

# PERSONAL STATEMENT | Niklas Elmqvist

Steve Jobs once famously stated that "*computers are like a bicycle for the mind*," and this motto is particularly true for the research area of *data visualization*—my research area—where we use interactive graphical representations of data to amplify cognition. Put differently, visualization scaffolds what essentially makes us human: our capacity for rational thought.<sup>1</sup> Instead of endeavoring to remove people from the analytical process entirely, which is increasingly the approach taken by machine learning and artificial intelligence, visualization engages individuals as integral parts of a *sensemaking loop* where the computer and the human are separate, but often equal, partners. People have used technology to improve their capabilities and overcome their limitations since the dawn of time. Visualization is just a tool in a long line of tools, but its potential for supporting the human in truly understanding vast oceans of data is unparalleled.

My approach to visualization research is grounded in the areas of human-computer interaction, cognitive science, and ubiquitous computing. My view is that interaction is a cognitive catalyst for sensemaking; essentially, that merely viewing data is insufficient and that manipulation is what truly enables insight. My goal is to leverage the new generation of hardware—touch, pens, gestures, mobile, and multimodal—to design, build, and evaluate new tools for making sense of data. My unique contribution, first proposed in 2013, is the vision of a *ubiquitous* form of data analytics (*ubilytics*) [J30], where ever-present networked devices can be harnessed for analysis and decision-making anytime and anywhere. Spurred by papers, workshops, and talks, this idea is now gaining momentum in the field and has contributed to the topic of *immersive analytics*.

In this document, my personal statement in support of my application for promotion to Full Professor at the University of Maryland, College Park (UMD), I will not only describe this vision in more detail, but also outline my efforts within teaching as well as service to the university and my professional community. The UMD Faculty Handbook<sup>2</sup> states that an individual applying to the rank of Full Professor shall possess "*a national and, where appropriate, international reputation for outstanding **research**, ... a distinguished record of **teaching**... [and] relevant and effective professional **service**."* Below I will endeavor to show that I have attained all three of these distinctions. Furthermore, I argue that promotion to Full Professor would provide me with an appropriate platform for shouldering larger responsibilities within the scientific community of which I am part, for the students I teach, and on the university campus I serve.

## Scholarship and Research Methodology

My research area is data visualization, human-computer interaction, and visual analytics, with my primary scientific communities being the IEEE VIS (<http://www.ieeevis.org/>) and the ACM CHI (<https://sigchi.org/>) conferences. I have been very productive in research output in these areas, particularly since joining UMD in 2014, with more than 110 academic papers in strictly peer-reviewed journals and conference proceedings (almost doubled since 2014). In particular, I have co-authored 28 papers in IEEE Transactions on Visualization & Computer Graphics (TVCG) and 14 papers in the ACM CHI conference, both top venues for visualization and HCI research, respectively. According to Google Scholar, my work has been cited thousands of times and I have an h-index of 35, putting me on equal footing with many full professors in my area.

---

<sup>1</sup> N.B.: From an analytical perspective and in contrast to "artificial" forms of intelligence. This is not to say that humans merely possess rational thought; additional aspects are outside the scope of this discussion.

<sup>2</sup> [https://faculty.umd.edu/policies/ten\\_titles.html](https://faculty.umd.edu/policies/ten_titles.html)

My research methodology is a mix of theory, design, and evaluation. The problems I attack are real problems posed by real users, and I strive to involve these users in the design process in a user-centered, participatory fashion. Because the problems are real and require solutions, all of my work is characterized by a strong software engineering component. New HCI techniques must be empirically evaluated, and for this to be possible we need prototype implementations. After iterative design and development, my approach is to evaluate the new technique using a blend of qualitative and quantitative methods. I often deploy my tools in the field and over time.

Significantly, I study data visualization through the lenses of Norman's Gulfs of Evaluation and Execution,<sup>3</sup> which fit well with data visualization: here, **evaluation** refers to the capacity of the user to discern the state of the computer system, which in visualization maps to the actual visual representation, whereas **execution** refers to the mechanisms the computer system provides to change its state, which corresponds to the interactivity of the visual representations. I find this to be a useful organizing framework for my work: the visual vs. interactive computing aspects.

## Visual Computing: Making Sense of Big Data

Visualization creates graphical representations of data to offload computation, re-represent data, and constrain problem solving, thus allowing a user to view, analyze, and understand datasets larger than would be possible with less visual formats. However, for truly big data, we invariably reach a point when there are simply not enough pixels to go around. Large or many displays do not generally help for this situation, as human perceptual limitations dominate. In my research, I have addressed this problem through an aggregation approach by recursively combining data into a hierarchy of discrete cluster levels to create a multiscale representation of the dataset. I then manage the resulting hierarchy in two ways: by (1) visually representing these aggregate entities that consist of potentially thousands of data cases [J10, C12, J12], and by (2) providing interaction techniques for navigating the multiscale space [J11, C17, C26, C27, J27].

Nevertheless, computing has today reached a point where we often must go beyond the confines of a single monitor and look at display spaces consisting of multiple, often heterogeneous, displays [J32]. My work investigates how we can leverage the ecosystem of digital devices (smartphones, tablets, music players, laptops, head-mounted displays, etc.) in our surroundings to form shared display spaces that allow the seamless transfer and viewing of big data. By being embedded into the real world to a much higher degree than was previously possible, these display spaces can support the visual fabric that ubiquitous analytics relies on.

To make this possible, we need open and standardized infrastructures that will support meshing this sea of devices into a coherent whole. My work during the last few years has focused on prototyping and evaluating several infrastructures. My first attempt was Munin [J37], a Java framework for distributed visualization based on a peer-to-peer network (P2P) infrastructure. However, the web's rich and growing ecosystem of libraries, APIs, and standards is a better platform for device-independent visualizations than Java. This resulted in the PolyChrome [C37] JavaScript P2P framework. Most recently in 2018, my research group has partnered with collaborators at Aarhus University in Denmark to build a new Open Source platform called Vistrates [J63] that allow for visual programming using reusable components in a truly distributed, shareable, and malleable web-based form. The platform supports easily building cross-device and distributed visualization applications using standard web technologies.

---

<sup>3</sup> Norman, Donald (1988). *The Design of Everyday Things*. New York: Basic Books.

## Interactive Computing: Interaction as a Cognitive Catalyst

While often receiving scant attention in visualization research compared to visual encodings, interaction is much more than the interface used to control our visualization tools. Instead, interaction serves as a critical catalyst for understanding because it places direct control of the data into the hands of the user [J19]. This reduces the visual representation into a mere medium where the interaction takes place. In fact, post-cognitivist frameworks such as *distributed cognition* model information flow in a cognitive system—such as an analyst using a computational device to view and understand data—as the transfer of internal and external representational states across different media—such as the device’s screen, the user’s mind, and a piece of paper used to take notes—through *interactions* between them. Designing seamless interactions in the analytical computing system will amplify this flow. Humans do not think in a vacuum; rather, we surround ourselves with surfaces, spaces, artifacts, and other people that support the cognitive task. Consider spreading financial reports on your desk when working on your stock portfolio; annotating, stacking, and organizing bills in your office when balancing your checkbook; or gathering your family around a dining table littered with catalogues, maps, and notepads when planning your vacation. Put simply, *action is a catalyst for understanding*.

A ubiquitous approach to interaction, then, would endeavor to reduce or eliminate the barriers between users and the data they interact with (i.e., reducing the Gulf of Execution). Such a fluid form [J19] of human-data interaction must scaffold people in managing large and complex data, serving as the interactive counterpart to world-embedded display environments. I scaffold interaction in two primary ways: using computational support, and through novel devices.

**Computational support** for human-data interaction fits into the nascent research area of *visual analytics*, where where computational methods such as machine learning and data mining are integrated in the sensemaking loop to support human users in their analysis process. My work on TimeFork [C41] combines automatic prediction with human insight for time-series data. ConceptVector [J55] aids rapid dictionary building through advanced word embedding. TopicLens [J48] provides real-time topic modeling within a user-controlled lens.

My work on **novel devices** for analytics go beyond traditional computers equipped with mouse and keyboard and into the space of novel platforms such as touch-based, gestural, and tangible computing to augment human abilities using the action-as-catalyst concept. Our extended multitouch concept [C28] uses a Kinect depth camera to infer touch and hand posture. Tracking people in a physical space allows for utilizing proxemics to understand how they use their bodies to relate to each other and to large displays [C42]. In fact, smartwatches can serve as powerful companions for data visualization on such large displays, which we utilize in our David + Goliath framework [C49]. Finally, our most recent work studies conveying data through olfactory displays [J61], which resulted in my students building two physical prototypes of such displays.

## Future Research Outlook

The ultimate goal for my research is to enable real users to solve real tasks—such as understanding large-scale datasets, seeing the structure of huge hierarchies, or navigating large information spaces—that were previously beyond their reach. I am applying these ideas to furthering science, society, and democracy in an effort I call Visualization for Good (Vis4Good), which includes improving data and visualization literacy [J57], supporting medical science [C52], enabling scientific discovery [J59], and promoting public safety [C29, C32, J35].

## Teaching Philosophy

Teaching is just another example of how we as scholars communicate our knowledge to a broader audience, be it our students, our colleagues, or the general public. Classrooms and one-on-one mentoring alike give me a stage where I can share my passion for computing, and I have found that the more enthusiastic I am, the more infected my students become.

In my four years at the UMD iSchool, I have developed three new visualization courses from scratch (two graduate, one undergraduate). All three are immensely popular to the point where they fill up to capacity the same day registration opens and the size of the waitlist rivals the number of seats. My course evaluation scores typically rank well above the college average.

I lead a large research group, advising a total of nine Ph.D. students. Since joining UMD, I have graduated two Ph.D.s, with an additional three within a year of graduation. My advising method is inclusive, practical, and hands-on. I received the Purdue Graduate Student Mentoring Award in 2014, and was a runner-up for the UMD Graduate Faculty Mentor of the Year Award in 2017.

## Service to the Scientific Community

Service to the scientific community is central to my personal mission, and I have so far served on more than 50 technical program committees. I am an associate editor of IEEE TVCG and the Information Visualization journal, and series co-editor of the Morgan & Claypool Synthesis Lectures on Visualization. The pinnacle of my professional service so far came in 2016 and 2017, when I was chosen to serve as papers co-chair for the IEEE InfoVis conference. Chairing was challenging but rewarding, and I introduced several innovations, including a revised call for papers, a reviewer scorecard, and multiple educational efforts to improve review quality.

I have also realized that my own experiences have given me insight into the academic enterprise, and I have begun to publish blog articles on this topic on my website. Blogs are an excellent complement to academic publications, and I plan to continue this practice as service to the field.

## Service to the University

When I joined UMD in 2014, I also became the director of the iSchool's Master of Science in Human-Computer Interaction (HCIM) program. That fall, the HCIM program was in trouble, with zero incoming students. The program was research-oriented, but wasn't able to compete effectively with older, more well-known, and higher ranked programs. My first action as director was thus to change the admission criteria to focus on students with a design background (rather than research) who were only looking to get a masters degree and then join industry, essentially turning the program into a professional one. This decision has since been validated several times over: the program has now more than 40 students, and our incoming class for Fall 2018 is 50!

In 2016, I was invited to become the eighth director of UMD's Human-Computer Interaction Laboratory (HCIL), the oldest such lab in North America and one of the most reputable in the world. Serving as director has been the highest honor of my career so far, and going forward, I plan to provide leadership to the HCIL, protect its legacy, and introduce some ideas of my own.



*August 2018 - College Park, MD*

Summary Statement of Professional Achievements  
Dr. Niklas Elmqvist  
12/3/18

Read and Approved by Dr. Elmqvist

Signature

Date 12/3/2018

## 1. Background

Dr. Niklas Elmqvist earned a B. Sc. and M. Sc. in Computer Science and Engineering from Chalmers University of Technology (Göteborg, Sweden) in 2001 and a Ph.D. in Computer Science from Chalmers University of Technology in 2006. In Spring 2006 he was a visiting scholar at Georgia Institute of Technology. From January to June 2007, he was a postdoctoral fellow at INRIA/LRI at Université Paris-Sud, and he continued his postdoctoral work at Microsoft Research – INRIA Center from June 2007 to August 2008.

Dr. Elmqvist joined the faculty of the School of Electrical and Computer Engineering at Purdue University in August 2008 as an Assistant Professor, and he was promoted to her current rank of Associate Professor with tenure in August, 2014. He joined the College of Information Studies at the University of Maryland, College Park in August the same year as an Associate Professor with tenure. He has an appointment in UMIACS (the University of Maryland Institute for Advanced Computer Studies) and an affiliate appointment in Computer Science.

The summary provided here is current as of Dr. Elmqvist's curriculum vitae from August 2018 (with a supplement dated November 21, 2018; see Section 6).

The College of Information Studies' mission statement, adopted in the 2009 Strategic Plan, states: "The College engages in collaborative, interdisciplinary, and innovative research, teaching, and service. We educate information professionals and scholars; and we create knowledge, systems, and processes to promote the management and use of information."

## 2. Research

Quoting from Dr. Elmqvist's personal statement:

"My approach to visualization research is grounded in the areas of human-computer interaction, cognitive science, and ubiquitous computing. My view is that interaction is a cognitive catalyst for sensemaking; essentially, that merely viewing data is insufficient and that manipulation is what truly enables insight. My goal is to leverage the new generation of hardware—touch, pens, gestures, mobile, and multimodal—to design, build, and evaluate new tools for making sense of data. My unique contribution, first proposed in 2013, is the vision of a ubiquitous form of data

analytics (ubilytics) [J30], where ever-present networked devices can be harnessed for analysis and decision-making anytime and anywhere.”

**2.1. Book Publications.** Dr. Elmqvist is a co-author of the 6<sup>th</sup> edition (2016) of the textbook Designing the User Interface.

**2.2. Journal Publications.** Dr. Elmqvist has published a total of 65 journal articles in 12 different journals. Note that the journal *IEEE Transactions on Visualization & Computer Graphics* publishes a special issue containing the proceedings of the conferences IEEE Visual Analytics Science and Technology (VAST), IEEE Information Visualization (InfoVis), and IEEE Scientific Visualization (SciVis). Similarly, the journal *Computer Graphics Forum* every year publishes a special issue with the proceedings of the IEEE EuroVis conference. The journal article total includes 22 of these conference papers that were printed in the journals that published the proceedings. Of these 65 journals articles, he was the principal author on 15, and a student or postdoc directly mentored by Dr. Elmqvist was the principal author for an additional 29. Of the 65, 33 have been published since 2014. The impact factor for each journal in which Dr. Elmqvist as published is shown below.

**2.3. Conference Publications.** The Computing Research Association (CRA), the professional association of research-oriented computer science departments, produced a Best Practices Memo on Evaluating Computer Scientists and Engineers for Promotion and Tenure (Computing Research Association, 1999), which states:

“... For experimentalists conference publication is preferred to journal publication, and the premier conferences are generally more selective than the premier journals [Academic Careers, 94]. ... Publication in the prestige conferences is inferior to the prestige journals only in having significant page limitations and little time to polish the paper. In those dimensions that count most, conferences are superior.”

Dr. Elmqvist has published a total of 54 full conference papers, not including conference papers published in journals as described above. Of those, he was the principal author for 14 and a student or postdoc he mentored was the principal author for an additional 24. Of these 54 full conference papers, 23 have been published since 2014. Papers authored by Dr. Elmqvist received best paper awards in 2013 and honorable mentions in 2016 (1 paper) and 2018 (3 papers).

**2.4. Other Publications.** Dr. Elmqvist has 21 other publications (3 book chapters, 14 workshop papers, and 4 poster papers). Of these 21 other publications, 5 have been published since 2014.

**2.5. Grants, Contracts and Gifts.** Dr. Elmqvist has served as Principal Investigator (PI), Co-PI, or senior personnel on 20 external grants, contracts, and gifts totaling \$20.6 million (for which Dr. Emlqvist's c.v. reports his share to be \$2.78 million) from the National Science Foundation, National Institutes of Health, Department of Homeland Security, Purdue Research Foundation,

and one company (Google). Of these 20 awards, 4 awards totaling \$2.4 million (for which his reported share is \$994,000) have been received since 2014

**2.6. Research Presentations.** Dr. Elmqvist has presented 31 invited talks including one keynote addresses (Transportation Visualization Midyear Committee Meeting, National Academy of Sciences). Of these, 11 have been presented since 2014.

### **3. Teaching and Advising**

**3.1. Courses.** Between Spring 2014 and Fall 2018 (i.e., in the most recent five years), Dr. Elmqvist has taught 6 sections of 3 different full (3-credit) graduate courses (Visual Analytics, Data Visualization, Programming for Information Professionals) and 2 sections of 1 undergraduate course (Introduction to Data Visualization). Prior to this period, Dr. Elmqvist also had graduate undergraduate teaching experience at Purdue University.

**3.2. Peer Evaluation of Teaching.** The iSchool first implemented a formal process for peer evaluation of teaching in Fall 2017, so only two reports available. Professor Weaver reviewed INST 760 in , and Marciano reviewed INST462 in Spring 2018.

**3.3. Research Students and Postdocs.** Dr. Elmqvist has graduated four Ph.D. students. These students have been placed in industry and academic positions:

- Waqas Javed (Ph.D. in 2013), senior staff UX design researcher, General Electric (GE).
- Sohaib Ghani (Ph.D. 2013), research scientist, King Abdullah University of Science & Technology.
- M. Adil Yalcin (Ph.D. 2016), co-founder and CEO, Keshif LLC (startup).
- Deok Gun Park (Ph.D. 2018), assistant professor, Department of Computer Science, University of Texas at Arlington.

He has additionally served on 7 other dissertation and thesis committee. Dr. Elmqvist currently advises eight Ph.D. students at the University of Maryland and one student at Purdue University.

### **4. Service**

**4.1. Professional Service.** Dr. Elmqvist served as an organizer for the top-tier IEEE InfoVis conference in some capacity since 2018, including most recently the best paper committee in 2018, papers co-chair in 2016 and in 2017, posters co-chair in 2015 and 2014, and doctoral colloquium co-chair in 2013 and 2012. He is associate editor for the journals Information Visualization, IEEE Transactions on Visualization and Computer Graphics, and the International Journal of Human-Computer Studies, as well as series co-editor of Morgan Claypool Synthesis Lectures on Visualization. He has also served on the program committee of more than 50 conferences. He is a frequent reviewer for journals and conferences (e.g., IEEE 3DUI, BELIV conference, ACM CHI Conference). Dr. Elmqvist has served on 18 NSF review panels.

**4.2. College and University Service.** Dr. Elmqvist was the Director of the iSchool's Master of Science in Human Computer Interaction degree program from August 2014 until August 2018. Additionally, he is Director of the Human-Computer Interaction Laboratory (a joint iSchool-UMIACS laboratory) since 2016. This is in addition to his regular membership on standing and ad hoc committees in the College.

**4.3. Public Outreach.** Dr. Elmqvist's c.v. reports 22 media mentions or guest appearances in venues such as Slashdot, DISCOVER Magazine, and Purdue News. Dr. Elmqvist also runs a popular blog on information visualization and general research methodology.

## **5. Impact Indicators**

Citation in the published work of other scholars has long been recognized as a useful indicator of scholarly impact, but comparisons are often confounded by issues of coverage, data quality, comparability, and assessment of interdisciplinary scholars whose work crosses domain boundaries. A number of sources offer citation analysis and metrics. Of those, Google Scholar achieves the broadest coverage, which is important when evaluating cases such as Dr. Elmqvist's where publications have appeared in a wide range of venues and publication outlets. This report therefore draws on data from Google Scholar.

**5.1. Journal Impact Factor.** A journal's impact factor is the average number of citations received in a two year period by each article in the journal, from other journal articles indexed within the Web of Science, normalized by the number of articles published in the journal over the previous two years. JCR impact factors are often interpreted as one indication of the quality of a publication venue. Impact factors are recomputed each year; the impact factors shown are for each year in which at least one article was published or, when no impact factor was reported for the publication year, in the nearest year for which an impact factor was reported. NA is indicated for cases in which a specific impact factor is not available. The Reputation of Publication Outlets report summarizes the Thomson Reuters Journal Citation Reports (JCR) two-year impact factors for each of the journals in which Dr. Elmqvist has published

**5.2. Citation Counts.** According to Google Scholar (November 21, 2018), Dr. Elmqvist's work has been cited a total of 19,227 times, with his most cited work, "Rolling the dice: Multidimensional visual exploration using scatterplot matrix navigation", having been cited 387 times. Note that Designing the User Interface includes citations for all editions of the book, but Dr. Elmqvist has only been a co-author since the 6th edition. Table 1 summarizes November 2018 citation statistics for Google Scholar. The list shows only Dr. Elmqvist's most highly cited publications; publications with fewer than 50 citations (by Google Scholar) are not shown. The basic bibliographic details are augmented with a reference to the sequence number for each publication in Dr. Elmqvist's c.v. (where Jxx indicates the Journals section of the c.v., Cxx indicates the Conference section of the c.v., etc.).

Table 1: Dr. Elmqvist's publications with more than 50 citations (according to Google Scholar).



<b>CV</b>	<b>Scholar</b>	<b>Title</b>	<b>Venue</b>	<b>Year</b>
<b>B1</b>	14889	Designing the user interface: strategies for effective human-computer interaction	Book	2016
<b>J8</b>	384	Rolling the dice: Multidimensional visual exploration using scatterplot matrix navigation	IEEE Transactions on Visualization & Computer Graphics	2008
<b>J12</b>	302	Hierarchical aggregation for information visualization: Overview, techniques, and design guidelines	IEEE Transactions on Visualization & Computer Graphics	2010
<b>J18</b>	187	Collaborative visualization: Definition, challenges, and research agenda	Information Visualization	2011
<b>J15</b>	175	Graphical perception of multiple time series	IEEE Transactions on Visualization & Computer Graphics	2010
<b>C12</b>	160	ZAME: Interactive large-scale graph visualization	IEEE PacificVis	2008
<b>J19</b>	149	Fluid interaction for information visualization	Information Visualization	2011
<b>J7</b>	141	A taxonomy of 3D occlusion management for visualization	IEEE Transactions on Visualization & Computer Graphics	2008
<b>J13</b>	140	GraphDice: A system for exploring multivariate social networks	Computer Graphics Forum	2010
<b>C25</b>	117	Exploring the design space of composite visualization	IEEE PacificVis	2012
<b>J6</b>	106	DataMeadow: a visual canvas for analysis of large-scale multivariate data	Information Visualization	2008

<b>J14</b>	88	TimeMatrix: Analyzing temporal social networks using interactive matrix-based visualizations	International Journal of Human-Computer Interaction	2010
<b>C14</b>	81	Melange: space folding for multi-focus interaction	ACM CHI	2008
<b>BC1</b>	80	Distributed user interfaces: State of the art	Book chapter	2011
<b>J5</b>	79	20 years of four HCI conferences: A visual exploration	International Journal of Human-Computer Interaction	2007
<b>J32</b>	66	Visualization beyond the desktop--the next big thing	IEEE Computer Graphics & Applications	2014
<b>C37</b>	61	PolyChrome: A cross-device framework for collaborative web visualization	ACM ITS	2014
<b>J21</b>	54	Perception of Animated Node-Link Diagrams for Dynamic Graphs	Computer Graphics Forum	2012
<b>C26</b>	53	PolyZoom: multiscale and multifocus exploration in 2D visual spaces	ACM CHI	2012
<b>C28</b>	51	Extended multitouch: recovering touch posture and differentiating users using a depth camera	ACM UIST	2012
<b>C20</b>	50	Temporal distortion for animated transitions	ACM CHI	2011

**5.3. Hirsch's *h*-Index.** One summary statistic that is now often considered as a measure of scholarly impact when a single value for each individual is desired is the ***h*-index**. It is the largest number *h* for which the scholar has published *h* articles that have each been cited more than *h* times (Hirsch, 2005). As of November 21, 2018, Dr. Elmqvist's *h*-index is **37**.

The following items were not available for inclusion at the time Dr. Elmqvist prepared his c.v. in August 2018 and are included here to bring that document up to date.

The key here follows the same key used in the CV. In all publications, Dr. Elmqvist's name is underlined. Students or postdoctoral scholars are marked with an asterisk (\*); students or postdocs under Dr. Elmqvist's direct supervision are marked with a dagger (†).

#### **Journal Papers (peer-reviewed)**

- J63. Zhe Cui†, Sriram Karthik Badam†, Adil Yalcin†, Niklas Elmqvist. DataSite: Proactive Visual Data Exploration with Computation of Insight-based Recommendations. *Information Visualization*, to appear, 2018. (Impact Factor 0.923)

#### **Conference Papers (peer-reviewed)**

- C54. Zhenpeng Zhao†, Rachael Marr†, Jason Shaffer, Niklas Elmqvist. Understanding Partitioning and Sequence in Data-Driven Storytelling: The Case for Comic Strip Narration. In Proceedings of the iConference (Lecture Notes in Computer Science), to appear, 2019.
- C53. Andrea Batch†, Hanuma Teja Maddali\*, Kyungjun Lee\*, Niklas Elmqvist. Gesture and Action Discovery for Evaluating Virtual Environments with Semi-Supervised Segmentation of Telemetry Records. In Proceedings of the IEEE Conference on Artificial Intelligence & Virtual Reality, to appear, 2018.

#### **Workshop Papers (peer-reviewed)**

- W14. Yuetling Wong†, Krishna Madhavan, Niklas Elmqvist. Towards Characterizing Domain Experts as a User Group. In *Proceedings of Evaluation and Beyond: Methodological Approaches for Visualization* (BELIV 2018) at IEEE VIS 2018.

#### **Book Chapters (peer-reviewed)**

- BC3. Bruce Thomas, Yvonne Jansen, Aurelien Tabard, Pierre Dragicevic, Niklas Elmqvist, Pourang Irani, Dieter Schmalstieg, Gregory Welch. Situated Analytics. In *Immersive Analytics, Lecture Notes of Computer Science*, No. 11190, Springer, 2018.

#### **Research Grants**

- G20. Reza Ghodssi, William Bentley, Pamela Abshire, Derek Paley, Niklas Elmqvist, "Planning Grant: Engineering Research Center for Adaptive Small-systems for data Analytic Pain Management (ERC-ASAP)", National Science Foundation, \$100,000 (personal share 20%), Sep. 2018-Aug. 2019.

#### **Honors and Awards**

ACM Distinguished Scientist (2018). Association for Computing Machinery (ACM), for outstanding contributions to computing (1 of 49 awardees in 2018).

## **References**

Computing Research Association (1999), "Evaluating Computer Scientists and Engineers for Promotion and Tenure," Computing Research News, September.

# L. NIKLAS E. ELMQVIST

## College of Information Studies

University of Maryland, College Park  
2117H Hornbake Building, South Wing  
College Park, MD 20742, USA  
Website: <https://sites.umiacs.umd.edu/elm/>

Office (HBK 2117H): +1 (301) 405-7414

Cell: +1 (765) 418-5677

Fax: +1 (301) 314-9145

E-mail: [elm@umd.edu](mailto:elm@umd.edu)

Twitter: @NElmqvist

## EDUCATION

---

Chalmers University of Technology	Göteborg, Sweden	2006	Ph. D. in Computer Science
Chalmers University of Technology	Göteborg, Sweden	2001	M. Sc. in Comp. Sci. & Eng.
Chalmers University of Technology	Göteborg, Sweden	2001	B. Sc. in Comp. Sci. & Eng.

- Ph.D. dissertation: “3D Occlusion Management and Causality Visualization,” School of Computer Science & Engineering, Chalmers University of Technology, Göteborg, Sweden, Dec. 2006 (ISBN 91-7291-869-1)
- Ph.D. Advisor: Professor Philippos Tsigas
- Ph.D. Defense: December 19, 2006 (Opponent: Professor Doug A. Bowman, Virginia Tech)

## PROFESSIONAL EXPERIENCE

---

### University of Maryland

College Park, MD, USA

*Associate Professor (with tenure)*

August 2014 – present

- Faculty member in the College of Information Studies (2014–present)
- Affiliate associate professor in the Department of Computer Science (2014–present)
- Member of the University of Maryland Institute for Advanced Computer Studies (UMIACS) (2014–present)
- Director of the Human-Computer Interaction Laboratory (HCIL) (2016–present)
- Director of the Master of Science in Human-Computer Interaction (HCIM) program (2014–2018)

### Purdue University

West Lafayette, IN, USA

*Associate Professor (with tenure)*

August 2014

*Assistant Professor (tenure-track)*

August 2008 – August 2014

- Faculty member in the School of Electrical and Computer Engineering

### Microsoft Research – INRIA Center

Paris, France

*Postdoctoral Research Fellow*

June 2007 – August 2008

- Member of the Aviz research group, mentored by Dr. Jean-Daniel Fekete

### INRIA/LRI at Université Paris-Sud

Paris, France

*Postdoctoral Research Fellow*

January 2007 – June 2007

- Member of the Aviz/In-Situ research groups, mentored by Dr. Jean-Daniel Fekete

### Georgia Institute of Technology

Atlanta, GA, USA

*Visiting Scholar*

Spring 2006

- Visiting member of the Information Interfaces research group

### Chalmers University of Technology

Göteborg, Sweden

*Ph.D. Student*

September 2001 – December 2006

- Member of the Distributed Computing and Systems research group, advised by Dr. Philippos Tsigas

## PUBLICATIONS

---

- In all publications, my name is underlined.
- I follow the convention where the first author is the lead author, but the last author is often the most senior author with a supervisory role of the project. In my work, the first author is often a student I am supervising.
- Students or postdoctoral scholars are marked with an asterix (\*); students or postdocs under my direct supervision are marked with a dagger (†).
- My primary area of publication is computer science, where conferences are often counted as having equal or higher prominence to journal publications. These conference papers are strictly peer-reviewed with at least three external reviewers and have acceptance rates of 30% or lower. More information here: <https://www.microsoft.com/en-us/research/wp-content/uploads/2017/01/CACMviews.pdf>
- Acceptance rates are given for all conference papers (if known); these are specific to each year.
- Impact factors are specified (if known) using the 2018 Clarivate Analytics Journal Citation Report (JCR).

### Journal Papers (peer-reviewed)

- J64. Sriram Karthik Badam<sup>†</sup>, Zhicheng Liu, Niklas Elmqvist. Elastic Documents: Coupling Text and Tables through Contextual Visualizations for Enhanced Document Reading. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2018), to appear, 2019. (Impact Factor 3.078)
- J63. Sriram Karthik Badam<sup>†</sup>, Andreas Mathisen\*, Roman Rädle\*, Clemens Nylandsted Klokmose, Niklas Elmqvist. Vistrates: A Component Model for Ubiquitous Analytics. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2018), to appear, 2019. (Impact Factor 3.078)
- J62. Brian Ondov<sup>†</sup>, Nicole Jardin\*, Niklas Elmqvist, Steven Franconeri. Face to Face: Evaluating Visual Comparison. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2018), to appear, 2019. (Impact Factor 3.078)
- J61. Biswaksen Patnaik<sup>†</sup>, Andrea Batch<sup>†</sup>, Niklas Elmqvist. Information Olfaction: Harnessing Scent to Convey Data. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2018), to appear, 2019. (Impact Factor 3.078)
- J60. Zhe Cui<sup>†</sup>, Shivalik Sen<sup>†</sup>, Sriram Karthik Badam<sup>†</sup>, Niklas Elmqvist. VisHive: Supporting Web-based Visualization through Ad-hoc Computational Clusters of Mobile Devices. *Information Visualization*, to appear, 2018. (Impact Factor 0.923)
- J59. Justin Wagner\*, Florin Chelaru\*, Jayaram Kancherla\*, Joseph N. Paulson, Alexander Zhang, Victor Felix. Anup Mahurkar, Niklas Elmqvist, Héctor Corrada Bravo. Metaviz: interactive statistical and visual analysis of metagenomic data. *Nucleic Acids Research*, 46(6):2777–2787, 2018. (Impact Factor 11.561)
- J58. Deok Gun Park<sup>†</sup>, Steven Drucker, Roland Fernandez, Niklas Elmqvist. ATOM: A Grammar for Unit Visualization. *IEEE Transactions on Visualization & Computer Graphics*, to appear, 2018. (Impact Factor 3.078)
- J57. Fanny Chevalier, Nathalie Henry Riche, Basak Alper, Catherine Plaisant, Jeremy Boy, Niklas Elmqvist. Observations and Reflections on Visualization Literacy at the Elementary School Level. *IEEE Computer Graphics & Applications*, 38(3):21–29, 2018. (Impact Factor 1.64)
- J56. Sriram Karthik Badam<sup>†</sup>, Niklas Elmqvist. Visfer: Camera-based Visual Data Transfer for Cross-Device Visualization. *Information Visualization*, to appear, 2018. (Impact Factor 0.923)
- J55. Deok Gun Park<sup>†</sup>, Seungyeon Kim\*, Jurim Lee\*, Jaegul Choo, Nicholas Diakopoulos, Niklas Elmqvist. ConceptVector: Text Visual Analytics via Interactive Lexicon Building using Word Embedding. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2017), 24(1):361–370, 2018. (Impact Factor 3.078)
- J54. Andrea Batch<sup>†</sup>, Niklas Elmqvist. The Interactive Visualization Gap in Initial Exploratory Data Analysis. *IEEE Transactions on Visualization & Computer Graphics* (Proc. VAST/InfoVis/SciVis 2017), 24(1):278–287, 2018. (Impact Factor 3.078)
- J53. M. Adil Yalcin<sup>†</sup>, Niklas Elmqvist, Benjamin B. Bederson. Keshif: Rapid and Expressive Tabular Data Exploration for Novices. *IEEE Transactions on Visualization & Computer Graphics*, 24(8):2339–2352, 2018. (Impact Factor 3.078)

- J52. Tak Yeon Lee\*, Alison Smith\*, Kevin Seppi, [Niklas Elmqvist](#), Jordan Boyd-Graber, Leah Findlater. The human touch: How non-expert users perceive, interpret, and fix topic models. *International Journal of Human-Computer Studies*, 105:28–42, 2017. (Impact Factor 2.300)
- J51. Senthil Chandrasegaran†, Sriram Karthik Badam†, Lorraine Kisselburgh, Karthik Ramani, [N. Elmqvist](#). Integrating Visual Analytics Support for Grounded Theory Practice in Qualitative Text Analysis. *Computer Graphics Forum* (Proc. IEEE EuroVis 2017), 36(3):201–212, 2017. [46/170, 27% acc. rate] (Impact Factor 2.046)
- J50. Sriram Karthik Badam†, [Niklas Elmqvist](#), Jean-Daniel Fekete. Steering the Craft: UI Elements and Visualizations for Supporting Progressive Visual Analytics. *Computer Graphics Forum* (Proc. IEEE EuroVis 2017), 36(3):491–502, 2017. [46/170, 27% acc. rate] (Impact Factor 2.046)
- J49. Senthil Chandrasegaran†, Sriram Karthik Badam†, Lorraine Kisselburgh, Kylie Pepler, [Niklas Elmqvist](#), Karthik Ramani. VizScribe: A Visual Analytics Approach to Understand Designer Behavior. *International Journal of Human-Computer Studies*, 100:66–80, 2017. (Impact Factor 2.300)
- J48. Minjeong Kim\*, Kyeongpil Kang\*, Deok Gun Park†, Jaegul Choo, [Niklas Elmqvist](#). TopicLens: Efficient Multi-Level Visual Topic Exploration of Large-Scale Documents. *IEEE Transactions on Visualization and Computer Graphics* (Proc. VAST/InfoVis/SciVis 2016), 23(1):151–160, 2017. [33/157, 21% acc. rate] (Impact Factor 3.078)
- J47. Alison Smith\*, Tak Yeon Lee\*, Forough Poursabzi-Sangdeh\*, Jordan Boyd-Graber, [Niklas Elmqvist](#), Leah Findlater. Evaluating Visual Representations for Topic Understanding and Their Effects on Manually Generated Labels. *Transactions of the Association for Computational Linguistics*, 5:1-15, 2017.
- J46. Ben Shneiderman, Catherine Plaisant, Steven Jacobs, [Niklas Elmqvist](#), Nicholas Diakopoulos. Grand challenges for HCI researchers. *ACM Interactions*, 23(5):24–25, 2016.
- J45. Udayan Umaphathi†, [Niklas Elmqvist](#). Mushaca: A 3-Degrees-of-Freedom Mouse Supporting Rotation. *International Journal of Human-Computer Interaction*, 32(6):481–492, 2016. (Impact Factor 1.259)
- J44. M. Adil Yalcin†, [Niklas Elmqvist](#), Benjamin B. Bederson. AggreSet: Rich and Scalable Set Exploration using Visualizations of Element Aggregations. *IEEE Transactions on Visualization and Computer Graphics* (Proc. VAST/InfoVis/SciVis 2015), 22(1):688–697, 2016. [39/178, 22% acc. rate] (Impact Factor 3.078)
- J43. Sujin Jang\*, [Niklas Elmqvist](#), Karthik Ramani. MotionFlow: Visual Abstraction and Aggregation of Sequential Patterns in Human Motion Tracking Data. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE VAST/InfoVis/SciVis 2015), 22(1):21–30, 2016. [31/149, 21% acc. rate] (Impact Factor 3.078)
- J42. William Z. Bernstein\*, Devarajan Ramanujan\*, Devadatta M. Kulkarni, Jeffrey Tew, [Niklas Elmqvist](#), Fu Zhao, Karthik Ramani. Mutually Coordinated Visualization of Product and Supply Chain Metadata for Sustainable Design. *Journal of Mechanical Design*, 137(12):121101, 2015. (Impact Factor 2.783)
- J41. Zhenpeng Zhao†, William Benjamin\*, [Niklas Elmqvist](#), Karthik Ramani. Sketcholution: Interaction Histories for Sketching. *International Journal of Human-Computer Studies*, 82:11–20, October 2015. (Impact Factor 2.300)
- J40. Jungu Choi\*, Deok Gun Park†, Yuetling Wong†, Eli Raymond Fisher†, [Niklas Elmqvist](#). VisDock: A Toolkit for Cross-Cutting Interactions in Visualization. *IEEE Transactions on Visualization & Computer Graphics*, 21(9):1087–1100, 2015. (Impact Factor 3.078)
- J39. Samah Gad\*, Waqas Javed†, Sohaib Ghani†, [Niklas Elmqvist](#), Tom Ewing, Keith N. Hampton, Naren Ramakrishnan. ThemeDelta: Dynamic Segmentations over Temporal Topic Models. *IEEE Transactions on Visualization & Computer Graphics*, 21(5):672–685, 2015. (Impact Factor 3.078)
- J38. Yuetling Wong†, Jieqiong Zhao†, [Niklas Elmqvist](#). Evaluating Social Navigation Visualization in Online Geographic Maps. *International Journal of Human-Computer Interaction*, 31(2):118–127, 2015. (Impact Factor 1.259)
- J37. Sriram Karthik Badam†, Eli Raymond Fisher†, [Niklas Elmqvist](#). Munin: A Peer-to-Peer Middleware for Ubiquitous Analytics and Visualization Spaces. *IEEE Transactions on Visualization & Computer Graphics*, 21(2):215–228, 2015. (Impact Factor 3.078)

- J36. [Niklas Elmqvist](#), Ji Soo Yi. Patterns for Visualization Evaluation. *Information Visualization*, 14(3):250–269, 2015. (Impact Factor 0.923)
- J35. Sungahn Ko\*, Jieqiong Zhao†, Jing Xia\*, Shehzad Afzal\*, Xiaoyu Wang, Greg Abram, [Niklas Elmqvist](#), Len Kne, David Van Riper, Kelly Gaither, William Tolone, William Ribarsky, David S. Ebert. VASA: Interactive Computational Steering of Large Asynchronous Simulation Pipelines for Societal Infrastructure. *IEEE Transactions on Visualization & Computer Graphics* (Proc. IEEE VAST/InfoVis/SciVis 2014), 20(12):1853–1862, 2014. [33/146, 23% acc. rate] (Impact Factor 3.078)
- J34. Krishna C. Madhavan, [Niklas Elmqvist](#), Mihaela Vorvoreanu, Xin Chen\*, Yuetling Wong†, Hanjun Xian\*, Zhihua Dong\*, Aditya Johri. DIA2: Web-based Cyberinfrastructure for Visual Analytics of Funding Portfolios. *IEEE Transactions on Visualization & Computer Graphics* (Proc. IEEE VAST/InfoVis/SciVis 2014), 20(12):1823–1832, 2014. [33/146, 23% acc. rate] (Impact Factor 3.078)
- J32. Jonathan C. Roberts, Panagiotis D. Ritsos, Sriram Karthik Badam†, Dominique Brodbeck, Jessie Kennedy, [Niklas Elmqvist](#). Visualization Beyond the Desktop – The Next Big Thing. *IEEE Computer Graphics & Applications*, 34(6):26–34, 2014. (Impact Factor 1.64)
- J32. Eli Raymond Fisher†, Sriram Karthik Badam†, [Niklas Elmqvist](#). Designing Peer-to-Peer Distributed User Interfaces: Case Studies on Building Distributed Applications. *International Journal of Human-Computer Studies*, 72(1):100–110, 2014. (Impact Factor 2.300)
- J31. Sohaib Ghani†, Bum chul Kwon\*, Sukwon Lee\*, Ji Soo Yi, [Niklas Elmqvist](#). Visual Analytics for Multimodal Social Network Analysis: A Design Study with Social Scientists. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE SciVis/InfoVis/VAST 2013), 19(12):2032–2041, 2013. [32/125, 26% acc. rate] (Impact Factor 3.078)
- J30. [Niklas Elmqvist](#), Pourang Irani. Ubiquitous Analytics: Interacting with Big Data Anywhere, Anytime. *IEEE Computer*, 46(4):86–89, 2013. (Impact Factor 1.94)
- J29. Waqas Javed†, [Niklas Elmqvist](#). ExPlates: Spatializing Interactive Analysis to Scaffold Visual Exploration. *Computer Graphics Forum* (Proc. IEEE EuroVis 2013), 32(2):441–450, 2013. [49/177, 28% acc. rate]
- J28. Stephen MacNeil†, [Niklas Elmqvist](#). Visualization Mosaics for Multivariate Visual Exploration. *Computer Graphics Forum*, 32(6):38–50, 2013. (Impact Factor 2.046)
- J27. Waqas Javed†, [Niklas Elmqvist](#). Stack Zooming for Multi-Focus Interaction in Skewed-Aspect Visual Spaces. *IEEE Transactions on Visualization and Computer Graphics*, 19(8):1362–1374, 2013. (Impact Factor 3.078)
- J26. Krishna C. Madhavan, Mihaela Vorvoreanu, [Niklas Elmqvist](#), Aditya Johri, Naren Ramakrishnan, G. Alan Wang, Ann McKenna. Portfolio Mining. *IEEE Computer*, 45(10):95–99, 2012. (Impact Factor 1.94)
- J25. Shehzad Afzal\*, Ross Maciejewski, Yun Jang, [Niklas Elmqvist](#), David S. Ebert. Spatial Text Visualization Using Automatic Typographic Maps. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE SciVis/InfoVis 2012), 18(12):2556–2564, 2012. [44/178, 25% acc. rate] (Impact Factor 3.078)
- J24. Bum chul Kwon\*, Waqas Javed†, Sohaib Ghani†, [Niklas Elmqvist](#), Ji Soo Yi, David S. Ebert. Evaluating the Role of Time in Investigative Analysis of Document Collections. *IEEE Transactions on Visualization and Computer Graphics*, 18(11):1992–2004, 2012. (Impact Factor 3.078)
- J23. Brian Bowman†, [Niklas Elmqvist](#), T. J. Jankun-Kelly. Toward Visualization for Games: Theory, Design Space, and Patterns. *IEEE Transactions on Visualization and Computer Graphics*, 18(11):1956–1968, 2012. (Impact Factor 3.078)
- J22. KyungTae Kim†, [Niklas Elmqvist](#). Embodied Lenses for Collaborative Visual Queries on Tabletop Displays. *Information Visualization*, 11(4):319–338, 2012. (Impact Factor 0.923)
- J21. Sohaib Ghani†, [Niklas Elmqvist](#), Ji Soo Yi. Perception of Animated Node-Link Diagrams for Dynamic Graphs. *Computer Graphics Forum* (Proc. IEEE EuroVis 2012), 31(3):1205–1214, 2012. [55/202, 27% acc. rate] (Impact Factor 2.046)
- J20. [Niklas Elmqvist](#), David S. Ebert. Leveraging Multidisciplinary in a Visual Analytics Graduate Course. *IEEE Computer Graphics & Applications*, 32(3):84–87, May/June 2012. (Impact Factor 1.94)

- J19. Niklas Elmqvist, Andrew Vande Moere, Hans-Christian Jetter\*, Daniel Cernea\*, Harald Reiterer, T. J. Jankun-Kelly. Fluid Interaction for Information Visualization. *Information Visualization*, 10(4):327–340, 2011. (Impact Factor 0.923)
- J18. Petra Isenberg, Niklas Elmqvist, Daniel Cernea\*, Jean Scholtz, Kwan-Liu Ma, Hans Hagen. Collaborative Visualization: Definition, Challenges, and Research Agenda. *Information Visualization*, 10(4):310–326, 2011. (Impact Factor 0.923)
- J17. Sohaib Ghani†, Nathalie Henry Riche, Niklas Elmqvist. Dynamic Insets for Context-Aware Graph Navigation. *Computer Graphics Forum* (Proc. IEEE EuroVis 2011), 30(3):861–870, 2011. [54/190, 28% acc. rate] (Impact Factor 2.046)
- J16. Niklas Elmqvist, Pierre Dragicevic, Jean-Daniel Fekete. Color Lens: Adaptive Color Scale Optimization for Visual Exploration. *IEEE Transactions on Visualization and Computer Graphics*, 17(6):795–807, 2011. (Impact Factor 3.078)
- J15. Waqas Javed†, Bryan McDonnell†, Niklas Elmqvist. Graphical Perception of Multiple Time Series. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE Vis/InfoVis 2010), 16(6):927–934, 2010. [35/135, 26% acc. rate] (Impact Factor 3.078)
- J14. Ji Soo Yi, Niklas Elmqvist, Seungyoon Lee. TimeMatrix: Visualizing Temporal Social Networks Using Interactive Matrix-Based Visualizations. *International Journal of Human-Computer Interaction*, 26(11–12):1031–1051, 2010. (Impact Factor 1.259)
- J13. Anastasia Bezerianos, Fanny Chevalier, Pierre Dragicevic, Niklas Elmqvist, Jean-Daniel Fekete. GraphDice: A System for Exploring Multivariate Social Networks. *Computer Graphics Forum* (Proc. IEEE EuroVis 2010), 29(3): 863–872, 2010. [48/164, 29% acc. rate] (Impact Factor 2.046)
- J12. Niklas Elmqvist\*, Jean-Daniel Fekete. Hierarchical Aggregation for Information Visualization: Overview, Techniques and Design Guidelines. *IEEE Transactions on Visualization and Computer Graphics*, 16(3):439–454, 2010. (Impact Factor 3.078)
- J11. Niklas Elmqvist\*, Yann Riche\*, Nathalie Henry\*, Jean-Daniel Fekete. Mélange: Space Folding for Visual Exploration. *IEEE Transactions on Visualization and Computer Graphics*, 16(3):468–483, 2010. (Impact Factor 3.078)
- J10. Bryan McDonnell†, Niklas Elmqvist. Towards Utilizing GPUs in Information Visualization: Model and Implementation. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE Vis/InfoVis 2009), 15(6):1105–1112, 2009. [37/142, 26% acc. rate] (Impact Factor 3.078)
- J9. Niklas Elmqvist\*, Ulf Assarsson, Philippas Tsigas. Dynamic Transparency for 3D Visualization: Design and Evaluation. *International Journal of Virtual Reality*, 8(1):65–78, 2009. (Impact Factor 0.79)
- J8. Niklas Elmqvist\*, Pierre Dragicevic, Jean-Daniel Fekete. Rolling the Dice: Multidimensional Visual Exploration using Scatterplot Matrix Navigation. *IEEE Transactions on Visualization and Computer Graphics* (Proc. IEEE Vis/InfoVis 2008), 14(6):1141–1148, 2008. [28/107, 26% acc. rate] (**Best paper award**) [1/28, 3.6% acc. rate] (Impact Factor 3.078)
- J7. Niklas Elmqvist\*, Philippas Tsigas. A Taxonomy of 3D Occlusion Management for Visualization. *IEEE Transactions on Visualization and Computer Graphics*, 14(5):1095–1109, 2008. (Impact Factor 3.078)
- J6. N. Elmqvist\*, John Stasko, Philippas Tsigas. DataMeadow: A Visual Canvas for Analysis of Large-Scale Multivariate Data. *Information Visualization*, 7(1):18–33, 2008. (Impact Factor 0.923)
- J5. Nathalie Henry\*, Howard Goodell\*, Niklas Elmqvist\*, Jean-Daniel Fekete. 20 Years of Four HCI Conferences: A Visual Exploration. *International Journal of Human-Computer Interaction*, 23(3):239–285, 2007. (Impact Factor 1.259)
- J4. Niklas Elmqvist\*, Philippas Tsigas. View-Projection Animation for 3D Occlusion Management. *Computers & Graphics*, 31(6):864–876, 2007. (Impact Factor 1.200)
- J3. Niklas Elmqvist\*, Philippas Tsigas. CiteWiz: A Tool for the Visualization of Scientific Citation Networks. *Information Visualization*, 6(3):215–232, 2007. (Impact Factor 0.923)
- J2. Niklas Elmqvist\*, Eduard Tudoreanu. Occlusion Management in Immersive and Desktop 3D Virtual Environments: Theory and Evaluation. *International Journal of Virtual Reality*, 6(2):21–32, 2007. (**Best paper award**) [1/29, 3.5% acc. rate] (Impact Factor 0.79)



- J1. Niklas Elmqvist<sup>\*</sup>, Philippas Tsigas. Animated Visualization of Causal Relations through Growing 2D Geometry. *Information Visualization*, 3(3):154–172, 2004, Palgrave Macmillan. (Impact Factor 0.923)

**Conference Papers (strictly peer-reviewed)**

- C52. Sigfried Gold<sup>†</sup>, Andrea Batch<sup>†</sup>, Robert McClure, Guoqian Jiang, Hadi Kharrazi, Rishi Saripalle, Vojtech Huser, Chunhua Weng, Nancy Roderer, Ana Szarfman, Niklas Elmqvist, David Gotz, Clinical Concept Value Sets and Interoperability in Health Data Analytics. In *Proceedings of the Annual AMIA Symposium*, to appear, 2018.
- C51. Senthil Chandrasegaran<sup>†</sup>, Devarajan Ramanujan, Niklas Elmqvist. How Do Sketching and Non-Sketching Actions Convey Design Intent? In *Proceedings of the ACM Conference on Designing Interactive Systems*, pp. 373–385, 2018. (**Honorable Mention**) [23% acc. rate]
- C50. Jiawei Zhang<sup>\*</sup>, Chittayong Surakitbanharn, Niklas Elmqvist, Ross Maciejewski, Zhenyu Quan, David Ebert. TopoText: Context-Preserving Semantic Exploration Across Multiple Spatial Scales. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, paper no. 37 (13 pages), 2018. (**Honorable Mention**) [25.7% acc. rate]
- C49. Tom Horak<sup>\*</sup>, Sriram Karthik Badam<sup>†</sup>, Niklas Elmqvist, Raimund Dachsel. When David Meets Goliath: Combining Smartwatches with a Large Vertical Display for Visual Data Exploration. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, paper no. 19 (13 pages), 2018. (**Honorable Mention**) [25.7% acc. rate]
- C48. Sriram Karthik Badam<sup>†</sup>, Zehua Zeng<sup>†</sup>, Emily Wall<sup>\*</sup>, Alex Endert, Niklas Elmqvist. Supporting Team-First Visual Analytics through Group Activity Representations. In *Proceedings of Graphics Interface*, pp. 208–213, 2017.
- C47. Senthil Chandrasegaran<sup>†</sup>, Sriram Karthik Badam<sup>†</sup>, Ninger Zhou<sup>\*</sup>, Zhenpeng Zhao<sup>†</sup>, Lorraine Kisselburgh, Kylie Pepler, Niklas Elmqvist, Karthik Ramani. Merging Sketches for Creative Design Exploration: An Evaluation of Physical and Cognitive Operations. In *Proceedings of Graphics Interface*, pp. 115–123, 2017.
- C46. M. Adil Yalcin<sup>†</sup>, Niklas Elmqvist, Benjamin B. Bederson. Raising the Bars: Evaluating Treemaps vs. Wrapped Bars for Dense Visualization of Sorted Numeric Data. In *Proceedings of Graphics Interface*, pp. 41–49, 2017.
- C45. Cecil Piya<sup>\*</sup>, Vinayak, Senthil Chandrasegaran<sup>†</sup>, Niklas Elmqvist, Karthik Ramani. Co-3Deator: A Team-First Collaborative 3D Design Ideation Tool. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 6581–6592, 2017. [25% acc. rate]
- C44. Jiawei Zhang<sup>\*</sup>, Abish Malik<sup>\*</sup>, Benjamin Ahlbrand<sup>\*</sup>, Niklas Elmqvist, Ross Maciejewski, David S. Ebert. TopoGroups: Context-Preserving Visual Illustration of Multi-Scale Spatial Aggregates. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 2940–2951, 2017. [25% acc. rate]
- C43. Matthias Nielsen<sup>\*</sup>, Niklas Elmqvist, Kaj Grønbaek. Scribble Query: Fluid Touch Brushing for Multivariate Data Visualization. In *Proceedings of the Australian Conference on Human-Computer Interaction*, pp. 381–390, 2016.
- C42. Sriram Karthik Badam<sup>†</sup>, Feresteh Amini<sup>\*</sup>, Niklas Elmqvist, Pourang Irani. Supporting Visual Exploration for Multiple Users in Large Display Environments. In *Proceedings of the IEEE Conference on Visual Analytics Science & Technology*, 2016. [48/157, 31% acc. rate]
- C41. Sriram Karthik Badam<sup>†</sup>, Jieqiong Zhao<sup>†</sup>, Niklas Elmqvist, David S. Ebert. TimeFork: Interactive Prediction of Time Series. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 5409–5420, 2016. [23.4% acc. rate]
- C40. Deok Gun Park<sup>†</sup>, Simranjit Singh<sup>\*</sup>, Nicholas Diakopoulos, Niklas Elmqvist. Supporting Comment Moderators in Identifying High Quality Online News Comments. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 1114–1125, 2016. [23.4% acc. rate] (**Honorable Mention**)
- C39. Deok Gun Park<sup>†</sup>, Jungu Choi<sup>\*</sup>, Niklas Elmqvist. ParallelSpaces: Simultaneous Exploration of Feature and Data for Hypothesis Generation. In *Proceedings of the Hawaii International Conference on System Sciences (Visual Analytics Minitrack)*, 2016.

- C38. Alexandru Dancu\*, Mickaël Fourgeaud\*, Mohammad Obaid\*, Morten Fjeld, [Niklas Elmqvist](#). Map Navigation Using a Wearable Mid-air Display. In *Proceedings of the ACM Conference on Human-Computer Interaction with Mobile Devices and Services*, pp. 71–76, 2015. [59/234, 25% acc. rate]
- C37. Sriram Karthik Badam†, [Niklas Elmqvist](#). PolyChrome: A Cross-Device Framework for Collaborative Web Visualization. In *Proceedings of the ACM Conference on Interactive Tabletops and Surfaces*, pp. 109–118, 2014. [32/112, 29% acc. rate]
- C36. Sujin Jang\*, [Niklas Elmqvist](#), Karthik Ramani. GestureAnalyzer: Visual Analytics for Exploratory Analysis of Gesture Patterns. In *Proceedings of the ACM Symposium on Spatial User Interfaces*, pp. 30–39, 2014. [19/62, 31% acc. rate]
- C35. Sriram Karthik Badam†, Senthil Chandrasegaran\*, [Niklas Elmqvist](#), Karthik Ramani. Tracing and Sketching Performance using Blunt-Tipped Styli on Direct-Touch Tablets. In *Proceedings of the ACM Conference on Advanced Visual Interfaces*, pp. 193–200, 2014. [31/110, 28% acc. rate]
- C34. Zhenpeng Zhao†, Sriram Karthik Badam†, Senthil Chandrasegaran\*, Deok Gun Park†, [Niklas Elmqvist](#), Lorraine Kisselburgh, Karthik Ramani. skWiki: A Multimedia Sketching System for Collaborative Creativity. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 1235–1244, 2014. [471/2064, 22.8% acc. rate]
- C33. William Benjamin\*, Senthil Chandrasegaran\*, Devarajan Ramanujan\*, [Niklas Elmqvist](#), S.V.N. Vishwanathan, Karthik Ramani. Juxtapoze: Supporting Serendipity and Creative Expression in Clipart Compositions. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 341–350, 2014. [471/2064, 22.8% acc. rate]
- C32. Ahmad M. M. Razip\*, Abish Malik\*, Shehzad Afzal\*, Matthew Potrawski, Ross Maciejewski, Yun Jang, [Niklas Elmqvist](#), David Ebert. A Mobile Visual Analytics Approach for Law Enforcement Situation Awareness. In *Proceedings of the IEEE Pacific Symposium on Visualization*, pp. 169–176, 2014. [29/99, 29% acc. rate]
- C31. Devarajan Ramanujan\*, William Benjamin\*, William Z. Bernstein\*, [Niklas Elmqvist](#), Karthik Ramani. ShapeSift: Suggesting Sustainable Options in Design Reuse from Part Repositories. In *Proceedings of the ASME Conference on IDETC/CIE*, 2013. (**Best paper award**)
- C30. Will McGrath†, Brian Bowman†, David McCallum\*, Juan David Hincapié-Ramos\*, [Niklas Elmqvist](#), Pourang Irani. Branch-Explore-Merge: Facilitating Real-Time Revision Control in Collaborative Visual Exploration. In *Proceedings of the ACM Conference on Interactive Tabletops and Surfaces*, pp. 235–244, 2012. [30/103, 29% acc. rate]
- C29. Abish Malik\*, Ross Maciejewski, Yun Jang, Whitney Huang\*, [Niklas Elmqvist](#), David S. Ebert. A Correlative Analysis Process in a Visual Analytics Environment. In *Proceedings of the IEEE Conference on Visual Analytics Science and Technology*, pp. 33–42, 2012. [29/104, 28% acc. rate]
- C28. Sundar Murugappan\*, Vinayak\*, [Niklas Elmqvist](#), Karthik Ramani. Extended Multitouch: Recovering Touch Posture and Differentiating Users using a Depth Camera. In *Proceedings of the ACM Symposium on User Interface Software and Technology*, pp. 487–496, 2012. [62/289, 21% acc. rate]
- C27. Waqas Javed†, Sohaib Ghani†, [Niklas Elmqvist](#). GravNav: Using a Gravity Model for Multi-Scale Navigation. In *Proceedings of the ACM Conference on Advanced Visual Interfaces*, pp. 217–224, 2012. [54/193, 28% acc. rate]
- C26. Waqas Javed†, Sohaib Ghani†, [Niklas Elmqvist](#). PolyZoom: Multiscale and Multifocus Exploration in 2D Visual Spaces. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 287–296, 2012. [370/1577, 23% acc. rate]
- C25. Waqas Javed†, [Niklas Elmqvist](#). Exploring the Design Space of Composite Visualization. In *Proceedings of the IEEE Pacific Symposium on Visualization*, pp. 1–8, 2012. [30/89, 34% acc. rate]
- C24. Sungahn Ko\*, KyungTae Kim†, Tejas Kulkarni†, [Niklas Elmqvist](#). Applying Mobile Device Soft Keyboards to Collaborative Multitouch Tabletop Displays: Design and Evaluation. In *Proceedings of the ACM Conference on Interactive Tabletops and Surfaces*, pp. 130–139, 2011. [32/96, 33% acc. rate]
- C23. Waqas Javed†, KyungTae Kim†, Sohaib Ghani†, [Niklas Elmqvist](#). Evaluating Physical/Virtual Occlusion Management Techniques for Horizontal Displays. In *Proceedings of INTERACT*, pp. 391–408, 2011. [111/402, 28% acc. rate]

- C22. Sohaib Ghani<sup>†</sup>, [Niklas Elmqvist](#). Improving Revisitation in Graphs through Static Spatial Features. In *Proceedings of Graphics Interface*, pp. 175–182, 2011. [28/75, 37% acc. rate]
- C21. Bum chul Kwon<sup>\*</sup>, Waqas Javed<sup>†</sup>, [Niklas Elmqvist](#), Ji Soo Yi. Direct Manipulation Through Surrogate Objects. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 627–636, 2011. [400/1540, 26% acc. rate]
- C20. Pierre Dragicevic, Anastasia Bezerianos, Waqas Javed<sup>†</sup>, [Niklas Elmqvist](#), Jean-Daniel Fekete. Temporal Distortion for Animated Transitions. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 2009–2018, 2011. [400/1540, 26% acc. rate]
- C19. KyungTae Kim<sup>†</sup>, Sungahn Ko<sup>\*</sup>, [Niklas Elmqvist](#), David Ebert. WordBridge: Using Composite Tag Clouds in Node-Link Diagrams for Visualizing Content and Relations in Text Corpora. In *Proceedings of the Hawaii International Conference on System Sciences (Visual Analytics Minitrack)*, pp. 1–8, 2011.
- C18. KyungTae Kim<sup>†</sup>, Waqas Javed<sup>†</sup>, Cary Williams<sup>\*</sup>, [Niklas Elmqvist](#), Pourang Irani. Hugin: A Framework for Awareness and Coordination in Mixed-Presence Collaborative Information Visualization. In *Proceedings of the ACM Conference on Interactive Tabletops and Surfaces*, pp. 231–240, 2010. [34/120, 28% acc. rate]
- C17. Waqas Javed<sup>†</sup>, [Niklas Elmqvist](#). Stack Zooming for Multi-Focus Interaction in Time-Series Data Visualization. In *Proceedings of the IEEE Pacific Symposium on Visualization*, pp. 33–40, 2010. [27/84, 32% acc. rate]
- C16. Jean-Daniel Fekete, [Niklas Elmqvist](#), Yves Guiard. Motion-Pointing: Target Selection using Elliptical Motions. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 289–298, 2009. [289/1180, 24% acc. rate].
- C15. [Niklas Elmqvist](#)<sup>\*</sup>, Jean-Daniel Fekete. Semantic Pointing for Object Picking in Complex 3D Environments. In *Proceedings of Graphics Interface*, pp. 243–250, 2008. [34/85, 39% acc. rate]
- C14. [Niklas Elmqvist](#)<sup>\*</sup>, Nathalie Henry<sup>\*</sup>, Yann Riche<sup>\*</sup>, Jean-Daniel Fekete. Mélange: Space Folding for Multi-Focus Interaction. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 1333–1342, 2008. [157/714, 22% acc. rate]
- C13. [Niklas Elmqvist](#)<sup>\*</sup>, Eduard Tudoreanu, Philippas Tsigas. Evaluating Motion Constraints for 3D Wayfinding in Immersive and Desktop Virtual Environments. In *Proceedings of the ACM Conference on Human Factors in Computing Systems*, pp. 1769–1778, 2008. [157/714, 22% acc. rate]
- C12. [Niklas Elmqvist](#)<sup>\*</sup>, Thanh-Nghi Do<sup>\*</sup>, Howard Goodell<sup>\*</sup>, Nathalie Henry<sup>\*</sup>, and Jean-Daniel Fekete. ZAME: Interactive Large-Scale Graph Visualization. In *Proceedings of the IEEE Pacific Symposium on Visualization*, pp. 215–222, 2008. [30/99, 30% acc. rate]
- C11. [Niklas Elmqvist](#)<sup>\*</sup>, Eduard Tudoreanu, Philippas Tsigas. Tour Generation for Exploration of 3D Virtual Environments. In *Proceedings of the ACM Symposium on Virtual Reality Software & Technology*, pp. 207–210, 2007. [24/75, 32% acc. rate]
- C10. [Niklas Elmqvist](#)<sup>\*</sup>, John Stasko, Philippas Tsigas. DataMeadow: A Visual Canvas for Analysis of Large-Scale Multivariate Data. In *Proceedings of the IEEE Symposium on Visual Analytics Science & Technology*, pp. 187–194, 2007. [24/57, 42% acc. rate]
- C9. [Niklas Elmqvist](#)<sup>\*</sup>, Ulf Assarsson, Philippas Tsigas. Employing Dynamic Transparency for 3D Occlusion Management: Design Issues and Evaluation. In *Proceedings of INTERACT*, pp. 532–545, 2007. [76/230, 33% acc. rate]
- C8. [Niklas Elmqvist](#)<sup>\*</sup>, Philippas Tsigas. TrustNeighborhoods: Visualizing Trust in Distributed File Sharing Systems. In *Proceedings of the Eurographics/IEEE VGTC Symposium on Visualization*, pp. 107–114, 2007. [35/93, 38% acc. rate]
- C7. [Niklas Elmqvist](#)<sup>\*</sup>, Philippas Tsigas. A Taxonomy of 3D Occlusion Management Techniques. In *Proceedings of the IEEE Conference on Virtual Reality*, pp. 51–58, 2007. [26/130, 20% acc. rate]
- C6. [Niklas Elmqvist](#)<sup>\*</sup>, Eduard Tudoreanu. Evaluating the Effectiveness of Occlusion Reduction Techniques for 3D Virtual Environments. In *Proceedings of the ACM Symposium on Virtual Reality Software & Technology*, pp. 9–18, 2006. [26/73, 36% acc. rate]
- C5. [Niklas Elmqvist](#)<sup>\*</sup>, Philippas Tsigas. View Projection Animation for Occlusion Reduction. In *Proceedings of the ACM Conference on Advanced Visual Interfaces*, pp. 471–475, 2006.

- C4. Samuel Sandberg<sup>†</sup>, Calle Håkansson<sup>†</sup>, Niklas Elmqvist<sup>\*</sup>, Philippas Tsigas, Fang Chen. Using 3D Audio Guidance to Locate Indoor Static Objects. In *Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting*, pp. 1581–1584, 2006.
- C3. Niklas Elmqvist<sup>\*</sup>. BalloonProbe: Reducing Occlusion in 3D using Interactive Space Distortion. In *Proceedings of the ACM Symposium on Virtual Reality Software & Technology*, pp. 134–137, 2005. [22/61, 36% acc. rate]
- C2. Niklas Elmqvist<sup>\*</sup>, Philippas Tsigas. Causality Visualization Using Animated Growing Polygons. In *Proceedings of the IEEE Symposium on Information Visualization*, pp. 189–196, 2003. [29/90, 32% acc. rate]
- C1. Niklas Elmqvist<sup>\*</sup>, Philippas Tsigas. Growing Squares: Animated Visualization of Causal Relations. In *Proceedings of the ACM Symposium on Software Visualization*, pp. 17–26, 2003. [20/65, 31% acc. rate]

### Books

- B1. Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, Niklas Elmqvist. *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, 6<sup>th</sup> edition, Pearson, 2016.

### Book Chapters (peer-reviewed)

- BC2. Michael Wybrow, Niklas Elmqvist, Jean-Daniel Fekete, Tatiana von Landesberger, Jarke J. van Wijk, Björn Zimmer. Interaction in the Visualization of Multivariate Networks. In *Multivariate Network Visualization*, Lecture Notes in Computer Science 8380, Springer, pp. 97–126, 2014.
- BC1. Niklas Elmqvist. Distributed User Interfaces: State of the Art. In *Distributed User Interfaces: Designing Interfaces for the Distributed Ecosystem*, Springer, pp. 1–12, 2011.

### Workshop Papers (peer-reviewed)

- W13. M. Adil Yalcin<sup>†</sup>, Niklas Elmqvist, Benjamin B. Bederson. Cognitive Stages in Visual Data Exploration. In *Proceedings of Beyond Time and Errors: Novel Evaluation Methods for Visualization* (BELIV 2016) at IEEE VIS 2016.
- W12. Yuetling Wong<sup>†</sup>, Niklas Elmqvist. Crowdster: Enabling Social Navigation in Web-based Visualization using Crowdsourced Evaluation. In *Proceedings of Beyond Time and Errors: Novel Evaluation Methods for Visualization* (BELIV 2014) at IEEE VIS 2014.
- W11. Deok Gun Park<sup>†</sup>, Niklas Elmqvist, Lorraine Kisselburgh. VisTwit: Talking Together about News Visualization with Twitter. Workshop paper presented at *NewsVis 2013* at IEEE VIS 2013.
- W10. Niklas Elmqvist, Ji Soo Yi. Patterns for Visualization Evaluation. Workshop paper presented at *Beyond Time and Errors: Novel Evaluation Methods for Visualization* (BELIV 2012) at IEEE VisWeek 2012.
- W9. Sohaib Ghani<sup>†</sup>, Niklas Elmqvist, David S. Ebert. MultiNode-Explorer: A Visual Analytics Framework for Generating Web-based Multimodal Graph Visualizations. Workshop paper presented at the *EuroVis Workshop on Visual Analytics* (EuroVA 2012) at EuroVis 2012.
- W8. Will McGrath<sup>†</sup>, Brian Bowman<sup>†</sup>, Niklas Elmqvist, Pourang Irani. Branch-Explore-Merge: Real-time Revision Control for Conflict Resolution in Collaborative Visual Exploration. Workshop paper presented at *Data Exploration for Interactive Surfaces* (DEXIS 2011) at ACM ITS 2011, pp. 32–35, 2011.
- W7. Niklas Elmqvist. Embodied Human-Data Interaction. Workshop paper presented at *Embodied Interaction: Theory and Practice in HCI* at ACM CHI 2011.
- W6. Niklas Elmqvist. Munin: A Peer-to-Peer Middleware for Ubiquitous Visualization Spaces. Workshop paper presented at *Distributed User Interfaces* (DUI 2011) at ACM CHI 2011.
- W5. Niklas Elmqvist. Distributed User Interfaces: State of the Art. Workshop paper presented at *Distributed User Interfaces* (DUI 2011) at ACM CHI 2011.
- W4. Niklas Elmqvist. Mutually Linked Studies—Balancing Threats to Internal Validity and Ecological Validity in InfoVis Evaluation. Workshop paper presented at *BEyond time and errors: novel evaluation methods for Information Visualization* (BELIV 2010) at ACM CHI 2010.
- W3. KyungTae Kim<sup>†</sup>, Tejas Kulkarni<sup>†</sup>, Niklas Elmqvist. Interaction Workspaces: Identity Tracking for Multi-user Collaboration on Camera-based Multi-touch Tabletops. Workshop paper presented at *Collaborative Visualization on Interactive Surfaces* (CoVIS 2009) at IEEE InfoVis 2009.

- W2. Nathalie Henry\*, [Niklas Elmqvist](#)\*, Jean-Daniel Fekete. A Methodological Note on Setting-Up Logging and Replay Mechanisms in InfoVis Systems. Workshop paper presented at *BEyond time and errors: novel evaluation methods for Information Visualization* (BELIV 2008) at ACM CHI 2008.
- W1. [Niklas Elmqvist](#)\*, Morten Fjeld, et al. 3DVN: A Mixed Reality Platform for Mobile Navigation Assistance. Workshop paper presented at *Mobile Spatial Interaction* (MSI) at ACM CHI 2007.

### Posters and Demos (peer-reviewed)

- P4. Sriram Karthik Badam<sup>†</sup>, Jieqiong Zhao<sup>†</sup>, Niklas Elmqvist, David S. Ebert. TimeFork: Mixed-Initiative Time-Series Prediction. Poster presented at the *IEEE Conference on Information Visualization*, 2014.
- P3. Waqas Javed<sup>†</sup>, [Niklas Elmqvist](#). TraXplorer: Multi-Focus Interaction in Time-Series Data Visualization. Poster presented at the *IEEE Conference on Information Visualization*, 2009.
- P2. [Niklas Elmqvist](#), Philippas Tsigas. TrustNeighborhoods in a Nutshell. Poster presented at the *ACM Symposium on Software Visualization*, pp. 189–190, 2006.
- P1. [Niklas Elmqvist](#), Philippas Tsigas. Growing Squares: Visualizing Causal Relations. Demo presented at the *ACM Symposium on Software Visualization*, 2003.

### INVITED TALKS

---

- T31. Niklas Elmqvist. #Vis4Good: Data Visualization in Community Service. Invited talk (host: Thomas LaToza), Humanity-Centered Design Seminar, Department of Computer Science, George Mason University (November 10, 2017).
- T30. Niklas Elmqvist. #Vis4Good: Data Visualization in Community Service. Invited talk (host: Susanne Bødker, Henrik Korsgaard), Aarhus, Denmark (August 15, 2017).
- T29. Niklas Elmqvist. *Visualization for Scientific Discovery*. Invited talk (host: Adam Phillippy), National Institutes of Health, Bethesda, MD, USA (July 19, 2017).
- T28. Niklas Elmqvist. *Visualization for Scientific Discovery*. Keynote, Transportation Visualization Midyear Committee Meeting (host: Michael L. Pack), National Academy of Sciences, Washington, DC (July 28, 2016).
- T27. Niklas Elmqvist. *Visualization for Scientific Discovery*. Laboratory for Telecommunication Sciences (host: Gerry Baumgartner), University of Maryland, College Park, MD (September 17, 2015).
- T26. Niklas Elmqvist. *Visualization for Scientific Discovery*. National Socio-Environmental Synthesis Center (SESYNC) (host: Nick Magliocca), Annapolis, MD (June 1, 2015).
- T25. Niklas Elmqvist. *Managing Literacy and Complexity for Casual Visualization*. UMD Visualization Lecture Series, University of Maryland, College Park, MD (September 10, 2014).
- T24. Niklas Elmqvist. *Ubiquitous Analytics: Interacting with Big Data Anywhere, Anytime*. HCIL Brown Bag Lecture, University of Maryland, College Park, MD (September 4, 2014).
- T23. Niklas Elmqvist. *Visualization is Dead! (Long Live Visualization!)*. School of Computing, University of Utah (host: Chris Johnson), Salt Lake City, UT (March 18, 2014).
- T22. Niklas Elmqvist. *Ubiquitous Analytics: Interacting with Data Anywhere, Anytime*. Department of Computer Science, Stony Brook University (host: Yeijin Choi), Stony Brook, NY (February 20, 2014).
- T21. Niklas Elmqvist. *Visualization is Dead! (Long Live Visualization!)*. College of Information Studies, University of Maryland at College Park (host: Jen Golbeck), College Park, MD (February 5, 2014).
- T20. Niklas Elmqvist. *Ubiquitous Analytics: Interacting with Data Anywhere, Anytime*. SCI Institute, University of Utah (host: Chris Johnson), Salt Lake City, UT (December 11, 2013).
- T19. Niklas Elmqvist. *Action-as-Catalyst: The Role of Interaction for Big Data Analytics*. Faculty of Science, University of Ontario Institute of Technology (host: Christopher Collins), Oshawa, ON, Canada (December 6, 2013).
- T18. Niklas Elmqvist. *Ubiquitous Analytics: Interacting with Data Anywhere, Anytime*. Science on Tap, Lafayette, IN (April 25, 2013).
- T17. Niklas Elmqvist. *Analytics Anywhere, Anytime: Supporting Ubiquitous Sensemaking*. Department of Computer Science, Brown University (host: David Laidlaw), Providence, RI (November 2012).

- T16. Niklas Elmqvist. *Analytics Anywhere, Anytime: Supporting Ubiquitous Sensemaking*. Pfister Lab, School of Engineering & Applied Sciences, Harvard University (host: Hanspeter Pfister), Cambridge, MA (November 2012).
- T15. Niklas Elmqvist. *It's About Time: Analyzing, Forecasting, and Reasoning with Temporal Data*. Department of Computer Science, University of Texas at Austin (host: Chandrajit Bajaj), Austin, TX (September 2012).
- T14. Niklas Elmqvist. *Analytics Anywhere, Anytime: Supporting Ubiquitous Sensemaking*. School of Information, University of Texas at Austin (host: Luis Francisco-Revilla), Austin, TX (September 2012).
- T13. Niklas Elmqvist. *Visual Representations and Interaction Techniques for Multiple Time Series*. Department of Computer Science & Engineering, Chalmers University of Technology (host: Philippos Tsigas), Göteborg, Sweden (July 2010).
- T12. Niklas Elmqvist. *Visual Summaries: Sustaining the Utility of Information Visualization through Data Abstraction*. Department of Computer Science at University of Illinois (host: Brian Bailey), Urbana-Champaign, IL (April 2010).
- T11. Niklas Elmqvist. *CoE Explorer: Visualizing the DHS Centers of Excellence*. Presented at the C2I panel at the U.S. DHS University Network Summit 2010, Washington, D.C. (March 2010).
- T10. Niklas Elmqvist. *Dice Everywhere: Generalizing Scatterplot Matrix Navigation to Coordinated Multiple Views*. Microsoft Research (host: Nathalie Henry-Riche), Seattle, WA (December 2009).
- T9. Niklas Elmqvist. *Dice Everywhere: Generalizing Scatterplot Matrix Navigation to Coordinated Multiple Views*. Georgia Institute of Technology (host: John Stasko), Atlanta, GA (December 2009).
- T8. Niklas Elmqvist. *Visual Representations and Interaction Techniques for Multiple Time Series*. Human-Computer Interaction Laboratory (HCIL), University of Maryland (host: Catherine Plaisant), College Park, MD (September 2009).
- T7. Niklas Elmqvist. *Taking Control: Interaction for Visual Exploration*. Department of Computer Science, University of Manitoba (host: Pourang Irani), Winnipeg, MN, Canada (April 2008).
- T6. Niklas Elmqvist. *Introduction to Information Visualization*. IT-University (host: Morten Fjeld), Göteborg, Sweden (Sep 2006).
- T5. Niklas Elmqvist. *Image-Space Dynamic Transparency for Improved Object Discovery in 3D Environments*. Georgia Institute of Technology (host: John Stasko), Atlanta, GA (March 2006).
- T4. Niklas Elmqvist. *Causality Visualization*. Saab Systems, Järfälla, Sweden (January 2006).
- T3. Niklas Elmqvist, Robert Karlsson. *3Dwm: The Three-Dimensional Workspace Manager*. LinuxTag 2001, Stuttgart, Germany (July 2001).
- T2. Niklas Elmqvist, Robert Karlsson. *3Dwm: The Three-Dimensional Workspace Manager*. Astra-Zeneca, Göteborg, Sweden (May 2001).
- T1. Niklas Elmqvist, Robert Karlsson. *3Dwm: The Three-Dimensional Workspace Manager*. Museum of Architecture, Stockholm, Sweden (April 2001).

## INVITED WORKSHOPS AND MEETINGS

---

- IW11. SummerPIT 2017, “Participatory Information Technology”, Aarhus, Denmark (August 2017).
- IW10. Dagstuhl seminar 16231, “Immersive Analytics” (organizers: Tim Dwyer, Nathalie Henry Riche, Wolfgang Stuerzlinger, Bruce Thomas), Dagstuhl, Germany (June 2016).
- IW9. Center for Human-Computer Interaction, “What Comes After CHI: PSI (People, Systems, Information)” (organizer: Virginia Tech), Blacksburg, VA (March 2016).
- IW8. Humanities Data Visualization Workshop (organizer: Georgia Institute of Technology), Atlanta, GA (March 2016).
- IW7. National Science Foundation, “NSF Workshop/Retreat on the Science of Interaction for Visual Analytics” (organizer: VACCINE), Lake Louise, AB, Canada (May 2013).
- IW6. Dagstuhl seminar 13201, “Information Visualization - Towards Multivariate Network Visualization” (organizers: Andreas Kerren, Helen C. Purchase, Matthew Ward), Dagstuhl, Germany (May 2013).
- IW5. Google Faculty Summit 2012, “New Interactions in the Digital World,” Mountain View, CA (July 2012).

- IW4. National Science Foundation, “NSF Workshop on Science of Interaction for Data and Visual Analytics” (organizer: VACCINE), Austin, TX (March 2012).
- IW3. National Science Foundation, “NSF Workshop on Pervasive Computing at Scale (PeCS),” Seattle, WA (January 2011).
- IW2. Dagstuhl seminar 10241, “Information Visualization” (organizers: Andreas Kerren, Catherine Plaisant, John Stasko), Dagstuhl, Germany (June 2010).
- IW1. Pacific Northwest National Laboratories, “Precision Information Environments” (organizer: William Pike), Seattle, WA (December 2009).

## GRANTS AND CONTRACTS

---

### Research grants

- G19. Niklas Elmqvist (PI), Catherine Plaisant, “Microbiome Visualization”, Center for Health-related Informatics and Bioimaging, University of Maryland, \$100,028, Sep. 2018–May. 2019.
- G18. Héctor Corrada Bravo (PI), Niklas Elmqvist (Co-PI), Mihail Pop, M. Morgan, “Integrative Visual and Computational Exploratory Analysis of Genomics Data” (R01), National Institutes of Health (NIH) - National Institute of General Medical Services (NIGMS), \$1.8M (personal share 33%), Sep. 1, 2015–Aug. 31, 2019.
- G17. Niklas Elmqvist (PI), Karthik Ramani (Co-PI), “CHS: Small: C3DaR - Collection, Creation, and Collaboration for Engineering Design and Reflection,” National Science Foundation (NSF), \$490,089 (personal share \$300,000), Aug. 1 2014-Jul. 31 2017.
- G16. Krishna Madhavan (PI), Niklas Elmqvist (Co-PI), Mihaela Vorvoreanu (Co-PI), “Supplemental funding to DIA2,” National Science Foundation (NSF), \$363,820 (personal share \$121,273), Aug. 2013-Aug. 2015.
- G15. Niklas Elmqvist (PI), Remco Chang (Co-PI), Jian Chen (Co-PI), “Workshop: Doctoral Colloquium at IEEE VIS 2013,” National Science Foundation (NSF), \$20,000, Jul. 1 2013-Jun. 30, 2014.
- G14. Niklas Elmqvist (PI), “CAREER: Ubilytics: Harnessing Existing Device Ecosystems for Anywhere Sensemaking,” National Science Foundation (NSF), \$480,894, Feb. 2013-Jan. 2018.
- G13. Karthik Ramani (PI), Niklas Elmqvist (Co-PI), Lorraine Kisselburgh (Co-PI), “V-ICED: Visually-Integrated Cyber Exploratorium for Design,” National Science Foundation (NSF), \$750,000 (personal share \$180,000), Aug. 2012-Jul. 2015.
- G12. Niklas Elmqvist (PI), Karthik Ramani (Co-PI), “EAGER: SkWiki – A Sketch-based Wiki,” National Science Foundation (NSF), \$200,000 (personal share \$125,000), Jul. 2012-Jul. 2014.
- G11. Niklas Elmqvist (PI), Leland Wilkinson (Co-PI), Christopher G. Healey (Co-PI), “Workshop: Doctoral Colloquium at IEEE VisWeek 2012,” National Science Foundation (NSF), \$19,766, Jul. 2012-Jun. 2013.
- G10. David Ebert (PI), Niklas Elmqvist (Co-PI), “Visual Analytics for Security Applications (VASA),” Department of Homeland Security (DHS), \$300,000 (personal share \$40,000), Jun. 2012-Mar. 2013.
- G9. Niklas Elmqvist (PI), “Context-Aware Navigation in Large Visual Spaces,” Purdue Research Foundation (PRF) research grant, \$17,287, Aug. 2012-Jul. 2013.
- G8. Krishna Madhavan (PI), Niklas Elmqvist (Co-PI), Mihaela Vorvoreanu (Co-PI), “Deep Insights Anytime, Anywhere (DIA2) – Central Resource for Characterizing the TUES Portfolio through Interactive Knowledge Mining and Visualizations,” National Science Foundation (NSF), \$1.1M (personal share \$300,000), Sep. 2011-Aug. 2015.
- G7. Karthik Ramani (PI), Niklas Elmqvist (Co-PI), “Towards Design Aided by Computers (DAC): Pen and Touch-based Interfaces for Design Collaboration,” PLM Center of Excellence, \$30,000 (personal share \$2,500), Jan. 2011-Jul. 2011.
- G6. Niklas Elmqvist (PI), “VACCINE Supplemental Funding: COE Explorer,” U.S. Department of Homeland Security (DHS), \$75,000 (personal share), Sep. 2010-Mar. 2011.
- G5. Niklas Elmqvist (PI), “Visualization Mosaics: Effortless View Creation for Sensemaking,” Google Research Award, \$50,000, Sep. 2010-Aug. 2011.
- G4. Niklas Elmqvist (PI), “Visual Summaries: Maintaining the Utility of Visualization through Data Abstraction,” Purdue Research Foundation (PRF) research grant, \$18,145, Jun. 2010-May 2011.

- G3. David Ebert, Tim Collins, Mireille Boutin, William Cleveland, Edward Delp (PIs), Niklas Elmqvist (Co-PI), “VACCINE: Visual Analytics for Command, Control, Interoperability, National Security and Emergencies,” U.S. Department of Homeland Security (DHS), \$15,000,000, 6 years (personal share \$270,000: 1 graduate research assistant, 25% AY effort, and 2 weeks of summer support for 6 years).
- G2. Niklas Elmqvist (PI), “Evaluating the Value and Effectiveness of Visualization,” Purdue Research Foundation (PRF) research grant, \$18,145, Jun. 2009-May 2010.
- G1. Niklas Elmqvist (PI), “Multi-Focus Interaction for Time Series Visualization,” Google Research Award, \$50,000, Mar. 2009-Feb. 2010.

### Equipment grants

- EG2. Niklas Elmqvist (PI), NVidia Academic Partnership Program, ~\$2,000 (equipment value), Nov 2010.
- EG1. Niklas Elmqvist (PI), Robert Karlsson, “Wearable computers equipment grant for the 3Dwm project,” Xybernaut GmbH, €12,000 (equipment value), Jan. 1999-Aug. 1999.

### Personal grants

- PG8. Niklas Elmqvist. International Travel Grant, Purdue College of Engineering, \$1,000, 2013.
- PG7. Niklas Elmqvist. Summer Faculty Grant, Purdue Research Foundation, \$8,000, 2012.
- PG6. Niklas Elmqvist. International Travel Grant, Purdue College of Engineering, \$1,000, 2010.
- PG5. Niklas Elmqvist. Strategic Planning Grant, Purdue College of Engineering, \$1,000, 2009.
- PG4. Niklas Elmqvist. ACM SigSoft, CAPS Program (ACM SoftVis 2006 attendance), \$220, 2006.
- PG3. Niklas Elmqvist. Chalmers Research Foundation, Ph.D. Student Grant, 20,000 SEK (\$3,000), 2005.
- PG2. Niklas Elmqvist. Lars Hierta Memorial Foundation, Independent Scientist, 20,000 SEK (\$3,000), 2005.
- PG1. Niklas Elmqvist. ACM SigSoft, CAPS Program (ACM SoftVis 2003 attendance), \$600, 2003.

### HONORS AND AWARDS

---

- Honorable Mention for Best Paper (2018). ACM Conference on Designing Interactive Systems 2018 (DIS), awarded for “How Do Sketching and Non-Sketching Actions Convey Design Intent?” (C51).
- Honorable Mention for Best Paper (2018). ACM Conference on Human Factors in Computing Systems 2018 (CHI), awarded for “TopoText: Context-Preserving Semantic Exploration Across Multiple Spatial Scales” (C50).
- Honorable Mention for Best Paper (2018). ACM Conference on Human Factors in Computing Systems 2018 (CHI), awarded for “When David Meets Goliath: Combining Smartwatches with a Large Vertical Display for Visual Data Exploration” (C49).
- Honorable Mention for Best Paper (2016). ACM Conference on Human Factors in Computing Systems 2016 (CHI), awarded for “Supporting Comment Moderators in Identifying High Quality Online News Comments” (C40).
- IEEE TVCG Best Reviewer Award (2014). Institute of Electrical and Electronics Engineers (given to top four reviewers in 2014; awarded in December 2015).
- Purdue Graduate Student Mentoring Award (2014). Purdue Student Government.
- NSF CAREER (Faculty Early Career Development) award (2013). U.S. National Science Foundation.
- Best Paper Award (2013). ASME Conference on IDETC/CIE 2013, awarded for “ShapeSift: Suggesting Sustainable Options in Design Reuse from Part Repositories” (C31).
- IEEE TVCG Best Reviewer Award (2012). Institute of Electrical and Electronics Engineers (given to top three reviewers among nearly 3,000 reviewers for IEEE TVCG during October 2011 to October 2012).
- ACM Senior Membership (2013). Association for Computing Machinery.
- IEEE Senior Membership (2013). Institute of Electrical and Electronics Engineers.
- The Ruth and Joel Spira Outstanding Teacher Award (2012). Purdue University, School of Electrical and Computer Engineering (for teaching performance in ECE 264, Spring 2011 and 2012).
- Excellence in Research Award (2012). Purdue University, Vice President of Research (\$1M+ grant in AY11-12), awarded for DIA2 grant (G8) by National Science Foundation.



- Chicago Alumni New Faculty Award (2010). Purdue University, School of Electrical and Computer Engineering (startup grant funding).
- Seed for Success (2009). Purdue University, Vice President of Research (\$1M+ grant in AY08-09), awarded for VACCINE grant (G3) by U.S. Department of Homeland Security.
- Best Paper Award (2008). IEEE Conference on Information Visualization (InfoVis), awarded for “Rolling the Dice: Multidimensional Visual Exploration using Scatterplot Matrix Navigation” (J8).
- Best Paper Award (2008). International Journal of Virtual Reality (2007), awarded for “Occlusion Management in Immersive and Desktop 3D Virtual Environments: Theory and Evaluation” (J2).
- Postdoctoral Fellowship (2007). Microsoft Research – INRIA Centre, 1-year appointment (2007-2008).
- Claes Adelskiöld’s Medal (2005). Royal Swedish Academy of Science, 7000 SEK (\$1000).

## **SCIENTIFIC COMMUNITY SERVICE**

---

### **Journal/series editing**

- International Journal of Human-Computer Studies (impact factor 2.863), associate editor, August 2017-present.
- IEEE Transactions on Visualization and Computer Graphics (impact factor 2.168), associate editor, October 2015-present.
- Information Visualization (impact factor 0.767), associate editor, January 2015-present.
- Morgan Claypool Synthesis Lectures on Visualization, co-editor, May 2014-present.

### **Professional society service**

- IEEE Computer Society Publications Board, member at large, January 2016-December 2016.

### **Conference technical program committee memberships**

- IEEE 3DUI program committee member
  - 3DUI 2017 – March 18-19, 2017, Los Angeles, CA
  - 3DUI 2016 – March 19-20, 2016, Greenville, SC
  - 3DUI 2015 – March 23-24, 2015, Arles, France
  - 3DUI 2014 – March 29-30, 2014, Minneapolis, MN
  - 3DUI 2013 – March 16-17, 2013, Orlando, FL
  - 3DUI 2012 – March 4-5, 2012, Orange County, CA
  - 3DUI 2011 – March 20-21, 2011, Singapore
  - 3DUI 2010 – March 20-21, 2010, Waltham, MA
- IEEE BDVA 2018 program committee member (October 17-19, 2018)
- BELIV (Beyond time and errors: novel evaluation methods for visualization) program committee member
  - BELIV 2018 – October 21, 2018, Berlin, Germany
  - BELIV 2016 – October 24, 2016, Baltimore, MD
  - BELIV 2014 – November 10, 2014, Paris, France
  - BELIV 2012 – October 14-15, 2012, Seattle, WA
- ACM CHI associate chair (program committee member)
  - CHI 2019 – May 4-9, 2019, Glasgow, UK
  - CHI 2018 – Apr 21-26, 2018, Montreal, QC, Canada
  - CHI 2017 – May 6-11, 2017, Denver, CO, USA
  - CHI 2016 – May 7-12, 2016, San Jose, CA, USA
  - CHI 2015 – April 18-24, 2015, Seoul, South Korea
  - CHI 2014 – April 26-May 1, 2014, Toronto, ON, Canada
  - CHI 2012 – May 5-10, 2012, Austin, TX
  - CHI 2010 – April 10-15, 2010, Atlanta, GA
- ACM DIS 2018 associate chair (program committee member) (June 9-13, 2018, Hong Kong, China)
- IEEE EuroVis program committee member
  - EuroVis 2013 – June 17-21, 2013, Leipzig, Germany

- EuroVis 2012 – June 5-8, 2012, Vienna, Austria
  - EuroVis 2011 – June 1-3, 2011, Bergen, Norway
- Graphics Interface 2011 program committee member (May 25-27, 2011, St. John's, NL, Canada)
- iConference program committee member (March 20-23, 2016, Philadelphia, PA)
- IEEE InfoVis program committee member
  - InfoVis 2015 – October 25-31, 2015, Chicago, IL
  - InfoVis 2014 – November 9-14, 2014, Paris, France
  - InfoVis 2013 – October 13-18, 2013, Atlanta, GA
  - InfoVis 2011 – October 23-28, 2011, Providence, RI
  - InfoVis 2010 – October 24-29, 2010, Salt Lake City, UT
  - InfoVis 2009 – October 12-16, 2009, Atlantic City, NJ
- INTERACT (IFIP Human-Computer Interaction Conference) program committee member
  - INTERACT 2013 – September 2-6, 2013, Cape Town, South Africa
  - INTERACT 2009 – August 24-29, 2009, Uppsala, Sweden
- IEEE Lдав program committee member
  - Lдав 2013 – October 13-14, 2013, Atlanta, GA
  - Lдав 2012 – October 14-15, 2012, Seattle, WA
- NordiCHI 2008 program committee member (October 20-22, 2008, Lund, Sweden)
- IEEE PacificVis program committee member
  - PacificVis 2019 – April 23-26, 2019, Bangkok, Thailand
  - PacificVis 2015 – April 14-17, 2015, Hangzhou, China
  - PacificVis 2014 – March 4-7, 2014, Yokohama, Japan
  - PacificVis 2013 – February 27-March 1, 2013, Sydney, Australia
  - PacificVis 2011 – March 1-4, 2011, Hong Kong, China
  - PacificVis 2010 – March 2-5, 2010, Taipei, Taiwan
  - PacificVis 2009 – April 21-23, 2008, Beijing, China
- IEEE VAST program committee member
  - VAST 2018 – October 21-26, 2018, Berlin, Germany
  - VAST 2015 – October 25-30, 2015, Chicago, IL
  - VAST 2014 – November 9-14, 2014, Paris, France
  - VAST 2012 – October 14-19, 2012, Seattle, WA
  - VAST 2011 – October 23-28, 2011, Providence, RI
  - VAST 2010 – October 24-29, 2010, Salt Lake City, UT

### **Conference organization**

- IEEE InfoVis 2018 best papers committee (October 21-26, 2018, Berlin, Germany)
- IEEE InfoVis 2017 papers co-chair (October 1-6, 2017, Phoenix, AZ)
- IEEE InfoVis 2016 papers co-chair (October 23-28, 2016, Baltimore, MD)
- IEEE EuroVis 2016 short papers co-chair (Groningen, the Netherlands)
- IEEE InfoVis 2015 posters co-chair (October 25-30, 2015, Chicago, IL)
- IEEE InfoVis 2014 posters co-chair (November 9-14, 2014, Paris, France)
- IEEE EuroVis 2014 short papers co-chair (June 9-13, 2014, Swansea, United Kingdom)
- IEEE InfoVis 2013 doctoral colloquium chair (October 13-18, 2013, Atlanta, GA)
- IEEE InfoVis 2012 doctoral colloquium chair (October 14-19, 2012, Seattle, WA)
- IEEE InfoVis 2011 exhibits chair (October 23-28, 2011, Providence, RI)
- IEEE InfoVis 2010 tutorials chair (October 24-29, 2010, Salt Lake City, UT)

### **Conference session chair**

- ACM CHI session chair
  - CHI 2014 – Modeling Users and Interaction (May 1, 2014, Toronto, ON, Canada)
  - CHI 2012 – Programming, Performance, and Sensemaking (May 10, 2012, Austin, TX)

- CHI 2010 – Making Meaning in Large Displays (April 12, 2010, Atlanta, GA)
- IEEE InfoVis session chair
  - InfoVis 2013 – Systems & Sets (October 13-18, 2013, Atlanta, GA)
  - InfoVis 2010 – Multi-dimensional Visualization (October 28, 2010, Salt Lake City, UT)
  - InfoVis 2009 – Multidimensional Data Visualization (October 15, 2009, Atlantic City, NJ)
- ACM ITS 2012 session chair – Understanding Users (November 14, 2012, Boston, MA)
- IEEE VAST session chair
  - VAST 2014 – Visual Analysis of Changes (November 13, 2014, Paris, France)
  - VAST 2012 – Sensemaking and Collaboration (October 17, 2012, Seattle, WA)
  - VAST 2010 – Text Analytics (October 26, 2010, Salt Lake City, UT)

### **Journal reviewing**

- Behaviour & Information Technology (2014)
- BMC Research Notes (2012)
- Computational Statistics (2009)
- Computers & Graphics (2015, 2018)
- IEEE Computer Graphics & Applications (2003, 2014-2016)
- Computer Graphics Forum (2012-2015)
- Empirical Software Engineering (2007)
- Foundations and Trends in Human-Computer Interaction (2012)
- International Journal of Computer Assisted Radiology and Surgery (2010)
- International Journal of Human-Computer Studies (2007-2015)
- Information Visualization (2007-2018)
- Interacting with Computers (2012-2013)
- Journal of Visual Languages and Computing (2007-2009)
- ACM Transactions on Interactive Intelligent Systems (2012-2014)
- ACM Transactions on Human-Computer Interaction (2011-2015)
- Tsinghua Science and Technology (2012)
- IEEE Transactions on Visualization and Computer Graphics (2008-2018)
- The Visual Computer (2009)

### **Conference reviewing**

- IEEE Symposium on 3D User Interfaces (2008-2015)
- ACM Conference on Advanced Visual Interfaces (2010-2014)
- ACM Workshop on BEYond time and error in evaluation of Visualization (2010-2014)
- ACM Conference on Human Factors in Computing Systems (2003-2016)
- ACM Conference on Computer Supported Cooperative Work and Social Computing (2008-2011, 2014-2015)
- Conference of the European Association for Computer Graphics (2008, 2013)
- ACM Conference on Engineering Interactive Computing Systems (2010)
- Eurographics/IEEE Symposium on Visualization (2009-2014)
- Canadian HCC Society's Graphics Interface conference (2006-2008, 2011, 2015)
- IEEE Conference on Information Visualization (2005, 2007-2015, 2018)
- IFIP Conference on Human-Computer Interaction (2009-2011, 2013)
- IEEE Symposium on Large-Scale Data Analysis and Visualization (2012-2013)
- ACM Conference on Mobile Human-Computer Interaction (2012)
- Nordic Conference on Human-Computer Interaction (2006-2008)
- International Conference on Principles of Distributed Systems (2006)
- IEEE Pacific Visualization Symposium (2008-2015)
- IEEE Conference on Scientific Visualization (2005, 2007-2008)

- ACM Conference on Interactive Tabletops and Surfaces (2009-2012, 2014-2015)
- ACM Conference on Tangible, Embedded, and Embodied Interaction (2011)
- ACM Symposium on User Interface Software and Technology (2008, 2013, 2018)
- IEEE Symposium on Visual Analytics Science and Technology (2006-2015)
- IEEE Workshop on Visualization of Security (2005)
- IEEE Conference on Virtual Reality (2007-2008, 2014)
- ACM Symposium on Virtual Reality Software and Technology (2007)

#### Grant reviewing

- Agence Nationale de la Recherche (ANR, France) – external reviewer (2014)
- Austrian Science Fund (FWF, Austria) – external reviewer (2013)
- U.S. National Science Foundation (NSF) – panelist (2008, 2011, 2014-18)
- Swiss National Science Foundation (SNSF, Switzerland) – external reviewer (2009)

### ACADEMIC SOCIETY MEMBERSHIPS

---

#### Association for Computing Machinery (ACM)

- Senior Member of the ACM
- Senior Member of the ACM Special Interest Group for Human-Computer Interaction (SIGCHI)

#### Institute of Electrical and Electronics Engineers (IEEE)

- Senior Member of the IEEE
- Senior Member of the IEEE Computer Society

### TEACHING EXPERIENCE

---

#### University of Maryland

College Park, MD, USA

##### Course Developer

- |   |             |                                   |
|---|-------------|-----------------------------------|
| • INST 462 Introduction to Data Visualization | Fall 2017   | New elective undergraduate course |
| • INST 762 Visual Analytics                   | Spring 2016 | New experimental graduate course  |
| • INST 760 Data Visualization                 | Fall 2015   | New experimental graduate course  |

##### Instructor

- |  |             |                           |
|--|-------------|---------------------------|
| • INST 462 Introduction to Data Visualization        | Spring 2018 | 50 undergraduate students |
| • INST 462 Introduction to Data Visualization        | Fall 2017   | 29 undergraduate students |
| • INST 760 Data Visualization                        | Fall 2016   | 30 graduate students      |
| • INST 728Q Visual Analytics                         | Spring 2016 | 30 graduate students      |
| • INST 728V Data Visualization                       | Fall 2015   | ~30 graduate students     |
| • INST 630 Programming for Information Professionals | Fall 2015   | ~30 graduate students     |
| • INST 630 Programming for Information Professionals | Spring 2015 | ~30 graduate students     |
| • INST 630 Programming for Information Professionals | Fall 2014   | 30 graduate students      |

#### Purdue University

West Lafayette, IN, USA

##### Course Developer

- |  |           |                                   |
|--|-----------|-----------------------------------|
| • ECE 395x Human-Computer Interaction        | Fall 2009 | New experimental undergrad course |
| • ECE 495E Fundamentals of Computer Graphics | Fall 2011 | New permanent undergrad course    |
| • ECE 695D Introduction to Visual Analytics  | Fall 2009 | New permanent graduate course     |

##### Instructor

- |                                  |             |                           |
|----------------------------------|-------------|---------------------------|
| • ECE 264 Advanced C Programming | Spring 2014 | 60 undergraduate students |
| • ECE 264 Advanced C Programming | Spring 2013 | 48 undergraduate students |
| • ECE 264 Advanced C Programming | Spring 2012 | 48 undergraduate students |

- *ECE 264 Advanced C Programming* Spring 2011 38 undergraduate students
- *ECE 364 Software Engineering Tools* Spring 2010 ~60 undergraduate students
- *ECE 495E Fundamentals of Computer Graphics* Spring 2009 ~25 undergraduate students
- *ECE 595E Visualization Techniques* Fall 2012 16 graduate students
- *ECE 595E Visualization Techniques* Fall 2010 10 graduate students
- *ECE 695D Introduction to Visual Analytics* Fall 2013 23 graduate students
- *ECE 695D Introduction to Visual Analytics* Fall 2011 14 graduate students
- *ECE 695D Introduction to Visual Analytics* Fall 2009 12 graduate students

*Project Advisor*

- *Table-It: Kinect-based Conference Meeting System* AY 2012-13 5 undergraduate students
- *Speech and Audiology Clinic EPICS team* Spring 2010 12 undergraduate students

**Chalmers University of Technology**

Göteborg, Sweden

*Course Developer*

- *Simulation Engines* 2003-2005 600 slides, 14 lectures
- *3D Real-Time Graphics* 2002-2003 50 slides, 2 lectures

*Instructor*

- *Simulation Engines* Fall 2004 50 students
- *Simulation Engines* Fall 2005 40 students

*Project Advisor*

- *Collaborative Editing (project)* 2003-2004 8 students
- *Wearable Platforms for AR & VR (project)* 2002-2003 8 students

*Teaching Assistant*

- *Object-Oriented Software Engineering* 2002, 2003 100+ undergraduate students
- *Data Structures* 2001 30 undergraduate students

**STUDENTS ADVISED**

---

**University of Maryland**

College Park, MD, USA

*Graduated Ph.D. Students – Major Advisor (Academic Committee Chair)*

- Deok Gun Park (Ph.D. 2018), *Visual Analytics for Open-Ended Tasks in Text Mining*, Department of Computer Science, Mar. 2018. (Major advisor Dec. 2012–Mar. 2018)
  - Now assistant professor at University of Texas at Arlington, TX, USA.
- Adil Yalcin (Ph.D. 2016), *Towards Rapid, Effective, and Expressive Visual Data Exploration*, Department of Computer Science, Oct. 2016. (Major advisor Dec. 2014–Oct. 2016)
  - Now CEO at Keshif, LLC, Arlington, VA, USA

*Ph.D. Thesis Major Advisor (Academic Committee Chair)*

- Erik Newburger (Ph.D. student), College of Information Studies, Aug. 2018–present (unfunded graduate research assistant).
- Brian Ondov (Ph.D. student), Department of Computer Science, Aug. 2017–present (funded graduate research assistant).
- Sigfried Gold (Ph.D. student), College of Information Studies, Aug. 2017–present (funded graduate research assistant).
- Andrea Batch (Ph.D. student), College of Information Studies, Aug. 2016–present (funded graduate research assistant).

- Zehua Zheng (Ph.D. student), Department of Computer Science, Jan. 2016–present (funded graduate research assistant).
- Zhe Cui (Ph.D. candidate), Department of Electrical & Computer Engineering, Jan. 2016–present (funded graduate research assistant).
- Sriram Karthik Badam (Ph.D. candidate), Department of Computer Science, Sep. 2012–present (funded graduate research assistant).
- Zhenpeng Zhao (Ph.D. candidate), Department of Computer Science, Dec. 2011–present (funded graduate research assistant).

*Graduated Ph.D. Students – Academic Committee Member*

- Matthew Mauriello (Ph.D. 2018), *Designing and Evaluating Next-Generation Thermographic Systems to Support Residential Energy Audits*, Department of Computer Science, Aug. 2018. (Committee member.)
- Justin Wagner (Ph.D. 2018), *Software Infrastructure for Visual and Integrative Analysis of Microbiome Data*, Department of Computer Science, Jun. 2018. (Committee member.)
- Fan Du (Ph.D. 2018), *Explainable Recommendation for Event Sequences: A Visual Analytics Approach*, Department of Computer Science, Mar. 2018. (Committee member.)
- Uran Oh (Ph.D. 2016), *Accessible On-Body Interaction for People With Visual Impairments*, Department of Computer Science, Oct. 2016. (Committee member Sep. 2016–Oct. 2016.)
- Kotaro Hara (Ph.D. 2016), *Scalable Methods to Collect and Visualize Sidewalk Accessibility Data for People with Mobility Impairments*, Department of Computer Science, Aug. 2016. (Committee member Jul. 2016–Aug. 2016.)
- Sana Malik (Ph.D. 2016), *A Visual Analytics Approach to Comparing Cohorts of Event Sequences*, Department of Computer Science, May 2016. (Committee member Dec. 2015–May 2016.)

*Ph.D. and Masters Committee Member*

- Alina Goldberg-Striner (Ph.D. candidate), College of Information Studies, Jul. 2016–present.

**Purdue University**

West Lafayette, IN, USA

*Graduated Ph.D. Students – Major Advisor (Academic Committee Chair)*

- Sohaib Ghani (Ph.D. 2013), *Advanced Visualization, Navigation, and Interaction in Graphs: Theory, Design, and Evaluation*, School of Electrical and Computer Engineering, Purdue University, June 2013.
  - Now research scientist, KAUST, Saudi Arabia
- Waqas Javed (Ph.D. 2013), *Spatializing Visual Exploration: Transforming Interactive Visual Analysis into Spatial Representations to Aid Sensemaking*, School of Electrical and Computer Engineering, Purdue University, May 2013.
  - Now HCI researcher, GE Global Research, San Ramon, CA, USA

*Graduated Masters Students – Major Advisor (Academic Committee Chair)*

- Sriram Karthik Badam (Masters 2014), *Developing Digital Media Platforms for Early Design*, School of Electrical & Computer Engineering, Purdue University, July 2014.
  - Major advisor, funded research assistant (Sep. 2012–Jul. 2014)
- Udayan Umaphathi (Masters 2014), *Realization and Evaluation of a 3-Degrees-of-Freedom Mouse Model*, School of Electrical & Computer Engineering, Purdue University, May 2014.
  - Major advisor, funded research assistant (Oct. 2013–May 2014)
  - Researcher at Hasso-Plattner Institute, Potsdam, Germany in 2014 (advisor: Patrick Baudisch)
  - Now Ph.D. student at MIT Media Lab (advisor: Hiroshi Ishii)
- Salman Javed (Masters 2014), Non-thesis option, School of Electrical & Computer Engineering, Purdue University, May 2014.
  - Major advisor (2011–2014; break 2012–2013)

- KyungTae Kim (Masters 2010), *A Framework to Support Awareness and Coordination in Mixed-Presence Collaborative Information Visualization for Multi-Touch Tabletop Displays*, School of Electrical & Computer Engineering, Purdue University, November 2010.
  - Major advisor, funded research assistant (Sep. 2009–Dec. 2010)
  - Now CEO of startup company in Seoul, South Korea

*Graduated Ph.D. Students – Academic Committee Member*

- Sukwon Lee (Ph.D. 2016), *Investigation of Visualization Literacy: A Visualization Sensemaking Model, a Visualization Literacy Assessment Test, and the Effects of Cognitive Characteristics*, School of Industrial Engineering, December 2016. (Committee member Jan. 2013–Dec. 2016)
- Junghoon Chae (Ph.D. 2016), *Visual Analytics of Location-based Social Networks for Decision Support*, School of Electrical & Computer Engineering, August 2016. (Committee member Nov. 2011–Aug. 2016.)
- Sujin Jang (Ph.D. 2016), *Methods for Analyzing Natural Patterns and Physical Ergonomics of Human Gestures in Mid-Air Interaction*, School of Mechanical Engineering, April 2016. (Committee member Oct. 2012–Apr. 2016).
- Ayan Sinha (Ph.D. 2016), *Physics-based Supervised and Unsupervised Learning of Graph Structure*, School of Mechanical Engineering, February 2016. (Committee member Dec. 2011–Feb. 2016)
- Vinayak (Ph.D. 2015), *Embodied Interactions for Spatial Design Ideation: Symbolic, Geometric, and Tangible Approaches*, School of Mechanical Engineering, Nov. 2015. (Committee member Apr. 2011–Nov. 2015)
- Senthil Chandrasegaran (Ph.D. 2015), *Tools and Methods to Analyze Multimodal Data in Collaborative Design Ideation*, School of Mechanical Engineering, November 2015. (Committee member Feb. 2014–Nov. 2015)
- Devarajan Ramanujan (Ph.D. 2015), *Data Representation Methods for Environmentally Conscious Product Design*, School of Mechanical Engineering, August 2015. (Committee member Apr. 2014–Aug. 2015)
- Haeyong Chung (Ph.D. 2015), *Designing Display Ecologies for Visual Analysis*, Department of Computer Science, Virginia Tech, February 2015. (Committee member Oct. 2011–Feb. 2015).
- Samah Gad (Ph.D. 2014), *Expressive Forms of Topic Modeling to Support Digital Humanities*, Department of Computer Science, Virginia Tech, Sep. 2014 (Major advisor: Naren Ramakrishnan). (Committee member Nov. 2012–Sep. 2014)
- Jin Ryong Kim (Ph.D. 2014), *Touch Typing Performance with Sensory Feedback on a Flat Keyboard*, School of Electrical & Computer Engineering, Purdue University, Jul. 2014 (Major advisor: Hong Z. Tan). (Committee member Apr. 2011–Jul. 2014)
- William Benjamin (Ph.D. 2014), *Structure Discovery and Navigation on Shape Data*, School of Mechanical Engineering, Purdue University, Jul. 2014 (Major advisor: Karthik Ramani). (Committee member Aug. 2012–Jul. 2014)
  - Now researcher at National Institute of Standards and Technology
- Sungahn Ko (Ph.D. 2014), *Aided Decision-Making Through Visual Analytics Systems for Large Multi-Variate, Spatiotemporal, Hierarchical and Network Data*, School of Electrical & Computer Engineering, Purdue University, Jul. 2014 (Major advisor: David Ebert). (Committee member Sep. 2011–Jul. 2014)
- Abish Malik (Ph.D. 2014), *Assisted Decision Making Using Multivariate Spatiotemporal Data Through the Application of Visual Analytics*, School of Electrical & Computer Engineering, Purdue University, Jul. 2014 (Major advisor: David Ebert). (Committee member (Apr. 2010–Jul. 2014).
  - Now research scientist at Purdue University, West Lafayette, IN
- Hanjun Xian (Ph.D. 2013), *Scholarly Collaboration in Engineering Education: From Big-Data Scientometrics to a User-Centered Software Design*, School of Engineering Education, Purdue University, Oct. 2013 (Major advisor: Krishna Madhavan). (Committee member Dec. 2010–Oct. 2013)
  - Now research software engineer, Bing team, Microsoft Corporation, Redmond, WA

- Jaeyoung Park (Ph.D. 2013), *Effect of Contact Location Information on Haptic Shape Perception*, School of Electrical & Computer Engineering, Jun. 2013 (Major advisor: Hong Z. Tan). (Committee member Jan. 2010–Jun. 2013)
  - Now research scientist at Korea Institute of Science and Technology
- Bum chul Kwon (Ph.D. 2013), *Visualization Aids to Support the Consumer Decision Making Process*, School of Industrial Engineering, Purdue University, May 2013. (Major advisor: Ji Soo Yi) (Committee member Jan. 2011–May 2013)
  - Now postdoctoral researcher, University of Konstanz, Germany
- Sundar Murugappan (Ph.D. 2012), *Natural User Interfaces for Engineering Design*, School of Mechanical Engineering, Purdue University, Mar. 2012. (Major advisor: Karthik Ramani) (Committee member 2010–2012)
  - Now User Experience Researcher at GE Global Research, San Ramon, CA
- Yi Fang (Ph.D. 2011), *Heat-Driven Framework for Interpretation of Data in Networks*, School of Mechanical Engineering, Purdue University, Oct. 2011. (Major advisor: Karthik Ramani) (Committee member 2011–2012)
  - Now assistant professor, electrical engineering, New York University Abu-Dhabi

*Graduated Masters Students – Academic Committee Member*

- Brandon Blaine Gardner (Masters 2014), *Developing an Embedded System Solution for High-Speed, High-Capacity Data Logging for a Size-Constrained, Low-Power Biomechanical Telemetry System*, School of Electrical & Computer Engineering, Purdue University, Apr. 2014. (Committee member Oct. 2012–Apr. 2014)
- Silvia Oliveros-Torres (Masters 2013), *Interactive Multivariate Data Exploration for Risk-based Decision Making*, School of Electrical & Computer Engineering, Purdue University, Apr. 2013. (Committee member Jan. 2011–Apr. 2013)
- Hammad Haseeb (Masters 2013), *Impact of Access Control on Retrieval Performance of Spatiotemporal Data*, School of Electrical & Computer Engineering, Purdue University, Mar. 2013. (Committee member (Nov. 2012–Mar. 2013).
- Arpan Kusari (Masters 2011), School of Civil Engineering, Purdue University, Dec. 2011. Committee member 2011).
  - Now Ph.D. student at University of Houston, Houston, TX.
- Michael Wilga (Masters 2011), School of Visual & Performing Arts, Purdue University, Jul. 2011. (Committee member 2009–2011).
  - Now audio artist at Electronic Arts, San Francisco Bay Area, CA.

*Ph.D. Thesis Major Advisor (Academic Committee Chair)*

- Yuetling Wong (Ph.D. student), School of Electrical & Computer Engineering, Oct. 2012–present (unfunded graduate research assistant).

*Ph.D. and Masters Committee Member*

- Cecil Piya (Ph.D. student), School of Mechanical Engineering, Jan. 2014–May. 2017.
- Shuying Feng (Masters student), School of Electrical & Computer Engineering, Oct. 2013–2014.
- Sang Ho Yoon (Ph.D. student), School of Mechanical Engineering, Oct. 2013–2016.
- Rachel Whitson (Masters student), Department of Computer Graphics Technology, Sep. 2013–May. 2014.
- Nadra Guizani (Ph.D. student), School of Electrical & Computer Engineering, Sep. 2012–2014.
- Xin Chen (Ph.D. candidate), School of Engineering Education, Mar. 2012–Sep. 2014.
- Daniel Meija (Ph.D. student), School of Electrical & Computer Engineering, Aug. 2011–2014.
- Matthew Beard (Ph.D. candidate), Department of Forestry and Natural Resources, Mar. 2011–2014.
- Hyungju Park (Ph.D. candidate), School of Electrical & Computer Engineering, Jan. 2011–2014.

*Undergraduate Research Advisor*

- Eli Raymond Fisher, SRC Fellow, School of Electrical & Computer Engineering, May 2012–Sep. 2013.



- Now software engineer at Microsoft Corporation
- Brian Bowman, School of Electrical & Computer Engineering, Aug. 2010–May 2012.
  - Now software engineer at Microsoft Corporation
- Will McGrath, School of Electrical & Computer Engineering, Aug. 2010–May 2012.
  - Now Ph.D. student in Computer Science Department at Stanford University
- Stephen MacNeil, School of Electrical & Computer Engineering, Aug. 2009–May 2012.
  - Now Ph.D. student in Department of Computer Science at UNC Charlotte
- Tejas Kulkarni, School of Electrical & Computer Engineering, Jan. 2009–May 2010.
  - Now Ph.D. from Department of Brain and Cognitive Sciences at Massachusetts Institute of Technology (MIT)
- Bryan McDonnell, School of Electrical & Computer Engineering, Jan.–Aug. 2009.
  - Now Associate Developer at Spot Trading LLC

### **Chalmers University of Technology**

Göteborg, Sweden

#### *Master's Thesis Advisor (advisory only)*

- C. Håkansson and S. Sandberg, *Using 3D Audio Guidance for Static Object Location*, Chalmers University of Technology and IT University, 2006.
- J. Tibell, *Multiplayer Physics*, Department of Computer Science and Engineering, Chalmers University of Technology, 2006.
- T. Bengtsson and H. Svensson, *.NET Platform Evaluation for Spotfire Visualization*, Department of Computer Science and Engineering, Chalmers University of Technology, 2004.
- K. Höök, *Interaction with Products in Immersive 3D Environments*, Department of Computer Science and Engineering, Chalmers University of Technology, 2004.
- M. Kahnberg, *Design and Construction of a Three-Dimensional Role-Playing Game*, Department of Computer Science and Engineering, Gothenburg University, 2004.

### **PRESS AND MEDIA COVERAGE**

---

#### **TV coverage**

- InsideScience TV (2013). “Turning Your World into a Touch Screen,” August 14.
- WLFI-TV NewsChannel 18 (2012). “Purdue researchers turn any surface into interactive touch screen,” October 12.

#### **Online coverage**

- People Behind the Science (2014). “Dr. Niklas Elmqvist: A Picture is Worth a Thousand Words in the Field of Information Visualization,” May 19.
- MIT Technology Review (2014). “Making All Your Screens Play Nicely,” April 10.
- DISCOVER Magazine Online (2013). “Creating a Touch-Screen on a Countertop,” March 18.
- Purdue News (2012). “New interactive system detects touch and gestures on any surface,” October 10.
- Journal and Courier Online (2012). “PolyZoom: New Tool from Purdue,” May 12.
- Purdue News (2012). “‘PolyZoom’ is a new tool to view, study graphics,” April 24.
- Purdue News (2011). “NSF grant to create new resource to accelerate ‘STEM’ innovations,” October 18.
- Purdue Website (2011). “5 Students Who... Are Innovation Makers,” June 1 (on undergraduate advisee Will McGrath’s research project).
- Purdue News (2011). “‘Surrogates’ aid design of complex parts and controlling video games,” May 10.
- eCampus News (2011). “New software connects interactive displays online,” March 22.
- Purdue News (2010). “Software allows interactive tabletop displays on Web,” November 29.
- Chalmers News Service (2006). “Finding your way in Cyberspace,” December 12.
- Slashdot (2001). “Slashback: Solidity, Sneakiness, Recovery,” November 6.
- Slashdot (2001). “Nicklas [sic] Elmqvist On 3Dwm Project’s Progress,” August 22.
- LinuxPower (2001). “Adding a new dimension to the desktop with 3Dwm,” August 21. (interview)

- Slashdot (2000). “3Dwm Updates,” November 3.
- Slashdot (1999). “3D Window Manager,” November 3.

#### **Print media coverage**

- DISCOVER Magazine (2013), “Computing on the Kitchen Counter,” pp. 18-19, April issue.
- Journal and Courier (2012). “PolyZoom: New Tool from Purdue,” May 12.
- Purdue Exponent (2010). “Purdue research expands touch technology,” December 6.

### **UNIVERSITY AND DEPARTMENT SERVICE**

---

#### **University of Maryland, College Park**      UMCP Campus

- Human-Computer Interaction Laboratory (HCIL), director (2016-present)
- Institute for Advanced Computer Studies (UMIACS), Appointment, Promotion, and Tenure (APT) Committee, member (2018-present).

#### **University of Maryland, College Park**      College of Information Studies

- Appointment, Promotion, and Tenure Committee (APT), associate chair (2015-2016)
- Merit Pay Committee, member (2015-2016)
- Annual Review Committee, member (2014-2015)
- Master of Science in Human-Computer Interaction Program Committee
  - Director (2014-2018)
  - Member (2018-present)
- Programs, Curricula & Courses Committee, member (2014-2018)
- Master of Information Management Program Committee, member (2014-2015)

#### **Purdue University**      College of Engineering

- Strategic Planning Team – Virtual Reach and Web Presence, member (Fall 2009)
- Perception-based Engineering Faculty Search Committee, member (2009-2010)

#### **Purdue University**      School of Electrical and Computer Engineering

- Purdue Hacker Club, Faculty Advisor (2013-2014)
- ECE Graduate Committee, member (2011-2014)
- ECE Graduate Admissions Committee, member (2008-2014)
- ECE Faculty Search Committee, member (2008, 2009, 2010, 2012, 2013)

#### **Chalmers University of Technology**      Department of Computer Science & Engineering

- Graduate Committee, Ph.D. student representative (2003-2006)
- Distributed Computing and Systems Seminar, coordinator (2004-2006)
- Graduate Admissions Committee for Interaction Design master’s program, member (2004-2005)