MATTHEW BREHMER, PHD

INFORMATION VISUALIZATION RESEARCHER

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Ⓞ **github**/mattbrehmer

⊞ **bl.ocks**/mattbrehmer

I am a **postdoctoral researcher at Microsoft Research** in Redmond, Washington, where I specialize in information visualization for storytelling and journalism. I am a member of the EPIC Research Group, Project Steller, and the Microsoft Data Journalism Team.

EXPERTISE

VISUALIZATION AND INTERFACE DESIGN

I design, develop, and deploy visualization tools and techniques for data analysis and communication.

➡ EXAMPLES PROJECTS: *Timeline Storyteller*, *Portfolio Sandbox*, *SoundConsensus*, *ShinyFork*

➡ RELATED PUBLICATIONS: J6, J5, T3

QUANTITATIVE HUMAN FACTORS RESEARCH

I conduct controlled experiments as a way to understand human capabilities with respect to perception and attention with the objective of deriving actionable implications for interface design.

➡ RELATED PUBLICATIONS: C6, C4, T2, C3, T1

QUALITATIVE HUMAN FACTORS RESEARCH

I evaluate current data analysis and communication processes, work-in-progress designs, and deployed visualization tools by means of work domain analyses, interviews, chauffeured walkthroughs, and field studies.

➡ RELATED PUBLICATIONS: J5, J2, W3, W2, TR1, T2

APPLICATION DOMAINS

DATA JOURNALISM AND STORYTELLING

I aim to provide journalists and storytellers with usable and expressive tools for presenting information visually to their audience, such as with tools like *Timeline Storyteller*, *TimeLineCurator*, and *ChartAccent*.

➡ RELATED PUBLICATIONS: J4, J6

As part of my PhD, I conducted case studies of journalists who used *Overview* to investigate and report on large text document collections. Our findings provided transferable lessons for visualizing analyzing document collections and hierarchical data.

➡ RELATED PUBLICATION: J2

ENERGY MANAGEMENT AND CONSERVATION

As part of my PhD, I designed and developed visualization prototypes for analyzing and monitoring energy usage in portfolios of commercial buildings. I consulted with various stakeholders and prospective users, envisioning and implementing designs for interactively locating patterns and anomalies.

→ RELATED PUBLICATION: J5

HEALTH AND FITNESS

My MSc 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.

→ RELATED PUBLICATIONS: C4, J3, T2, W1

Prior to my MSc, 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 developed *GAIM*, an XNA/C# toolkit which allowed players with different input peripherals to play active games together.

→ RELATED PUBLICATIONS: C2, C1, T1

EDUCATION

DOCTOR OF PHILOSOPHY, COMPUTER SCIENCE

2011 - 2016

University of British Columbia (UBC), Vancouver, Canada
→ THESIS: *Why Visualization? Task Abstraction for Analysis and Design*
→ SUPERVISORY COMMITTEE: Tamara Munzner (UBC Computer Science), Joanna McGrenere (UBC Computer Science), and Ronald A. Rensink (UBC Psychology)
→ EXAMINATION COMMITTEE: Jason Dykes (giCentre, City University London), Alfred Hermida (UBC Journalism), and Giuseppe Carenini (UBC Computer Science)
→ RELATED PUBLICATIONS: T3, J1, J2, J5, TR1, W2

MASTER OF SCIENCE, COMPUTER SCIENCE

2009 - 2011

Specialization in Human-Computer Interaction
University of British Columbia (UBC), Vancouver, Canada
→ THESIS: *Usability and the Effects of Interruption in C-TOC: Self-Administered Cognitive Testing on a Computer*
→ SUPERVISED BY: Joanna McGrenere (UBC Computer Science) and Claudia Jacova (UBC Medicine)
→ THESIS READER: Peter Graf (UBC Psychology)
→ RELATED PUBLICATIONS: C4, J3, W1, T2

EDUCATION (CONT.)

BACHELOR OF COMPUTING
<div align="right">2004 - 2009</div>

Specialization in Cognitive Science with Professional Internship
Queen's University, Kingston, Canada
→ THESIS: *Assessing the Effect of Exercise Intensity on Cognitive Task Performance in an Exercise Video Game*
→ THESIS ADVISER: T.C. Nicholas Graham (Queen's School of Computing)
→ RELATED PUBLICATION: T1

EMPLOYMENT HISTORY

Microsoft Research
Postdoctoral Researcher
Redmond, USA
<div align="right">2016 - PRESENT</div>

University of British Columbia Department of Computer Science
Graduate Research Assistant
Vancouver, Canada
<div align="right">2009 - 2016</div>

Microsoft Research
Graduate Research Intern
Redmond, USA
<div align="right">2015</div>

Pulse Energy (now a division of EnerNOC)
Mitacs Graduate Research Intern
Vancouver, Canada
<div align="right">2013 - 2014</div>

University of British Columbia Department of Computer Science
Graduate Teaching Assistant
Vancouver, Canada
<div align="right">2009 - 2011</div>

Queen's University School of Computing
Research Assitant
Kingston, Canada
<div align="right">2009</div>

EMC Corporation (now Dell EMC)
User Interface Design Intern
Toronto, Canada
<div align="right">2007 - 2008</div>

Killam Properties, Inc.
Information Technology Staff and Web Developer
Halifax, Canada
<div align="right">2006</div>

INVITED TALKS

Slides and videos from these talks are available at mattbrehmer.github.io/#talks

Data-Driven Storytelling at Microsoft: Introducing Timeline Storyteller and ChartAccent for Microsoft Power BI
2017 / 10 / 24
UBC School of Journalism Course on Special Topics in Contemporary Journalism: Data Viz (JRNL 520H) (Vancouver, Canada)

Timelines Revisited: A Design Space and Considerations for Expressive Storytelling
2017 / 10 / 03
IEEE InfoVis 2017 (Phoenix, USA)
➡ RELATED PUBLICATION: J6

Expressive Storytelling With Timelines
2017 / 08 / 31
Uber Visualization Night: A Journey Through Space and Time (Seattle, USA)

Timelines Revisited: Considerations for Expressive Storytelling
2017 / 07 / 11
King's College London Department of Informatics (London, UK)

Timelines Revisited: Considerations for Expressive Storytelling
2017 / 07 / 10
City University London giCentre (London, UK)

The Timeline Storyteller Custom Visual for Power BI
2017 / 06 / 13
Microsoft Data Insights Summit BI Power Hour (Seattle, USA)

Timelines Revisited: Considerations for Expressive Storytelling
2017 / 04 / 28
Northeastern University NUVis Visualization Consortium (Boston, USA)

Timelines Revisited: Considerations for Expressive Storytelling
2017 / 04 / 27
Bentley University RealViz talk series (Waltham, USA)

What Story Does Your Timeline Tell?
2017 / 04 / 24
OpenVisConf 2017 (Boston, USA)

Timelines Revisited: Considerations for Expressive Storytelling
2016 / 12 / 08
Radcliffe Institute at Harvard University (Cambridge, USA)

Why Visualization? Task Abstraction for Analysis and Design
2016 / 03 / 23
Dissertation Defence (Vancouver, Canada)
➡ RELATED PUBLICATION: T3

Storytelling with Timeline Data
2016 / 02 / 11
Data-Driven Storytelling Dagstuhl Seminar (Wadern, Germany)

Why Visualization? Task Abstraction for Analysis and Design
2016 / 02 / 01
Microsoft Research (Redmond, USA)

INVITED TALKS (CONT.)

Matches, Mismatches, and Methods: Multiple-View Workflows for Energy Portfolio Analysis
IEEE InfoVis 2015 (Chicago, USA)
➞ RELATED PUBLICATION: J5

2015 / 10 / 28

Matches, Mismatches, and Methods: Multiple-View Workflows for Energy Portfolio Analysis
University of Washington (Seattle, USA)

2015 / 09 / 04

The Future of Data and Design ... In Visualization Research
Vancouver Data Visualization Meetup (Vancouver, Canada)

2015 / 05 / 19

Overview: The Design, Adoption, and Analysis of a Visual Document Mining Tool For Investigative Journalists
IEEE InfoVis 2014 (Paris, France)
➞ RELATED PUBLICATION: J2

2014 / 11 / 14

Visualizing Dimensionally-Reduced Data: Interviews with Analysts and a Characterization of Task Sequences
ACM BELIV 2014 (Paris, France)
➞ RELATED PUBLICATION: W3

2014 / 11 / 10

Pre-Design Empiricism for Information Visualization: Scenarios, Methods, and Challenges
ACM BELIV 2014 (Paris, France)
➞ RELATED PUBLICATION: W2

2014 / 11 / 10

Visualization Task Abstraction from Multiple Perspectives
IEEE VIS Doctoral Colloquium 2014 (Paris, France)

2014 / 11 / 08

A Multi-Level Typology of Abstract Visualization Tasks
IEEE InfoVis 2013 (Atlanta, USA)
➞ RELATED PUBLICATION: J1

2013 / 10 / 15

Investigating Interruptions in the Context of Computerised Cognitive Testing for Older Adults
ACM CHI 2012 (Austin, USA)
➞ RELATED PUBLICATION: C4

2012 / 05 / 10

A Tale of Two Studies: Investigating the Impact of Interruptions on Task Performance in Older Adults
GRAND NCE AGM 2011 (Vancouver, Canada)
➞ RELATED PUBLICATION: W1

2011 / 05 / 14

PUBLICATIONS

Author copies of these publications are available at mattbrehmer.github.io/#pubs

PUBLICATION TYPES: J = *journal article*, C = *conference proceedings*, W = *workshop paper*, TR = *techinical report*, BC = *book chapter*, T = *thesis*, PO = *poster*.

PUBLICATIONS AS PRIMARY AUTHOR

Evaluating Data-Driven Stories & Storytelling Tools   BC1
Fereshteh Amini[*], **Matthew Brehmer**[*], Gordon Bolduan, Christina Elmer, and Benjamin Wiederkehr ([*] equal contribution)
A chapter in *Data-Driven Storytelling*, a book edited by Sheelagh Carpendale, Nicholas Diakopoulos, Christophe Hurter, and Nathalie Henry Riche, 2018.

Demonstrating the Value of Visualization: Highlights from the 2017 PacificVis Visual Data Storytelling Contest   Po1
Matthew Brehmer, Kyungwon Lee, Ivan Viola, Jinwook Seo, and Bongshin Lee.
In poster proceedings of the 2017 *IEEE VIS Conference*.

Timelines Revisited: A Design Space and Considerations for Expressive Storytelling   J6
Matthew Brehmer, Bongshin Lee, Benjamin Bach, Nathalie Henry Riche, and Tamara Munzner
In Volume 23, Issue 9 (Sept. 2017) of *IEEE Transactions on Visualization and Computer Graphics*.

Why Visualization? Task Abstraction for Analysis and Design   T3
Matthew Brehmer
University of British Columbia PhD Dissertation (April, 2016).

Matches, Mismatches, and Methods: Multiple-View Workflows for Energy Portfolio Analysis   J5
Matthew Brehmer, Jocelyn Ng, Kevin Tate, and Tamara Munzner
In Volume 22, Issue 1 (Jan. 2016) of *IEEE Transactions on Visualization and Computer Graphics (InfoVis 2015)*.

Overview: The Design, Adoption, and Analysis of a Visual Document Mining Tool For Investigative Journalists   J2
Matthew Brehmer, Stephen Ingram, Jonathan Stray, and Tamara Munzner.
In Volume 20, Issue 12 (Dec. 2014) of *IEEE Transactions on Visualization and Computer Graphics (InfoVis 2014)*.

Visualizing Dimensionally-Reduced Data: Interviews with Analysts and a Characterization of Task Sequences
Matthew Brehmer, Michael Sedlmair, Stephen Ingram, and Tamara Munzner
In proceedings of the 2014 *ACM BELIV Workshop (Beyond Time and Errors: Novel Evaluation Methods for Visualization)*.

W3

Pre-Design Empiricism for Information Visualization: Scenarios, Methods, and Challenges
Matthew Brehmer, Sheelagh Carpendale, Bongshin Lee, and Melanie Tory.
In proceedings of the 2014 *ACM BELIV Workshop (Beyond Time and Errors: Novel Evaluation Methods for Visualization)*.

W2

A Multi-Level Typology of Abstract Visualization Tasks
Matthew Brehmer and Tamara Munzner
In Volume 19, Issue 12 (Dec. 2013) of *IEEE Transactions on Visualization and Computer Graphics (InfoVis 2013)*.

J1

Investigating Interruptions in the Context of Computerised Cognitive Testing for Older Adults
Matthew Brehmer, Joanna McGrenere, Charlotte Tang, and Claudia Jacova
In proceedings of the 2012 *ACM Conference on Human Factors in Computing Systems (CHI)*.

C4

Usability and the Effects of Interruption in C-TOC: Self-Administered Cognitive Testing on a Computer
Matthew Brehmer
University of British Columbia MSc Thesis (2011).

T2

A Tale of Two Studies: Investigating the Impact of Interruptions on Task Performance in Older Adults
Matthew Brehmer, Charlotte Tang, Joanna McGrenere, and Claudia Jacova
In the work-in-progress proceedings of the the 2011 *GRAND NCE AGM*.

W1

Activate Your GAIM: A Toolkit for Input in Active Games
Matthew Brehmer, T.C. Nicholas Graham, and Tadeusz Stach
In proceedings of the 2010 *ACM Future Play Conference*.

C2

Assessing the Effect of Exercise Intensity on Cognitive Task Performance in an Exercise Video Game
Matthew Brehmer
Queen's University B.Comp Thesis (2009).

T1

What's the Difference?: Evaluating Variants of Multi-Series Bar Charts for Visual Comparison Tasks
Arjun Srinivasan, **Matthew Brehmer**, Bongshin Lee, and Steven Drucker
In proceedings of the 2018 *ACM Conference on Human Factors in Computing Systems (CHI)*.

C6

Data Visualization on Mobile Devices
Bongshin Lee, **Matthew Brehmer**, Eun Kyoung Choe, Petra Isenberg, Ricardo Langer, and Raimund Dachselt
In extended abstract proceedings of the 2018 *ACM Conference on Human Factors in Computing Systems (CHI)*.

W4

ChartAccent: Annotation for Data-Driven Storytelling
Donghao Ren, **Matthew Brehmer**, Bongshin Lee, Tobias Höllerer, and Eun Kyoung Choe
In proceedings of the 2017 *IEEE PacificVis Symposium*.

C5

TimeLineCurator: Interactive Authoring of Visual Timelines from Unstructured Text
Johanna Fulda, **Matthew Brehmer**, and Tamara Munzner
In Volume 22, Issue 1 (Jan. 2016) of *IEEE Transactions on Visualization and Computer Graphics (VAST 2015)*.

J4

C-TOC (Cognitive Testing on Computer): Investigating the Usability and Validity of a Novel Self-administered Cognitive Assessment Tool in Aging and Early Dementia
Claudia Jacova, Joanna McGrenere, Hyunsoo S. Lee, William Wang, Sarah Le Huray, Emily F. Corenblith, **Matthew Brehmer**, Charlotte Tang, Sherri Hayden, B. Lynn Beattie, and Ging-Yuek R. Hsiung
In Volume 29, Issue 3 (July 2015) of *Alzheimer Disease and Associated Disorders*.

J3

Dimensionality Reduction in the Wild: Gaps and Guidance
Michael Sedlmair, **Matthew Brehmer**, Stephen Ingram, and Tamara Munzner
University of British Columbia Technical Report TR-2012-03 (2012).

TR1

The Haptic Crayola Effect: Exploring the Role of Naming in Learning Haptic Stimuli
Inwook Hwang, Karon MacLean, **Matthew Brehmer**, Jeff Hendy, Andreas Sotirkopoulos, and Seungmoon Choi
In proceedings of the 2011 *IEEE World Haptics Conference*.

C3

Classifying Input for Active Games
Tadeusz Stach, T.C. Nicholas Graham, **Matthew Brehmer**, and Andreas Hollatz
In proceedings of the 2009 *ACM Advances in Computer Entertainment Technology (ACE) Conference*.

C1

ACADEMIC SERVICE

Organizing Committee: IEEE VIS 2018 (Co-Chair: Visualization in Practice), the Data Visualization on Mobile Devices Workshop at CHI 2018, IEEE PacificVis 2017-2018 (Co-Chair, Visual Data Storytelling Contest)

Program Committee: IEEE InfoVis (2017, 2018), EuroVis State of the Art Reports (2017), IEEE PacificVis (2017, 2018), FAT*: Conference on Fairness, Accountability, and Transparency (2018), The Art of Networks III (2018), VIS Arts Program (2018), Information+ (2018)

Conference Session Chair: IEEE PacificVis 2018

Reviewer: IEEE InfoVis (2013 - 2016), IEEE VAST (2015), IEEE PacificVis (2017), IEEE TVCG (2015 - 2018), EuroVis (2014 - 2017), ACM CHI (2013 - 2018), ACM TOCHI (2013), Sage Information Visualization Journal (2015 - 2016), ACM SIGGRAPH Asia (2012), GRAND NCE ACM (2012)

Student Volunteer: ACM CHI Conference (2011, 2013, 2015, 2016)

UNIVERSITY SERVICE

University of Washington: Invited Project Judge for CSE 442 Data Visualization (2017)

University of British Columbia Department of Computer Science: Graduate Admissions and Recruitment Committee (2013-2015), Guest Lecturer (CPSC 547: Information Visualization, 2014-2017), Curriculum Development (CPSC 444: Advanced Human Computer Interaction Methods, 2010-2011), Teaching Assistant (CPSC 444: Advanced Human Computer Interaction Methods, 2010; CPSC 344: Introduction to Human Computer Interaction Methods, 2009)

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

Queen's University Computing Students' Association: Student Orientation Leader (2005), First Year Representative (2004-2005)

AWARDS

University of British Columbia: Student Service Award (2016), Volunteering Award (2015), Mitacs-Accelerate Graduate Research Internship Program Award (2013-2014), Natural Sciences & Engineering Research Council of Canada (NSERC) Postgraduate Scholarship (2011-2014), Four Year Doctoral Fellowship (2011-2015), Department of Computer Science Merit Scholarship (2009-2011)

Queen's University: Dean's Entrance Scholarship in Computing (2004-2005)

REFERENCES

References are available upon request.