



# Matthew Brehmer

p. 1 / 3

Data Visualization Researcher

PhD, MSc, BComp

Vancouver, British Columbia

[mattbrehmer.github.io](https://mattbrehmer.github.io)

mattbrehmer[at]gmail.com

@mattbrehmer

## Education

University of British Columbia

**Doctor of Philosophy** (Computer Science)

Dissertation: *Why Visualization? Task Abstraction for Analysis and Design*

Supervisory committee: Tamara Munzner (chair), Joanna McGrenere, & Ron Rensink

Vancouver, Canada

**2011 – 2016**

**Master of Science** (Computer Science, Sub-Specialization in Human Computer Interaction)

Supervised by Joanna McGrenere & Claudia Jacova

**2009 – 2011**

Queen's University

**Bachelor of Computing (Honours) with Distinction**

Specialization in Cognitive Science with Professional Internship

Kingston, Canada

**2004 – 2009**

## Skills

### Visualization & Interface Design

I design visualization tools and techniques for data analysis and communication: I write code, I sketch, and I explore and transform data.

### Experiment Design & Analysis

I conduct controlled experiments as a way to understand human capabilities with respect to perception and attention (and sometimes these results have actionable implications for human-computer interface design).

### Qualitative User Research

I evaluate current data analysis and communication processes, work-in-progress designs, and deployed visualization tools: I conduct work domain analyses, interview studies, chauffeured demos/walkthroughs, and field studies.

## Domains

### Journalism

As part of an ongoing collaboration between the UBC InfoVis Group and the Associated Press / Knight Foundation Overview Project, I conducted six case studies of journalists who used Overview to investigate and report on large text document collections. Our findings led to generalizable lessons for visualization design. I am also interested in providing journalists with better tools for producing presenting information to readers; and specifically tools for producing visual timelines.

### Energy

I have collaborated with a company that develops enterprise energy analysis and reporting software and designed visualizations for analyzing and monitoring energy usage in large portfolios of buildings. I consulted with various stakeholders and prospective users, envisioning ways to interactively locate patterns and anomalies.

### Health & Fitness

My M.Sc research pertained to the design and evaluation of C-TOC, a computerized cognitive assessment tool intended for early detection of dementia. I studied the use of C-TOC prototypes by healthy older adults and by adults with diagnosed mild cognitive impairments.

Prior to my M.Sc, I worked in the area of exercise video games (aka active games): I studied the role of physical exertion on cognitive task performance. I also designed GAIM, an XNA/C# toolkit which allowed players with different input peripherals to play active games together.



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p. 2 / 3

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## Work Experience

Microsoft Research  
**Research Intern**  
I conducted research related to information visualization and human-computer interaction, working with the neXus research team and advised by Bongshin Lee.

Redmond, USA  
**Summer 2015**

EnerNOC (formerly Pulse Energy)  
**Mitacs-Accelerate Graduate Research Intern**  
I designed visualization prototypes for commercial energy analysis and management software. I consulted with prospective users and other stakeholders, envisioning ways to interactively locate patterns and anomalies in large hierarchical spatio-temporal datasets.

Vancouver, Canada  
**2013 – 2014**

University of British Columbia Department of Computer Science  
**Research Assistant**  
I designed and conducted human-computer interaction experiments, collected qualitative data regarding software usability and utility from interview and field studies, performed data analysis in tools such as R and SPSS, and wrote research papers.

Vancouver, Canada  
**2009 – 2016**

Engineering Interactive Systems at Queen's University (EQUIS)  
**Research Assistant**  
I designed and conducted an experiment to investigate the role of physical exertion on cognitive task performance. I also designed GAIM, an XNA/C# toolkit which allowed players with different input peripherals to play active games together.

Kingston, Canada  
**2008 – 2009**

EMC Corporation  
**User Experience Design Intern**  
I designed the user interface for enterprise rich media content management software, intended for use by the design and marketing departments at a large automotive company. I consulted with stakeholders, developed mockups, and wrote UI code.

Toronto, Canada  
**2007 – 2008**

Killam Properties, Inc.  
**Web Developer, IT Support Staff**  
I maintained the website for a Canadian residential property management company.

Halifax, Canada  
**Summer 2006**

## Teaching

University of British Columbia Department of Computer Science  
**Teaching Assistant**  
I planned and conducted tutorials for up to three dozen senior undergraduate students in a course in advanced human-computer interaction methods, and in an introductory course in human computer interaction.

Vancouver, Canada  
**2009 – 2010**

## Volunteering

**External Reviewer:** IEEE InfoVis, VAST, & TVCG, EuroVis, ACM TOCHI, CHI, & SIGGRAPH Asia  
**2013 – 2016**

**Student Volunteer:** ACM CHI Conference  
**2011, 2013, 2015, 2016**

University of British Columbia Department of Computer Science  
**Graduate Admissions and Recruitment Committee**  
**2013 – 2015**

University of British Columbia Computer Science Graduate Students' Association  
**Vice President (Social Events)**  
**Graduate Student Orientation Committee**  
**Un-Distinguished Lecture Series Organizer**  
**2010 – 2011, 2012 – 2013**

## Awards & Honours

Invited to the 2014 IEEE VIS Doctoral Colloquium, Mitacs-Accelerate Graduate Research Internship Program Award, UBC CS Student Service & Volunteering Awards, NSERC Postgraduate Scholarship, UBC Four Year Doctoral Fellowship, UBC CS Merit Scholarship, Queen's Entrance Scholarship



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p. 3 / 3

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## Research Publications

\* papers accepted

Matches, Mismatches, and Methods: Multiple-View Workflows for Energy Portfolio Analysis. <b>Brehmer</b> , Ng, Tate, & Munzner. In <i>IEEE Trans. Visualization and Computer Graphics / Proc. InfoVis</i> , 22(1). p. 449-458.	<b>2015</b> 39 / 178* (22%)
TimeLineCurator: Interactive Authoring of Visual Timelines from Unstructured Text. Fulda, <b>Brehmer</b> , & Munzner. <i>IEEE Trans. Visualization and Computer Graphics / Proc. Visual Analytics Science &amp; Technology (VAST)</i> , 22(1). p.300-309.	<b>2015</b> 31 / 149* (21%)
Overview: The Design, Adoption, and Analysis of a Visual Document Mining Tool For Investigative Journalists. <b>Brehmer</b> , Ingram, Stray, & Munzner. <i>IEEE Trans. Visualization and Computer Graphics / Proc. InfoVis</i> . 20(12). p. 2271-2280.	<b>2014</b> 45 / 196* (23%)
Visualizing Dimensionally-Reduced Data: Interviews with Analysts and a Characterization of Task Sequences. <b>Brehmer</b> , Sedlmair, Ingram, & Munzner. <i>Proc. ACM Workshop on BEyond time and errors: novel evalUation methods for Information Visualization (BELIV)</i> . p1-8.	<b>2014</b> 23 / 30* (77%)
Pre-Design Empiricism for Information Visualization: Scenarios, Methods, and Challenges. <b>Brehmer</b> , Carpendale, Lee, & Tory. <i>Proc. ACM Workshop on BEyond time and errors: novel evalUation methods for Information Visualization (BELIV)</i> . p.147-151.	<b>2014</b> 23 / 30* (77%)
C-TOC (Cognitive Testing on Computer): Investigating the Usability and Validity of a Novel Self-administered Cognitive Assessment Tool in Aging and Early Dementia. Jacova, McGrenere, Lee, Wang, Le Huray, Corenblith, <b>Brehmer</b> , Tang, Hayden, Beattie, & Hsiung. <i>Alzheimer and Related Disorders</i> .	<b>2014</b>
A Multi-Level Typology of Abstract Visualization Tasks. <b>Brehmer</b> & Munzner. <i>IEEE Trans. Visualization and Computer Graphics / Proc. InfoVis</i> , 19(12), p. 2376–2385.	<b>2013</b> 38 / 152* (25%)
Investigating Interruptions in the Context of Computerised Cognitive Testing for Older Adults. <b>Brehmer</b> , McGrenere, Tang, & Jacova. <i>Proc. ACM Conf. Human Factors in Computing Systems (CHI)</i> , p.2649-2658.	<b>2012</b> 370 / 1577* (23%)
Dimensionality Reduction in the Wild: Gaps and Guidance. Sedlmair, <b>Brehmer</b> , Ingram, & Munzner. <i>UBC Department of Computer Science Technical Report TR-2012-03</i> .	<b>2012</b>
The Haptic Crayola Effect: Exploring the Role of Naming in Learning Haptic Stimuli. Hwang, Maclean, <b>Brehmer</b> , Hendy, Sotirakopoulos, & Choi. <i>Proc. IEEE World Haptics Conference (WHC)</i> , p. 385-390.	<b>2011</b>
Activate Your GAIM: A Toolkit for Input in Active Games. <b>Brehmer</b> , Graham, & Stach. <i>Proc. ACM Academic Conference on the Future of Game Design and Technology (Future Play)</i> , p. 151-158.	<b>2010</b>
Classifying Input for Active Games. Stach, Graham, <b>Brehmer</b> , & Hollatz. <i>Proc. ACM Advances in Computer Entertainment (ACE)</i> , p. 379-382.	<b>2009</b>
R, JavaScript (D3.js), HTML, CSS, ActionScript / Flex, Processing, Java, C#, C, Matlab	
OmniGraffle, Visio, Photoshop, SPSS, Tableau Desktop, Weka, Fusion Tables, ScraperWiki, InqScribe, Dedoose, Git, SVN, LaTeX, iWork, Office, GarageBand, Logic Pro	

## Programming

## Software Tools