partl, Dieter Schmalstieg, Peter J. Park and Nils Gehlenborg, *StratomeX: Visual Analysis of Large-Scale Heterogeneous Genomics Data for Cancer Subtype Characterization*. Computer Graphics Forum (EuroVis '12), pp. 1175–1184, 31(3), June 2012. **3rd Best Paper Award**.
17. Marc Streit, Hans-Jörg Schulz, **Alexander Lex**, Dieter Schmalstieg, Heidrun Schumann, *Model-Driven Design for the Visual Analysis of Heterogeneous Data*. IEEE Transactions on Visualization and Computer Graphics, pp.998-1010, 18(6), 2012.
18. **Alexander Lex**, Hans-Jörg Schulz, Marc Streit, Christian Partl and Dieter Schmalstieg, *VisBricks: Multiform Visualization of Large, Inhomogeneous Data*. IEEE Transactions on Visualization and Computer Graphics (InfoVis'11), pp. 2291-2300, 17(12), Dec. 2011.
19. Markus Steinberger, Manuela Waldner, Marc Streit, **Alexander Lex** and Dieter Schmalstieg, *Context-Preserving Visual Links*. IEEE Transactions on Visualization and Computer Graphics (InfoVis'11), pp. 2249-2258, 17(12), Dec. 2011. **Best Paper Award**.
20. **Alexander Lex**, Marc Streit, Christian Partl, Karl Kashofer, Dieter Schmalstieg, *Comparative Analysis of Multidimensional, Quantitative Data*. IEEE Transactions on Visualization and Computer Graphics (InfoVis'2010), 16(6), pp. 1027-1035, Nov.-Dec. 2010
21. Marc Streit, **Alexander Lex**, Michael Kalkusch, Kurt Zatloukal, Dieter Schmalstieg, *Caleydo: Connecting Pathways with Gene Expression*. Bioinformatics, Oxford Journals, 25(20), pp. 2760-2761, 2009.

## Peer-reviewed Conference Publications

1. Yan Zheng, Yi Ou, **Alexander Lex**, and Jeff M. Phillips, *Visualization of Big Spatial Data using Coresets for Kernel Density Estimates*. Symposium on Visualization in Data Science (VDS) at IEEE VIS, to appear, 2017.

2. Thomas Geymayer, Markus Steinberger, Marc Streit, **Alexander Lex**, and Dieter Schmalstieg, *Show me the Invisible: Visualizing Hidden Content*. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14), pp. 3705-3714, 2014. **Honorable Mention Award**.
3. John D. Mercer, Balaji Pandian, **Alexander Lex\***, Nicolas Bonneel, and Hanspeter Pfister, *Mu-8: visualizing differences between proteins and their families*. BMC Proceedings, vol. 8, no. Suppl 2, p. S5, 2014. *\*corresponding author*
4. Christian Partl, **Alexander Lex**, Marc Streit, Denis Kalkofen, Karl Kashofer, and Dieter Schmalstieg, *enRoute: Dynamic Path Extraction from Biological Pathway Maps for In-Depth Experimental Data Analysis*. Proceedings of the IEEE Symposium on Biological Data Visualization (BioVis '12), 2012, pp. 107-114, Seattle, WA, USA, Oct. 2012. **Best Paper Award**.
5. Clemens Holzhüter, **Alexander Lex**, Dieter Schmalstieg, Hans-Jörg Schulz, Heidrun Schumann and Marc Streit, *Visualizing Uncertainty in Biological Expression Data*. Proceedings of the SPIE Conference on Visualization and Data Analysis (VDA '12), pp. 82940O, San Francisco, CA, USA, 2012.
6. Thomas Geymayer, **Alexander Lex**, Marc Streit, Dieter Schmalstieg, *Visualizing the Effects of Logically Combined Filters*. Proceedings of the Conference on Information Visualisation (IV'2011), pp. 47-52, London, UK, 2011.
7. Manuela Waldner, Werner Puff, **Alexander Lex**, Marc Streit, Dieter Schmalstieg, *Visual Links across Applications*. Proceedings of the Graphics Interface (GI) 2010, Ottawa, Ontario, Canada, May 31 - June 2 2010. **Best Student Paper Award**.
8. **Alexander Lex**, Marc Streit, Ernst Kruijff, Dieter Schmalstieg, *Caleydo: Design and Evaluation of a Visual Analysis Framework for Gene Expression Data in its Biological Context* Proceedings of the IEEE Pacific Visualization Symposium, pp. 57-64, Taipei, Taiwan, March 2010.
9. Heimo Müller, Robert Reihls, Stefan Sauer, Kurt Zatloukal, Marc Streit, **Alexander Lex**, Bernhard Schlegl, Dieter Schmalstieg *Connecting Genes with Diseases*. Symposium on Information Visualization in Biomedical Informatics, 13th International Conference on Information Visualization, Barcelona, Spain, July 2009.
10. Marc Streit, **Alexander Lex**, Heimo Müller, Dieter Schmalstieg *Gaze-Based Focus Adaption in an Information Visualization System*. Computer Graphics and Visualization and Image Processing 2009 Conference (CGVCVIP), Algarve, Portugal, June 2009.

### Peer-reviewed Workshop Publications and Conference Short Papers

1. Sean McKenna, **Alexander Lex**, Miriah Meyer, *Worksheets for Guiding Novices through the Visualization Design Process*, Workshop on Pedagogy of Data Visualization at IEEE VIS, to appear, 2017.
2. Thomas Geymayer, Manuela Waldner, **Alexander Lex**, Dieter Schmalstieg, *How Sensemaking Tools Influence Display Space Usage*. EuroVis Workshop on Visual Analytics (EuroVA '17), 2017.
3. Carolina Nobre and **Alexander Lex**, *OceanPaths: Visualizing Multivariate Oceanography Data*. Proceedings of the Eurographics Conference on Visualization (EuroVis '15), Short Papers, 2015.
4. Manuela Waldner, **Alexander Lex**, Marc Streit, Dieter Schmalstieg, *Design Considerations for Collaborative Information Workspaces in Multi-Display Environments*. Proceedings of the CoVIS 2009 Workshop on Collaborative Visualization on Interactive Surfaces (IEEE VisWeek), Atlantic City, USA, October 2009.

### Preprints and Manuscripts under Review

1. Katarina Furmanova, Samuel Gratzl, Holger Stitz, Thomas Zichner, Miroslava Jaresova, Martin Ennemoser, **Alexander Lex**, Marc Streit, *Taggle: Scalable Visualization of Tabular Data through Aggregation*, arXiv preprint, 2017

## Commentaries and Posters

1. Carolina Nobre, Nils Gehlenborg, Hilary Coon, **Alexander Lex**, *Lineage: Visualizing Multivariate Clinical Data in Genealogy Graphs*. Poster Proceedings of IEEE InfoVis, Phoenix, Arizona, USA, 2017.
2. Katarína Furmanová, Miroslava Jarešová, Bikram Kawan, Holger Stitz, Martin Ennemoser, Samuel Gratzl, **Alexander Lex**, Marc Streit, *Taggle: Scaling Table Visualization through Aggregation*. Poster Proceedings of IEEE InfoVis, Phoenix, Arizona, USA, 2017.
3. Hendrik Strobelt, Bilal Alsallakh, Joseph Botros, Brant Peterson, Mark Borowsky, Hanspeter Pfister, and **Alexander Lex**: *A Novel Tool for Isoform Visualization*. Poster Proceedings of the 5th Symposium on Biological Data Visualization (BioVis'15), ISMB, Dublin, Ireland, USA, 2015.
4. **Alexander Lex**, Nils Gehlenborg: *Points of view: Sets and intersections*. Nature Methods, vol. 11, no. 8, pp. 779, 2014.
5. **Alexander Lex**, Nils Gehlenborg, Hendrik Strobelt, Romain Vuillemot, Hanspeter Pfister: *UpSet for Visualizing Intersecting Sets in Biology*. Poster Proceedings of the 4th Symposium on Biological Data Visualization (BioVis'14), ISMB, Boston, MA, USA, 2014.
6. **Alexander Lex**, Marc Streit, Hans-Jörg Schulz, Christian Partl, Dieter Schmalstieg, Peter J. Park and Nils Gehlenborg: *StratomeX: Enabling Visualization-Driven Cancer Subtype Analysis*. Poster Proceedings of the IEEE Symposium on Biological Data Visualization (BioVis'12), 2012.
7. Marc Streit, **Alexander Lex**, Hans-Jörg Schulz, Christian Partl, Dieter Schmalstieg, Peter J. Park, Nils Gehlenborg: *Guided Visual Analysis for the Identification of Cancer Subtypes*. The Cancer Genome Atlas' Semi-Annual Steering Committee Meeting, Houston, TX, US, 25-27 April 2012.
8. **Alexander Lex**, Marc Streit, Hans-Joerg Schulz, Christian Partl, Dieter Schmalstieg, Peter J. Park, Nils Gehlenborg: *StratomeX – Integrative Visualization of Tumor Subtypes in Cancer Genomics Data Sets*. EMBO Workshop on Visualizing Biological Data (VizBi), Heidelberg, Germany, 6-8 March 2012.
9. **Alexander Lex**, Peter J. Park and Nils Gehlenborg: *Supporting Subtype Characterization through Integrative Visualization of Cancer Genomics Data Sets*. The Cancer Genome Atlas' 1st Annual Scientific Symposium: Enabling Cancer Research Through TCGA, November 17-18, 2011, Washington, D.C., USA
10. Marc Streit, **Alexander Lex**, Helmut Doleisch, Dieter Schmalstieg: *Does software engineering pay off for research? Lessons learned from the Caleydo project*. Poster at the Eurographics Workshop on Visual Computing for Biomedicine 2010, Leipzig, Germany, July 2010.
11. Gudrun Schmidt-Gann, Katharina Schmid, Monika Uehlein, Joachim Struck, Andreas Bergmann, Dieter Schmalstieg, Marc Streit, **Alexander Lex**, Douw G. van der Nest, Martijn van Griensven and Heinz Redl: *Gene- and Protein Expression Profiling in Liver in a Sepsis-Baboon Model*. 32nd Annual Meeting on Shock, San Antonio, Texas, USA June 6-9, 2009.

## Thesis Papers

**Doctoral Thesis:** Visualization of Multidimensional Data with Applications in Molecular Biology

Advisor: Prof. Dieter Schmalstieg

Co-Advisor: Dr. Nils Gehlenborg, Harvard Medical School

Referee: Prof. Robert Kosara, University of North Carolina at Charlotte

Publication date: March 2012

**Best Dissertation Award**, Graz University of Technology

**Master's Thesis:** Exploration of Gene Expression Data in a Visually Linked Environment

Mentor: Prof. Dieter Schmalstieg

Publication date: June 2008

**Bachelor's Thesis:** Evaluation of Medical Image Viewers and Architectural Software Design for a Medical Image Viewer  
Mentors: Prof. Horst Bischof, Dr. Martin Urschler  
Publication date: June 2005

## Teaching

**COMP 5360/MATH 4100 — Introduction to Data Science**, University of Utah, Spring 2018  
Instructor. Undergraduate course on the fundamentals of data science. <http://datasciencecourse.net>

**CS 5630/CS 6630 — Visualization for Data Science**, University of Utah, Fall 2017  
Instructor. Graduate/undergraduate course on visualization covering visualization fundamentals, information visualization, and the development of web-based visualization tools. <http://dataviscourse.net>

**CS 5963/Math 3900 — Introduction to Data Science**, University of Utah, Fall 2016  
Instructor. Undergraduate course on the fundamentals of data science. <http://datasciencecourse.net>

**CS 5630/CS 6630 — Visualization**, University of Utah, Fall 2015, 2016  
Instructor. Graduate/undergraduate course on visualization covering fundamentals, information visualization and scientific visualization. <http://dataviscourse.net>

**CS 7942 — Visualization Seminar**, University of Utah, Fall 2016, Spring 2017, Fall 2017

**CS 171 — Visualization**, Harvard University, Spring 2015  
Instructor. Undergraduate level lecture on visualization. <http://cs171.org/2015/>

**CS 171 — Visualization**, Harvard University, 2013, 2014  
Head teaching fellow. Instructor: Hanspeter Pfister.  
Responsibilities: co-developed class, taught multiple lectures and supervised 15 teaching fellows.

**BioVis — Visualization in Molecular Biology**, Johannes Kepler University Linz, 2013  
Instructor. Lecture series sponsored by an “Excellence in Teaching” scholarship, state of Upper Austria.  
Graduate lecture on visualization for molecular biology.

**CS 109 / AC 209 / Stat 121 / E-109 — Data Science**, Harvard University, 2013  
Teaching fellow. Instructors: Hanspeter Pfister and Joe Blitzstein. Undergraduate and graduate lecture on data analysis using statistics, machine learning and visualization.

**Selected Topics Computer Graphics**, Graz University of Technology, 2010, 2011, 2012  
Co-Instructor. Graduate level lectures on perception, color, information visualization, visual analytics, flow visualization.

**Distributed Systems**, Graz University of Technology, 2009, 2010, 2011  
Teaching assistant. Undergraduate level. Development and supervision of lab assignments.

**Introduction to Scientific Work**, Graz University of Technology, 2010, 2011  
Teaching assistant. Undergraduate level. Supervision of focus groups.

**Computer Graphics 1**, Graz University of Technology, 2011, 2012  
Teaching assistant. Undergraduate level. Development and supervision of lab assignments.

**Computer Graphics 2** Graz University of Technology, 2011, 2012  
Teaching assistant. Undergraduate level. Development and supervision of lab assignments.

## PhD Students

Jennifer Rogers, 2017-2022

Carolina Nobre, 2016-2021

Cameron Waller, 2016-2018, co-supervised with Jared Rutter

Christian Partl (TU Graz), 2013-2017, co-supervised with Dieter Schmalstieg

## Other Mentored Students at Utah

Pranav Dommata, MS '18  
Sahar Mehrpour, PhD fellowship rotation '17  
Mengjiao Han, PhD fellowship rotation '17  
Asmaa Aljuhani, PhD fellowship rotation '17  
Annie Cherkaev, PhD fellowship rotation '17  
Sunny Hardasani, MS '16  
Anirudh Narasimhamurthy, M.S. '16  
Michael Kern, (on exchange from TU Munich) M.S. '16  
Murali Krishna Teja Kilari, M.S. '17  
Sateesh Tata, MS '16  
Roy Bastien, undergraduate thesis, BS '16  
Priyanka Parekh, undergraduate thesis, BS '16  
Shreya Singh, MS '15  
Varsha Alangar, MS '15

## Mentored Students at Harvard

Rasvan Iliescu, master's thesis, MS '14  
Alain Ibrahim, master's thesis, MS '14  
Tamar Rucham, master's thesis, MS '14  
Gabriel Hase, master's thesis, MS '14  
Conor Myhrvold, MS '14  
Ran Sofia Hou, undergraduate thesis, BS '13 (co-advised with Joe Blitzstein)

I supervise or have supervised many master's thesis, master's projects, and undergraduate's thesis. See a full list of students at <http://vdl.sci.utah.edu/team/lex/#teaching>.

## Tutorials

Nils Gehlenborg and **Alexander Lex**: *StratomeX & enRoute: Integrative Visualization with Caleydo* Visualizing Biological Data (VizBi) 2013, Cambridge, MA, USA, March 2013

**Alexander Lex** and Marc Streit: *Cancer Data Analysis with Caleydo StratomeX and enRoute* Symposium on Understanding Cancer Genomics through Information Visualization at Tokyo University, Tokyo, Japan, Feb. 2013

Marc Streit, Hans-Jörg Schulz and **Alexander Lex**: *Connecting the Dots—Showing Relationships in Data and Beyond* VisWeek'12, Seattle, WA, USA, Oct. 2012.

## Organized Conferences and Workshops

Co-chair of Symposium on Visualization in Data Science (VDS) at IEEE VIS 2017  
Co-chair of Workshop on Visualization in Data Science (VDS) at IEEE VIS 2016

## Paper Chair Roles at Conferences

Papers co-chair of Symposium on Biological Data Visualization (BioVis) 2017



Papers and Program co-chair of Symposium on Visualization in Data Science (VDS) at IEEE VIS 2015

### **Other Leadership roles at Conferences**

Publications chair of BioVis 2016

Publicity co-chair of IEEE VIS 2016, 2017

Poster co-chair of Symposium on Biological Data Visualization (BioVis) 2014, 2015

Website co-chair of Symposium on Biological Data Visualization (BioVis) 2014, 2015

### **Program Committees**

ACM CHI, 2017

IEEE VAST, 2017, 2018

IEEE InfoVis 2014, 2015, 2016

PacificVis 2016, 2017

International Symposium on Big Data Visual Analytics (BDVA), 2016

BioVis 2014, 2015, 2016

EuroVis Short Papers 2014, 2015, 2016, 2017

Conference on Human-Computer Interaction & Knowledge Discovery (HCI-KDD) 2012

International Conference on Information Visualisation (IV) 2010, 2011

### **Reviewing**

IEEE TVCG

IEEE CG&A

SAGE Information Visualization

IEEE Information Visualization (InfoVis) 2010-2016

IEEE Visual Analytics (VAST) 2010-2016

ACM CHI 2014-2017

EuroVis 2010-2016

BMC Bioinformatics

BioVis 2012-2016

Nucleic Acids Research

IEEE PacificVis 2010, 2011, 2013, 2015, 2016

IV 2009-2011

F1000Research

and others

### **Grant Review Panel**

National Science Foundation (NSF), 2018

### **Department Service**

Programming Languages Search Committee, 2018

Database Search Committee, 2017

Graduate Student Advisory Council Faculty Liaison, Since 2017

Graduate Students Admissions Committee, 2016, 2017, 2018

## Invited Talks

### **Visualizing Biological Data: Pathway Graphs, Genealogies, and Alternative Splicing**

Association for Molecular Pathology (AMP) Annual Meeting, Salt Lake City, UT, 2017-11-17.

Merck Research Laboratories, Boston, MA, 2017-06-15.

Department Of Biomedical Informatics, Harvard Medical School, Boston, MA, 2017-06-14.

### **Enabling Scientific Discovery through Interactive Visual Data Analysis**

Goldman Sachs Tech Expo, Salt Lake City, UT, 2017-06-28.

Department Of Biomedical Informatics, University of Utah, Salt Lake City, UT, 2017-04-06.

Walmart, Tech Tuesday, Bentonville, AK, 2017-02-07.

Marth Lab, Department of Human Genetics, University of Utah, Salt Lake City, UT, 2016-08-25.

Pacific Northwest National Laboratory, Richland, WA, 2016-07-01.

Huntsman Cancer Institute, Salt Lake City, UT, 2016-03-30.

Camp Lab, Huntsman Cancer Institute, University of Utah, Salt Lake City, UT, 2015-11-2.3

### **Enabling Scientific Discovery through Interactive Visual Data Analysis**

University of Vienna, Vienna, Austria, 2015-08-07.

Adobe Research, San Francisco, CA, USA, 2015-04-06.

EPFL, Lausanne, Switzerland, 2015-03-26.

University of Utah, Salt Lake City, UT, USA, 2014-12-03.

University of St. Andrews, St. Andrews, Scotland, 2014-11-03.

### **UpSet: Visualization of Intersecting Sets**

Data Ventures, Harvard University, Cambridge, MA, USA, 2015-04-23.

BioIT World Conference & Expo, Boston, MA, USA, 2015-04-22.

Tufts University, Somerville, MA, USA, 2014-10-29.

### **Visual Data Analysis for Biology and Pharmacology**

PerkinElmer, Boston, MA, USA, 2014-11-05. Novartis Institutes for BioMedical Research, Cambridge, MA, USA, 2014-07-09.

### **Visualizing Relationships between Biological Pathways**

Drug Discovery on Target Conference, Boston, MA, USA, 2014-10-08.

BioIT World Conference & Expo, Boston, MA, USA, 2014-05-01.

DBMI, Harvard Medical School, Boston, MA, USA, 2014-04-17.

### **Visualization Approaches for Biomolecular Data**

Georgia Tech, School of Interactive Computing, Atlanta, GA, USA, 2014-04-08.

University of Calgary, Department of Computer Science, Calgary, AB, Canada, 2014-02-13.

MIT CSAIL, Cambridge, MA, USA. 2013-04-12.

UMass Lowell, Lowell, MA, USA, 2013-11-06.

### **Visualizing Multi-Attribute Rankings & A Very Short Visualization Introduction**

Harvard Graduate School of Education, Strategic Data Project, Cambridge, MA, USA, 2014-03-07.

### **Data Visualization in Molecular Biology**

Novartis Institutes for BioMedical Research, Cambridge, MA, USA, 2013-07-29

### **enRoute: Dynamic Path Extraction from Biological Pathway Maps for Exploring Heterogeneous Experimental Datasets**

BioIT World Conference & Expo, Boston, MA, USA, 2013-04-10.

Visualizing Biological Data (VIZBI) 2013, Cambridge, MA, USA, 2013-03-20.

Symposium on Understanding Cancer Genomics through Information Visualization at Tokyo University, Tokyo, Japan, 2013-02-22.

**Visualizing Biomolecular Data with the Caleydo Framework**

CBMI, Harvard Medical School, Boston, MA, USA, 2011-08-12.

MRC Laboratory of Molecular Biology (LMB), Cambridge, UK, 2010-09-21.

European Bioinformatics Institute (EBI), Cambridge, UK, 2010-09-20

**Caleydo: Visual Analysis of Biomolecular Data**

VCBM 2010 Leipzig, Germany, 2010-07-02.

Caleydo and Visual Links.

VRVis Research Company, Vienna, Austria, 2010-03-11.

**Caleydo: Visualization of Gene Expression Data in the Context of Biological Processes**

AUVA Research Center for Traumatology, Vienna, Austria, 2009-02-26.

**Novel InfoVis Techniques Applied to Pathways and Gene Expression Data**

Institute for Genomics and Bioinformatics, Graz University of Technology, Austria, 2008-07-10.

For slides, see <http://vdl.sci.utah.edu/team/lex/#talks>.

## Selected Press

Inside Science, 2017

How Math Can Help Geologists Discover New Minerals

The OpenHelix Blog, 2016

Video Tip of the Week: Pathfinder, for exploring paths through data sets

The OpenHelix Blog, 2014

Video Tip of the Week: UpSet about genomics Venn Diagrams?

The Harvard Crimson, 2014

Painting by the Numbers: Data Visualization

The Harvard Crimson, 2014

New Tool Makes Cancer Analysis More Accessible

Harvard Medical School News, 2014

Pattern Recognition: New visualization software uncovers cancer subtypes

GenomeWeb, 2014

Harvard TCGA Data Visualization Software Adds Tools to Better Characterize Disease Subtypes

The OpenHelix Blog, 2014

StratomeX for genomic stratification of diseases

Harvard SEAS News & Harvard Gazette, 2014

What's behind a #1 ranking?

Forbes, 2014

Harvard And DARPA Develop Software For Deconstructing Top 100 Rankings

Der Standard, 2014

Heimische Forscher machen die Dynamik hinter Rankings sichtbar

The OpenHelix Blog, 2014

Video Tip of the Week: Entourage and enRoute from the Caleydo team

Nature Methods, 2013

Data visualization: ambiguity as a fellow traveler

GEN - Genetic Engineering & Biotechnology News, 2013

Pathway Analysis to Decipher Data

Harvard SEAS News, 2013  
Celebrating minds dedicated to discovery

The OpenHelix Blog, 2010  
Tip of the Week: Caleydo for gene expression and pathway visualization

For links to the articles, see <http://vdl.sci.utah.edu/team/lex/#press>.

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