

# Jason Chuang

## Human-Computer Interaction / Machine Learning / Natural Language Processing

My research focuses on human-centered design and deployment of artificial intelligence systems. I examine how people perform real-world tasks including statistical modeling, data-driven decision making, and visual analysis. I investigate how experts develop processes to effectively and efficiently accomplish their work. By combining automated algorithms and human expertise into an integrated workflow, I design intelligence systems that are interpretable, trusted by users and improve user performance and productivity.

My projects include computer-aided translation interfaces, automated text analysis tools, deep learning algorithms, and semantic search engines. My work has appeared in top-tier publications in human-computer interaction (CHI, TOCHI), machine learning (ICML), natural language processing (EMNLP, NAACL), and information visualization (AVI), and has contributed to multiple other disciplines including the social sciences and genetics research.

## Education

- Apr 2013 Stanford University, Stanford, California  
Ph. D. in Computer Science
- Jun 2005 Stanford University, Stanford, California  
M. S. in Scientific Computing and Computational Mathematics
- May 2003 The University of British Columbia, Vancouver, Canada  
B. Sc. in Mathematics

## Employment

- Oct 2014 - Feb 2015 Allen Institute for Artificial Intelligence, Seattle, Washington  
Visiting Research Scientist
- Sep 2013 - Sep 2014 University of Washington, Seattle, Washington  
Post-Doctoral Researcher
- Sep 2005 - Sep 2013 Stanford University, Stanford, California  
Post-Doctoral Researcher  
Research with Jeffrey Heer, Christopher D. Manning, and Pat Hanrahan  
Teaching Assistant with Jeffrey Heer, Christopher D. Manning, John C. Mitchell, and Sebastian Thrun
- Jul 2012 - Oct 2012 Google Inc., Cambridge, Massachusetts  
Summer Engineering Intern, Big Picture Group  
Research and Development with Martin Wattenberg and Fernanda Viégas
- Jul 2008 - Oct 2008 Adobe Systems Inc., Seattle, Washington  
Summer Research Intern, Creative Technologies Lab  
Research with Holger Winnemöller
- Jan 2005 - Sep 2005 Intel Corporation, Santa Clara, California  
Research Intern, Machine Learning Group
- Jan 2003 - Sep 2003 The University of British Columbia, Vancouver, Canada  
Undergraduate Research Assistant, Robotics and Control Lab

## Refereed Publications

- Conference Papers
- Jason Chuang**, Margaret Roberts, Brandon Stewart, Rebecca Weiss, Dustin Tingley, Justin Grimmer and Jeffrey Heer. TopicCheck: Interactive Alignment for Assessing Topic Model Stability. *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics - Human Language Technologies (NAACL-HLT)*. Denver, Colorado, 2015.
- Spence Green, **Jason Chuang**, Jeffrey Heer, and Christopher D. Manning. Predictive Translation Memory: A Mixed-initiative System for Human Language Translation. *Proceedings of the ACM Symposium on User Interface Software and Technology (UIST)*. Honolulu, Hawaii, 2014.
- Spence Green, Sida I. Wang, **Jason Chuang**, Jeffrey Heer, Sebastian Schuster, and Christopher D. Manning. Human Effort and Machine Learnability in Computer Aided Translation. *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. Doha, Qatar, 2014.
- Jason Chuang**, Sonal Gupta, Christopher D. Manning, and Jeffrey Heer. Topic Model Diagnostics: Assessing Domain Relevance via Topical Alignment. *Proceedings of the International Conference on Machine Learning (ICML)*. Atlanta, Georgia, 2013.
- Richard Socher, Alex Perelygin, Jean Y. Wu, **Jason Chuang**, Christopher D. Manning, Andrew Y. Ng, and Christopher Potts. Recursive Models for Semantic Compositionality Over a Sentiment Treebank. *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. Seattle, Washington, 2013.
- Jason Chuang**, Daniel Ramage, Christopher D. Manning, and Jeffrey Heer. Interpretation and Trust: Designing Model-Driven Visualizations for Text Analysis. *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)*. Austin, Texas, 2012.
- Jason Chuang**, Christopher D. Manning, and Jeffrey Heer. Termite: Visualization Techniques for Assessing Textual Topic Models. *Proceedings of the International Working Conference on Advanced Visual Interfaces (AVI)*. Capri Island, Italy, 2012.
- Jason Chuang**, Maureen Stone, and Pat Hanrahan. A Probabilistic Model of the Categorical Association between Colors. *Proceedings of the Color Imaging Conference (CIC)*. Portland, Oregon, 2008.
- Journal Articles
- Daniel A. McFarland, Daniel Ramage, **Jason Chuang**, Jeffrey Heer, Christopher D. Manning, and Daniel Jurafsky. Differentiating Language Usage through Topic Models. In *Poetics: Special Issue on Topic Models and the Cultural Sciences*, 41 (6), pp. 607-625. December 2013.
- Meng How Tan, Kin Fai Au, Arielle L. Yablonovitch, Andrea E. Wills, **Jason Chuang**, Julie C. Baker, Wing Hung Wong, and Jin Billy Li. RNA Sequencing Reveals Diverse and Dynamic Repertoire of the *Xenopus Tropicalis* Transcriptome Over Development. In *Genome Research*, 23 (1), pp. 201-216. January 2013.
- Jason Chuang**, Christopher D. Manning, and Jeffrey Heer. "Without the Clutter of Unimportant Words": Descriptive Keyphrases for Text Visualization. In *ACM Transactions on Computer-Human Interaction (TOCHI)*, 19 (3), pp. 1-29, October 2012.
- Stephen Okazawa, Richelle Ebrahimi, **Jason Chuang**, Robert Rohling, and Septimiu E. Salcudean. Methods for Segmenting Curved Needles in Ultrasound Images. In *Medical Image Analysis*, 10 (3), pp. 330-342. March 2006.
- Stephen Okazawa, Richelle Ebrahimi, **Jason Chuang**, Septimiu E. Salcudean, and Robert Rohling. Hand-held Steerable Needle Device. In *IEEE Transactions on Mechatronics*, 10 (3), pp. 285-296. June 2005.
- Workshop Papers
- Jason Chuang**, John D. Wilkerson, Rebecca Weiss, Dustin Tingley, Brandon M. Stewart, Margaret E. Roberts, Forough Poursabzi-Sangdeh, Justin Grimmer, Leah Findlater, Jordan Boyd-Graber, and Jeffrey Heer. Computer-Assisted Content Analysis: Topic Models for Exploring Multiple Subjective Interpretations. *Conference on Neural Information Processing Systems (NIPS). Workshop on Human-Propelled Machine Learning*. Montreal, Canada, 2014.
- Jason Chuang** and Daniel J. Hsu. Human-Centered Interactive Clustering for Data Analysis. *Conference on Neural Information Processing Systems (NIPS). Workshop on Human-Propelled Machine Learning*. Montreal, Canada, 2014.

- Workshop Papers (continued) **Jason Chuang** and Richard Socher. Interactive Visualizations for Deep Learning. *IEEE VIS Conference on Visual Analytics Science and Technology (VAST). Workshop on Visualization for Predictive Analytics*. Paris, France, 2014.
- Jason Chuang**, Sands Fish, David Larochelle, William P. Li, and Rebecca Weiss. Large-Scale Topical Analysis of Multiple Online News Sources with Media Cloud. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD). Workshop on NewsKDD: Data Science for News Publishing*. New York, New York, 2014.
- Alison Smith, **Jason Chuang**, Yuening Hu, and Jordan Boyd-Graber. Concurrent Visualization of Relationships between Words and Topics in Topic Models. *Annual Meeting of the Association for Computational Linguistics (ACL). Workshop on Interactive Language Learning, Visualization, and Interfaces*. Baltimore, Maryland, 2014.
- Jason Chuang**, Yuening Hu, Ashley Jin, John D. Wilkerson, Daniel A. McFarland, Christopher D. Manning, and Jeffrey Heer. Document Exploration with Topic Modeling: Designing Interactive Visualizations to Support Effective Analysis Workflows. *Conference on Neural Information Processing Systems (NIPS). Workshop on Topic Models*. Lake Tahoe, Nevada, 2013.
- Jason Chuang**, Daniel Ramage, Daniel A. McFarland, Christopher D. Manning, and Jeffrey Heer. Large-Scale Examination of Academic Publications Using Statistical Models. *International Working Conference on Advanced Visual Interfaces (AVI). Workshop on Supporting Asynchronous Collaboration in Visual Analytics Systems*. Capri Island, Italy, 2012.
- Daniel Ramage, Evan Rosen, **Jason Chuang**, Christopher D. Manning, and Daniel A. McFarland. Topic Modeling for the Social Sciences. *Conference on Neural Information Processing Systems (NIPS). Workshop on Applications for Topic Models*. Vancouver, Canada, 2009.
- Dissertation **Jason Chuang**. Designing Visual Text Analysis Methods to Support Sensemaking and Modeling. Doctoral Dissertation, Stanford University, April 2013.

## Teaching Experience

- Stanford University  
2006 - 2011
- CS 448B: Data Visualization  
Course Assistant for Jeffrey Heer
  - CS 242: Programming Languages  
Course Assistant for John C. Mitchell
  - CS 276: Information Retrieval and Web Search  
Course Assistant for Christopher D. Manning
  - CS 226: Statistical Techniques in Robotics  
Course Assistant for Sebastian Thrun
- U of British Columbia  
1998 - 2002
- CPSC 122/152: Computer Architecture and Engineering  
Undergraduate Teaching Assistant
  - MATH 100/101: Differential and Integral Calculus  
Undergraduate Teaching Assistant

## Professional Activities

- Chair ACL Workshop on Interactive Language Learning, Visualization, and Interfaces 2014
- Reviewer for Conferences
- ACM SIGCHI Conference on Human Factors in Computing Systems (CHI) 2012 - 2015
  - ACM Symposium on User Interface Software and Technology (UIST) 2012
  - Eurographics Conference on Visualization (EuroVis) 2011
  - IEEE VIS Conference on Information Visualization (InfoVis) 2011 - 2014
  - IEEE VIS Conference on Visual Analytics Science and Technology (VAST) 2013 - 2014
  - IEEE VIS Conference on Scientific Visualization (SciVis) 2012
  - IEEE Pacific Visualization Symposium (PacificVis) 2013
  - International Conference on Intelligent User Interfaces (IUI) 2012 - 2015

- Reviewer for Journals    ACM Transactions on Computer-Human Interaction (TOCHI) 2012  
IEEE Transactions on Visualization and Computer Graphics (TVCG) 2012  
Neurocomputing 2014  
Statistical Analysis and Data Mining 2013  
Transactions of the Association for Computational Linguistics (TACL) 2015
- Instructor                Stanford Computational Social Science Workshop 2013

## Invited Talks

- Designing Visual Analysis Methods*  
IBM Research Almaden, November 7, 2011  
Tufts University, October 4, 2012  
Purdue University, April 15, 2013  
Georgia Institute of Technology, April 23, 2013  
Carnegie Mellon University, June 11, 2013  
Cornell University, February 26, 2014  
Columbia University, March 12, 2014  
Imperial College London, March 31, 2014  
University of Utah, April 14, 2014  
IBM Research Cambridge, September 25, 2014
- Visualization Techniques for Assessing Textual Topic Models*  
University of Washington, October 23, 2013

## Exhibitions

- Stanford Dissertation Browser*  
The Art of Networks Exhibition, Foosaner Art Museum, March 8, 2012

## Research Advising

- Ashley Jin (MS, Stanford University)  
James Marquardt (MS, University of Washington)  
Emily Gu (MS/BS, University of Washington)

## Patents

- Jason Chuang** and Holger Winnemöller. Estimating Sensor Sensitivity. Adobe Systems Incorporated. US Patent 8,452,116.
- Jason Chuang** and Holger Winnemöller. Semantic Image Classification and Search. Adobe Systems Incorporated. US Patent 8,391,618.
- Gary Bradski and **Jason Chuang**. Training and Using Classification Components on Multiple Processing Units. Intel Corporation. US Patent 7,783,114.

## Awards

- 2002 - 2003    Undergraduate Scholar Program Scholarship  
The University of British Columbia
- 2002            Chapman Distinguished Service Award  
The University of British Columbia
- 1999           Undergraduate Student Research Award  
Natural Sciences and Engineering Research Council (NSERC) of Canada
- 1997           Chem13 News Research Assistantship Award  
University of Waterloo

## **References**

### **Jeffrey Heer**

Associate Professor, Computer Science and Engineering  
University of Washington  
jheer@uw.edu

### **Christopher D. Manning**

Professor, Linguistics and Computer Science  
Stanford University  
manning@cs.stanford.edu

### **Martin Wattenberg**

Research Scientist  
Google Inc.  
wattenberg@google.com