

Jessica Hullman

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CURRENT APPOINTMENT

Ginni Rometty Associate Professor of Computer Science

Northwestern University, Evanston IL. 2020 - current.

Faculty Fellow, Institute for Policy Research

Northwestern University, Evanston IL. 2024 – current.

PRIOR APPOINTMENTS

Allen K. and Johnnie Cordell Breed Assistant Professor of Computer Science Assistant Professor of Journalism

Northwestern University, Evanston IL, 2018 – 2020.

Assistant Professor of Information Science Adjunct Assistant Professor of Computer Science & Engineering

University of Washington, Seattle, WA, 2015 – 2018.

Postdoctoral Fellow

University of California, Computer Science Division, Berkeley, CA, 2014.

Mentor Maneesh Agrawala.

EDUCATION

Ph.D. in Information Science. 2014.

Committee: E. Adar (Chair), T. Finholt, P. Resnick, P. Shah.
University of Michigan School of Information. Ann Arbor, MI

Master of Science in Information. Specialization in Information Analysis & Retrieval. 2008.

University of Michigan School of Information. Ann Arbor, MI

Bachelor of Arts. Comparative Studies in Religion. 2003.

Ohio State University, Columbus, OH. Honors with distinction (GPA: 3.73)

AWARDS & HONORS

Best Research Mentor, Northwestern Computer Science Department, 2023.

Best Paper award, IEEE VIS 2023. Top 6 accepted papers.

Honorable Mention for Best Paper award. ACM CHI 2023. Top 4% total submissions

Honorable Mention for Best Paper award, IEEE InfoVis 2021. Top 5 accepted papers.

Best Paper award, IEEE InfoVis 2020. Top 1 accepted paper.

Honorable Mention for Best Paper award, ACM CHI 2020. Top 4% total submissions

Microsoft Faculty Fellowship One of five computer scientists chosen in 2019.

Honorable Mention for Best Paper award. ACM CHI 2018. Top 4% total submissions.

Honorable Mention for Best Paper award IEEE InfoVis 2017. Top 3 accepted papers.

Best Paper award ACM CHI 2017. Top 1% total submissions.

Honorable Mention for Best Paper award ACM CHI 2017. Top 4% total submissions.

Gary M. Olson Outstanding Ph.D. Student Award 2013. School of Information at the University of Michigan. One chosen by faculty annually.

Honorable Mention for Best Paper award IEEE InfoVis 2011. Top 3 accepted papers

RESEARCH FUNDING

NSF CISE Medium Award (#2211939; co-PI: Matt Kay). 2022. Improving data visualization and analysis tools to support reasoning about analysis assumptions. (\$1.2m)

Adobe Software 2017, 2018, 2019, 2020, 2021, 2022. Unrestricted Research Donations. (~\$20k annual)

U.S. Navy (#N17A-T004 extension, with Stottler Henke and Associates). 2021. Visual Tools and Progressive Automation for Complex Knowledge Management and Decision Support. (\$125k)

U.S. Navy (#N17A-T004, with Stottler Henke and Associates). 2019. Visual Tools and Progressive Automation for Complex Knowledge Management and Decision Support. (\$300k)

NSF CISE Small Award (#1907941; co-PI: Jeff Heer, University of Washington). 2019. Representing and Learning Visualization Design Knowledge. (\$523k)

NSF CISE CAREER Award (#1930642). 2018. Enhancing Critical Reflection on Data by Integrating Users' Expectations in Visualization Interaction. (\$523k). REU Supplement (\$12k)

U.S. Navy (with Stottler Henke and Associates). 2017. Visualizing Complex Scientific Knowledge for Decision Making (\$70k)

NSF CRII Award 2016. Facilitating Consumption and Re-expression of Scientific Information in a Journalism Context. (\$174K)

Google Faculty Award (PI, co-PI Sean Munson, University of Washington). 2015. User-Centered Representations of Uncertainty in Everyday Predictive Systems (\$67K)

REFEREED CONFERENCE PROCEEDINGS & JOURNAL PAPERS*

Nanayakkara, P., Kim, H., Wu, Y., Sarvghad, A., Mahyar, N., Miklau, G., and **Hullman, J.** Measure-Observe-Remeasure: An Interactive Paradigm for Differentially-Private Exploratory Analysis. *IEEE Symposium on Privacy & Security* (Proceedings of S&P 2024).

Guo, Z., Wu, Y., Hartline, J., and **Hullman, J.** A Statistical Framework for Measuring AI Reliance. *ACM Conference on Fairness, Accountability, & Transparency* (Proceedings of FAccT 2024).

Zhang, D., Chatzimparmpas, A., Kamali, N., and **Hullman, J.** Evaluating the Utility of Conformal Prediction Sets for AI-Advised Image Labeling. *ACM Conference on Human Factors in Computing Systems* (Proceedings of CHI 2024). (26.3%, 1060/4028)

Kim, H., Kim, Y-S., and **Hullman, J.** Erie: A Declarative Grammar for Data Sonification. *ACM Conference on Human Factors in Computing Systems* (Proceedings of CHI 2024). (26.3%, 1060/4028)

Sarma, A., Hwang, K., Hullman, J., and Kay, M. Milliways: Taming Multiverses through Principled Evaluation of Data Analysis Paths. *ACM Conference on Human Factors in Computing Systems* (Proceedings of CHI 2024). (26.3%, 1060/4028)

Zhang, D., Hartline, J., and **Hullman, J.** Designing Shared Information Displays for Agents of Varying Strategic Sophistication. *ACM Conference on Computer-Supported Cooperative Work* (Proceedings of CSCW 2024).

Gelman, A., **Hullman, J.**, Kennedy, L. Causal Quartets: Different Ways to Attain the Same Average Treatment Effect. *American Statistician*, Sept. 2023.

Wu, Y., Guo, Z., Mamakos, M., Hartline, J., and **Hullman, J.** The Rational Agent Benchmark for Data Visualization. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of IEEE VIS 2023) (24.6%, 133/539)

Subramonyam, H., and **Hullman, J.** Are We Closing the Loop Yet? Gaps in the Generalizability of VIS4ML Research. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of IEEE VIS 2023) (24.6%, 133/539)

Kim, H., Rossi, R., Hoffswell, J., and **Hullman, J.** Dupo: A Mixed Initiative System for Responsive Visualization Authoring. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of IEEE VIS 2023) (24.6%, 133/539)

Kale, A., Guo, Z., Qiao, E., Heer, J., and **Hullman, J.** EVM: Incorporating Model Checking into Exploratory Visual Analysis. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of IEEE VIS 2023) (24.6%, 133/539)

Yang, F., Cai, M., Mortenson, C., Fakhari, H., Lokmanoglu, A., **Hullman, J.**, Franconeri, S., Diakopoulos, N., Nisbet, E., and Kay, M. Swaying the Public? Impacts of Election Forecast Visualizations on Emotion, Trust, and Intention in the 2022 U.S. Midterms. *IEEE VIS 2023*. (24.6%, 133/539) **Best Paper Award**.

Kale, A., Lee, S., Goan, T., Tipton, E., and **Hullman, J.** MetaExplorer: Facilitating Reasoning with Epistemic Uncertainty in Meta-analysis. *ACM Conference on Human Factors in Computing Systems (CHI '23)*. (28%, 880/3099)

Sarma, A., Kale, A., Moon, M., Taback, N., Chevalier, F., **Hullman, J.**, and Kay, M. multiverse: Multiplexing alternative data analyses in R notebooks. *ACM Conference on Human Factors in Computing Systems (CHI '23)*. (28%, 880/3099) **Honorable Mention Award**.

Nanayakkara, P. and **Hullman, J.** What's Driving Conflicts Around Differential Privacy for the US Census. *IEEE Security & Privacy*, 2022.

Hullman, J., Kapoor, S., Nanayakkara, P., Gelman, A., and Narayanan, A. The Worst of Both Worlds: A Comparative Analysis of Errors in Learning From Data in Psychology and Machine Learning. *AAAI/ACM Conference on Artificial Intelligence, Ethics, & Society (AIES '22)*. (34%, 79/235)

Liu, D., Nanayakkara, P., **Hullman, J.**, Sakha, S., Abuhamad, G., Blodgett, S. L., Diakopoulos, N., and Elliassi-Rad, T. Examining Responsibility and Deliberation in AI Impact Statements and Ethics Reviews. *AAAI/ACM Conference on Artificial Intelligence, Ethics, & Society (AIES '22)*. (34%, 79/235)

Kim, H., Rossi, R., Du, F., Koh, E., Guo, S., **Hullman, J.**, and Hoffswell, J. A Declarative Grammar for

Responsive Visualization. *ACM Conference on Human Factors in Computing Systems (CHI '22)*. (24.6%, 634/2579)

Nanayakkara, P., Bater, J., He, X., **Hullman, J.**, and Rogers, J. Visualizing Privacy-Utility Trade-Offs in Differentially Private Data Releases. *Proceedings of Privacy Enhancing Technologies Symposium (PoPETS '22)*.

Franconeri, S., Padilla, L., Shah, P., Zacks, J., and **Hullman, J.** The Science of Visual Data Communication: What Works. *Psychological Science in the Public Interest*. 2021.

Kerrigan, D., **Hullman, J.**, and Bertini, E. A Survey of Domain Knowledge Elicitation in Applied Machine Learning. 2021. *Multimodal Technologies and Interaction* (Special Issue: AI for and by the People).

Kale, A., Wu, Y., and **Hullman, J.** Causal Support: Modeling Causal Inferences with Visualizations. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2021) (25%, 114/442). **Honorable Mention Award.**

Kayongo, P., Sun, G., Hartline, J., and **Hullman, J.** Visualization Equilibrium. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2021) (25%, 114/442)

Kim, H., Rossi, R., Sarma, A., Moritz, D., and **Hullman, J.** An Automated Approach to Reasoning About Task-Oriented Insights in Responsive Visualization. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2021) (25%, 114/442)

Zhang, D., Adar, E., and **Hullman, J.** Visualizing Uncertainty in Probabilistic Graphs with Network Hypothetical Outcome Plots (NetHOPs). *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2021) (25%, 114/442)

Hullman, J. and Gelman, A. Challenges in Incorporating Exploratory Data Analysis into Statistical Workflow (Rejoinder). *Harvard Data Science Review*, Issue 3.3 (Summer 2021).

Hullman, J. and Gelman, A. Designing for interactive exploratory data analysis requires theories of graphical inference. *Harvard Data Science Review*, Issue 3.3 (Summer 2021).

Kim, H., Moritz, D., and **Hullman, J.** Design Patterns and Trade-offs in Responsive Visualization for Communication. *Computer Graphics & Applications* (Proceedings of EuroVis 2021). (26%, 45/173)

Nanayakkara, P., **Hullman, J.**, and Diakopoulos, N. Unpacking the Expressed Consequences of AI Research in Broader Impact Statements. *AAAI/ACM AIES 2021* (37.7%, 105/282).

Gelman, A., **Hullman, J.**, Wlezien, C., and Morris, G. E. Information, incentives, and goals in election forecasts. *Judgment and Decision Making* 2020.

Boukhelifa, N., Bezerianos, A., Chang, R., Collins, C., Drucker, S., Endert, A., **Hullman, J.**, North, C., & Sedlmair, M. (2020). Challenges in Evaluating Interactive Visual Machine Learning Systems. *IEEE Computer Graphics & Applications (CGA)*, 2020.

Kale, A., Kay, M., and **Hullman, J.** Visual Reasoning Strategies for Effect Size Judgments and Decisions. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2020). (25.7%, 54/209) **Best Paper Award.**

Kim, YS., Kayongo, P., Grunde-McLaughlin, M., and **Hullman, J.** Bayesian-Assisted Inference from Visualized Data. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2020). (25.7%, 54/209)

Hofman, J., Goldstein, D., **Hullman, J.** How Visualizing Inferential Uncertainty can Mislead Readers About Treatment Effects in Scientific Results. *ACM Conference on Human Factors in Computing Systems (CHI '20)*. (24.3%, 760/3,126) **Honorable Mention**

Hong, S., **Hullman, J.**, Bertini, E. Human Factors in Model Interpretability: Industry Practices, Challenges, and Needs. *ACM Conference on Computer-Supported Cooperative Work (CSCW '20)*.

Hullman, J. Why Authors Don't Visualize Uncertainty. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2019). (25.7%, 54/209)

Xiong, C., Shapiro, J., **Hullman, J.**, Franconeri, S. Illusion of Causality in Visualized Data. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2019). (25.7%, 54/209)

Kim, Y-S., Henry, N., Lee, B., Brehmer, M., Pahud, M., Hinkley, K. and **Hullman, J.** Inking Your Insights: Investigating Digital Externalization Behaviors During Data Analysis. *ACM Conference on Interactive Systems & Surfaces (ISS '19)*. (30.6%, 26/85)

Kim, Y-S., Walls, L., Krafft, P., and **Hullman, J.** A Bayesian Cognition Approach to Improve Data Visualization. *ACM Conference on Human Factors in Computing Systems (CHI '19)*. (23.8%, 705/2938)

Kim, Y-S., Dontcheva, M., Adar, E., and **Hullman, J.** Vocal Shortcuts for Creative Experts. *ACM Conference on Human Factors in Computing Systems (CHI '19)*. (23.8%, 705/2938)

Kale, A., Kay, M., and **Hullman, J.** Decision-Making Under Uncertainty in Research Synthesis: Designing for the Garden of Forking Paths. *ACM Conference on Human Factors in Computing Systems (CHI '19)*. (23.8%, 705/2938)

Phelan, C., **Hullman, J.**, Kay, M., and Resnick, P. Some Prior(s) Experience Necessary: Templates for Getting Started with Bayesian Analysis. *ACM Conference on Human Factors in Computing Systems (CHI '19)*. (23.8%, 705/2938)

Nguyen, F., Shrestha, S., Germuska, J., Kim, Y-S., and **Hullman, J.** Belief-Driven Data Journalism. *Computation+Journalism 2019*.

Hullman, J., Qiao, X., Correll, M., Kale, A., & Kay, M. In Pursuit of Error: A Survey of Uncertainty Visualization Evaluation. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2018). (25.7%, 47/183).

Kale, A., Nguyen, F., Kay, M., & **Hullman, J.** Hypothetical Outcome Plots Help Untrained Observers Judge Trends in Ambiguous Data. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2018). (25.7%, 47/183)

Hullman, J., & Bach P. Picturing Science: Design Patterns in Graphical Abstracts. *Proc. DIAGRAMS 2018*. (35%)

Hullman, J., Kim, Y-S., Nguyen, F., & Agrawala, M. Improving Comprehension of Measurements Using Concrete Re-expression Strategies. *ACM Conference on Human Factors in Computing Systems (CHI '18)*. (25.7%, 666/2590)

Fernandes, M., Walls, L., Munson, S., **Hullman, J.**, & Kay, M. Uncertainty Displays Using Quantile Dotplots or CDFs Improve Transit Decision-Making. **Honorable Mention**. *ACM Conference on Human Factors in Computing Systems (CHI '18)*. (25.7%, 666/2590)

Qu, Z. & **Hullman, J.** Keeping Multiple Views Consistent: Constraints, Validations & Exceptions. **Honorable Mention**. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2017). (23%, 39/170)

Hullman, J., Kay, M., Kim, Y-S., & Shrestha, S. Imagining Replications: Graphical Prediction & Discrete Visualizations Improve Recall & Estimation of Effect Uncertainty. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2017). (23%, 39/170)

Kim, YS., Reinecke, K., & **Hullman, J.** Data Through Others' Eyes: The Impact of Visualizing Others' Expectations on Visualization Interpretation. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2017). (23%, 39/170)

Hullman, J., Kosara, R., & Lam, H. Finding a Clear Path: Structuring Strategies for Visualization Sequences. *Computer Graphics & Applications* (Proceedings of EuroVis 2017). (27%, 46/170)

Kim, YS., Reinecke, K., & **Hullman, J.** Explaining the Gap: Visualizing One's Predictions Improves Recall and Comprehension of Data. **Best Paper**. *ACM Conference on Human Factors in Computing Systems (CHI '17)*. (25%, 600/2400)

Kim, Y., Wongsuphasawat, K., **Hullman, J.**, & Heer, J. Graphscape: A Model for Automated Reasoning about Visualization Similarity and Sequencing. **Honorable Mention**. *ACM Conference on Human Factors in Computing Systems (CHI '17)*. (25%, 600/2400)

Adar, E., Gearig, C., Balasubramanian, & **Hullman, J.** A. Persalog: Personalization of News Article Content. *ACM Conference on Human Factors in Computing Systems (CHI '17)*. (25%, 600/2400)

Kim, YS, **Hullman, J.**, Burgess, M., & Adar, E. SimpleScience: Lexical Simplification of Scientific Terminology. *Proc. EMNLP 2016*. (22%, 87/400)

Kim, YS, **Hullman, J.**, & Agrawala, M. Generating Personalized Spatial Analogies of Distances and Areas. *ACM Conference on Human Factors in Computing Systems (CHI '16)*. (23%, 538/2300)

Kay, M., Kola, T., **Hullman, J.**, & Munson, S. When(ish) is my Bus: User-centered Visualizations of Uncertainty in Everyday Mobile Predictive Systems. *ACM Conference on Human Factors in Computing Systems (CHI '16)*. (23%, 538/2300)

Hullman, J., Resnick, P., & Adar, E. Hypothetical Outcome Plots Outperform Error Bars and Violin Plots for Inferences About Reliability of Variable Ordering. *PLOS ONE 2015*.

Kim, YS, **Hullman, J.**, & Adar, E. DeScipher: A Text Simplification Tool for Science Journalism. *Computation+Journalism 2015*.

Gearig, C, Adar, E., & **Hullman, J.**, Designing for Personalized Article Content. *Computation+Journalism 2015*.

Hullman, J., Krupka, E., & Adar, E. Evaluating Approaches To Crowdsourced Visual Analytics. *Collective Intelligence 2015*.

Hullman, J., Diakopolous, N., Momeni Roochi, E., & Adar, E. Content, Context, & Critique: Commenting on a Data Visualization Blog. *ACM Conference on Computer-Supported Cooperative Work (CSCW '15)*. (28%, 575/2032).

Gao, T., **Hullman, J.**, Adar, E., Hecht, B., & Diakopoulos, N. NewsViews: An Automated Pipeline for Creating Custom Geovisualizations for News. *ACM Conference on Human Factors in Computing Systems (CHI '14)*. (22.8%, 464/2034)

Hullman, J., Drucker, S., Riche, N., Lee, B., Fisher, D., & Adar, E. A Deeper Understanding of Sequence in Narrative Visualization. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2013). (25%, 38/151).

Hullman, J., Diakopolous, N., & Adar, E. Contextifier: Automatic Generation of Annotated Stock Visualizations. *ACM Conference on Human Factors in Computing Systems (CHI '13)*. (20%, 392/1963).

Hullman, J., Adar, E., & Shah, P. Benefitting InfoVis with Visual Difficulties (Best Paper Honorable Mention). *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2011). (26%, 44/172).

Hullman, J. & Diakopolous, N. Visualization Rhetoric: Framing Effects in Narrative Visualization. *IEEE Transactions of Visualization & Computer Graphics* (Proceedings of InfoVis 2011). (26%, 44/172).

Hullman, J., Adar, E., & Shah, P. The Effect of Social Information on Visual Judgments. *ACM Conference on Human Factors in Computing Systems (CHI '11)*. (27%, 302/1346).

*I use a convention for authorship where student authors come first. Through 2016, I used a convention where I listed myself earlier when I was the primary faculty mentor. From 2017 to the present, I list myself last when I am the primary faculty mentor on a publication.

REFEREED WORKSHOP PROCEEDINGS

Guo, Z., Wu, Y., Hartline, J., and **Hullman, J.** A Statistical Framework for Measuring AI Reliance. Collaborative AI and Modeling of Humans Workshop at AAAI 2024.

Nanayakkara, P., Diakopoulos, N., and **Hullman, J.** Anticipatory ethics and the role of uncertainty. NeurIPS 2020 Navigating the Broader Impacts of AI Research Workshop.

Kale, A., & **Hullman, J.** Adaptation and Learning Priors in Visual Inference. VISxVISION Workshop at *IEEE VIS 2019*.

Kim, YS., Walls, L., Krafft, P., & **Hullman, J.** Modeling the Interpretation of Visualized Statistics as Bayesian Cognition. Behavioral Economics Workshop at *Economics and Computation (EC) 2019*.

Qiao, X., & **Hullman, J.** Translating Scientific Graphics for Public Audiences. VisGuides: 2nd Workshop on the Creation, Curation, Critique and Conditioning of Principles and Guidelines in Visualization Workshop at *IEEE InfoVis 2018*.

Hullman, J. Why Evaluating Uncertainty Visualization is Error Prone. Workshop on BEyond time and errors: novel evaluation methods for Information Visualization (BELIV 2016) at *IEEE InfoVis 2016*.

Qu, Z., & **Hullman, J.** Evaluating Visualization Sets: Trade-offs Between Local Effectiveness and Global Consistency. BEyond time and errors: novel evaluation methods for Information Visualization Workshop (BELIV 2016) at *IEEE InfoVis 2016*.

Kim, YS., **Hullman, J.** Expectation Visualization. Personal Visualization Workshop at *IEEE InfoVis 2015*.

Hullman, J. How Prior Knowledge Affects the Processing of Visualized Data. Many People Many Eyes Workshop at *ACM Conference on Human Factors in Computing Systems (CHI '13)*.

Hullman, J. Not all HITs are Created Equal: Controlling for Reasoning and Learning Processes in MTurk. Workshop on Crowdsourcing and Human Computation at *ACM Conference on Human Factors in Computing Systems (CHI '11)*.

Hullman, J., McQuaid, M., Chia, Y., Lin, T., & Zhang, Z. Chance-it: Motivating Collaborative Exploration using Spatial Layout on a Multitouch Surface. Workshop on Large Displays in Urban Life at *ACM Conference on Human Factors in Computing Systems (CHI '11)*.

Hullman, J. A Narratology-Informed Approach to Infovis Design and Evaluation. Position paper. Telling Stories with Data Workshop at *IEEE INFOVIS 2010*.

Hullman, J. Framing Artistic Visualization: Aesthetic Object as Evidence. Workshop on Understanding the Creative Act: Modeling to Engagement at *Creativity & Cognition 2009*.

THESES

Hullman, J., Understanding and Supporting Trade-offs in the Design of Communicative Visualizations. Dissertation. University of Michigan School of Information, 2014.

TECHNICAL REPORTS

Lease, M., **Hullman, J.**, Bigham, J.P., Bernstein, M.S., Kim, J., Lasecki, W.S., Bakhshi, S., Mitra, T., and Miller, R.C. Mechanical Turk is Not Anonymous. Social Science Research Network 2013. Rank (Aug. 2019): 8,366/882,206.

POPULAR PRESS ARTICLES

Nanayakkara, P., and **Hullman, J.** States Are Suing the Census Bureau Over Its Attempts to Make Data More Private. *Slate Future Tense*. Aug. 2021. <https://slate.com/technology/2021/08/census-bureau-differential-privacy-lawsuit.html>

Hullman, J. There's More Than Meets the Eye in 2020 Election Forecasts. *The Hill*. Sept. 2020. <https://thehill.com/opinion/campaign/515291-theres-more-than-meets-the-eye-in-2020-election-forecasts>

Pierson, E., Redmiles, E., Battle, L., & **Hullman, J.** If you want more women in your workforce, here's how to recruit. *Nature Careers*. Aug. 2020. <https://www.nature.com/articles/d41586-020-02489-w>

Gelman, A., & **Hullman, J.** Is Your Chart a Detective Story or a Police Report? *WIRED*. Aug. 2020. <https://www.wired.com/story/is-your-chart-a-detective-story-or-a-police-report/>

Schrager, A., & **Hullman, J.** We Need Better Risk Communication to Combat the Coronavirus. *National Review*. Aug. 2020. <https://www.nationalreview.com/2020/08/coronavirus-better-risk-communication-needed-combat-pandemic/>

Hullman, J. Leading with Unknowns in COVID 19 Model Results. *Scientific American Blog*. Apr. 2020. <https://blogs.scientificamerican.com/observations/leading-with-the-unknowns-in-covid-19-models/>

Hullman, J. Confronting Unknowns: How to Interpret Common Visualizations of Uncertainty. *Scientific American*. September 2019. <https://www.scientificamerican.com/article/how-to-get-better-at-embracing-unknowns/>

WORKSHOPS ORGANIZED

Bansal, G., Bucina, Z., Wu, T., Smith-Renner, A., Ashktorab, Z., Holstein, K., Zhang, W., and **Hullman, J.** Trust and Reliance in Evolving Human-AI Workflows (TREW). Workshop at *ACM CHI 2024*.

Bansal, G., Smith-Renner, A., Bucina, Z., Wu, T., Holstein, K., **Hullman, J.**, and Stumpf, S. Trust and Reliance in AI-Augmented Tasks (TRAIT). Workshop at *ACM CHI 2023*.

Bansal, G., Smith-Renner, A., Bucina, Z., Wu, T., Holstein, K., **Hullman, J.**, and Stumpf, S. Trust and Reliance in Human-AI Teams (TRAIT). Workshop at *ACM CHI 2022*.

Haehn, D., Franconeri, S., **Hullman, J.**, Kriegeskorte, N., and Pfister, H. Chart Question Answering Workshop at *CVPR 2021*.

Boukhelifa, N., Bezerianos, A., Bertini, E., Collins, C., Drucker, S., **Hullman, J.**, Sedlemeir, M. EVIVA ML: Evaluation of Interactive Visual Machine Learning. Workshop at *IEEE VIS 2019*.

Aitamurto, T., Annany, M., Anderson, C., Birnbaum, L., Diakopoulos, N., Hansen, M., **Hullman,**

J., Ritchie, N. HCI for Accurate, Impartial and Transparent Journalism: Challenges and Solutions. Workshop at *ACM Conference on Human Factors in Computing Systems (CHI '19)*.

Greis, M., **Hullman, J.**, Correll, M., Kay, M., and Schaer, O. Designing for Uncertainty: When Does Uncertainty Help? Workshop at *ACM Conference on Human Factors in Computing Systems (CHI '17)*.

Diakopolous, N., DiMicco, J., **Hullman, J.**, Karhalios, K., and Perer, A. Telling Stories with Data: The Next Chapter. Workshop at *IEEE InfoVis 2011*.

INVITED PLENARY PRESENTATIONS

“Graphical Tools for Hypothesizing about Effects.” (keynote). Visualizing Biological Data (VIZBI). Los Angeles. Mar. 2024.

“Toward robust communication of modeling results (*for prediction or explanation*)” (keynote) Conference on Non-traditional Data, Natural Language Processing, & Machine Learning. Organized by Sveriges Riksbank, U.S. Federal Reserve Board, and Bank of Italy. Stockholm. Oct. 2022.

“Theories of inference for visualization interactions.” (keynote) BioVIS Workshop, Co-located with ISMB, July. 2021.

“Interactive Analysis Needs Theories of Inference.” (keynote) Visualization in Data Science (VDS) Workshop, Co-located with IEEE VIS, Oct. 2020.

“Why Interactive Analysis Needs Theories of Inference.” (keynote) Human-in-the-loop Data Analysis Workshop, Co-located with SIGMOD, June 2020.

“Supporting Reasoning with Uncertainty with Data Visualization.” (keynote) Data Science and Visualization Symposium. University of Miami, December 2019.

“How to Visually Communicate Uncertain Data.” (keynote) Conference on Global Risk, Uncertainty, & Volatility. Zurich. Organized by U.S. Federal Reserve Board, Swiss National Bank, and Bank of Canada. November 2019.

“Storytelling with Visualization” (keynote). *Tapestry Conference*. Organized by Tableau Software. 2016.

INVITED PRESENTATIONS

“Data Visualization for Inference: Opportunities and Challenges.” Health Data Science Distinguished Speaker Series. Boston University. Mar. 2024.

“Strategic visualization of uncertainty.” Workshop on Advancing Risk Communication With Decision-Makers for Tropical Cyclones. National Academies of Science, Engineering, & Medicine (NASEM). Feb. 2024.

“Hypothesizing about effects in experiment design and interpretation.” Toyota Technological Institute at Chicago (TTIC). Jan. 2024.

“Evaluating Visualizations for Inference and Decision-Making.” Department of Statistics Colloquium, Columbia University. Sept. 2023.

“Toward Robust Data Visualization for Inference.” Distinguished Data Science Lecture, Cornell University, May 2023.

“Toward Robust Data Visualization for Inference.” Computer Science Seminar, University of Illinois, Urbana Champaign, May 2023.

“Using theories of decision-making under uncertainty to improve data visualization.” Behavioral Economics Seminar, Booth School of Business, University of Chicago. Feb. 2023.

“Navigating Privacy-Utility Trade-offs in Public Data.” Institute for Policy Research, Northwestern University. Jan. 2023.

“Using theories of decision-making under uncertainty to improve data visualization.” Simon’s Institute at the University of California Berkeley. Nov. 2022.

“Improving the robustness of data visualization for trustworthy inference.” University of California Berkeley iSchool Distinguished Lecture Series, Nov. 2022.

“Toward Robust Visualization for Inference.” University of Utah Scientific Computing & Imaging Institute (SCI) Seminar, Nov. 2022.

“Visualizing Privacy-Utility Trade-offs in Differentially Private Data Releases.” Microsoft Research Summit. Oct. 2022.

“The worst of both worlds: a comparative analysis of errors in learning from data in psychology and machine learning.” Princeton Workshop on Reproducibility in Machine Learning. July 2022.

“Better Visualizations for Model Checks.” International Society for Bayesian Analysis World Meeting, Montreal, CA, Jun. 2022.

“Visualizations as Model Checks.” Martin Zelen Memorial Symposium, Harvard University Department of Biostatistics, Mar. 2022.

“Strategic Communication of Uncertainty.” Meeting of the Presidential Council of Advisors on Science and Technology. Mar. 2022.

“Theories of Inference for Data Interactions.”

- Stanford HCI Seminar, Dec. 2021.
- University of California San Diego Data Science Seminar, Nov. 2021.
- Bayes Webinar, Hosted by Generable. Jun. 2021.
- Cornell Behavioral Economics and Decision Research Center (BEDR). Apr. 2021.
- CMU HCII Seminar, Carnegie Mellon University. Nov. 2020.
- DREAM Lab, University of Massachusetts Amherst. Dec. 2020.

“Supporting Reasoning with Uncertainty with Data Visualization.” New York City Data Viz Meetup. Jan. 2021.

“How to Communicate Uncertainty in Forecasts.”

- The Centers for Disease and Control (CDC). Oct. 2020.
- After Dark Online Series, San Francisco Exploratorium. Sept. 2020.

“Beyond Visualization: Improving Reasoning Under Uncertainty From Data.”

- Dept. of Risk and Insurance, University of Wisconsin Madison. June 2020.
- Marketing Dept., Leeds School of Business, University of Colorado Boulder. May 2020.

“Supporting Reasoning with Uncertainty with Data Visualization.” Washington Post. Washington D.C., December 2019.

“Seeing What We (Should) Think Through Visualization Interaction.” Chicago Data Vis Meetup, Chicago, IL June 2019.

“Improving Inference and Decision Making from Visualized Data.” Lawrence Dumas Domain Dinner, Northwestern University, Evanston, IL May 2019.

“Supporting Reasoning with Uncertainty with Data Visualization.”

- Biostats Seminar, Feinberg School of Medicine, Northwestern University, Chicago, IL Apr. 2019.

- Michigan Interactive and Social Computer Seminar (MISC), University of Michigan, Ann Arbor, MI Mar. 2019.

“Interactive Visualization for News Readers' Beliefs: Why and How.” (with Yea Seul Kim). NICAR 2019 Invited Session, Newport Beach, CA Mar. 2019.

“Seeing What We (Should) Think Through Visualization Interaction.” Medill Faculty Colloquium, Northwestern University, Evanston, IL Feb. 2019.

Supporting Reasoning About Uncertainty Through Data Visualization.

- Scientific Computing & Imaging Institute, University of Utah, Salt Lake City, UT. Jan. 2019.
- NORC at the University of Chicago, Chicago, IL. Dec. 2018.
- Neubauer Collegium, University of Chicago, Chicago, IL. Nov. 2018.

“Seeing What We (Should) Think Through Visualization Interaction.” MIT CSAIL HCI Seminar, Boston, MA. Oct. 2018.

“Interrogating Shared Representations in Mixed Initiative Systems.” (Invited discussant for Jeff Heer's presentation on Agency & Automation). *HCIC*, Watsonville CA. June 2018.

“Improving Data Reasoning Through Visualization and Automation.” Northwestern University Computer Science CS+X Seminar. 2018.

“Reconciling Single Vs. Multiple View Criteria in InfoVis.” (with Zening Qu). Tableau Software (Seattle WA). 2017.

“Seeing What We Think Through Visualization Interaction.” Northwestern University Technology & Social Behavior Series Distinguished Lecture. 2017.

“Visualization Tools for Improving Reasoning with Data.” Microsoft Research (New York City). 2016.

“The Visual Uncertainty Experience.” *OpenVis* 2016.

“Data-Driven Storytelling.” Dagstuhl seminar. 2016.

“Uncertainty Visualization.” NSF seminar on Hazard Mapping at University of Washington. 2015.

“Making Sense of Scales With a Database of Measurements.” Design Use Build (DUB) seminar at University of Washington. 2015.

“Tools for Understanding and Repurposing Visualized Data.” (With Maneesh Agrawala). Tableau Software (Seattle WA). Oct. 2014.

“Anticipating Context in Designing Visualizations for Communication.” Invited presentation at

- Adobe (San Francisco, CA) July 2014.
- Tableau Software (Seattle, WA) June 2014.

“Understanding and Supporting Design Trade-offs for Visualization-based Communication.” Invited presentation at:

- Dept. of Computer Science, Stanford University. May 2014.
- School of Interactive Computing, Georgia Tech. Mar. 2014.
- School of Information, University of Washington. Feb. 2014.
- Dept. of Cognitive Science, University of California, San Diego. Feb. 2014.
- Dept. of Computer Science, University of Minnesota. Feb. 2014.
- Dept. of Computer Science at the University of Colorado Boulder. Jan. 2014.

“Understanding and Automating Complex Visualization Design Processes.” Invited presentation at Visual Computing Lab, University of California Berkeley Computer Science. Sept. 2013.

“Social and Contextual Visualizations” (with Eytan Adar) Gale Cengage Learning (Farmington Hills, MI). April 2013.

“Letting the Data (and People) Speak: Visualization as Communication and Analysis.” Tableau Software (Seattle, WA). Nov. 2012.

“Visualization as Communication and Analysis.” Design Use Build (DUB) seminar at University of Washington. Oct. 2012.

“Implications of the Crowd in Collaborative Visual Analytics.” HCI Lab at Tufts University Dept. of Computer Science (Cambridge, MA). Aug. 2011.

“Presenting Social Information Online: Evidence of Effects on Visual Judgments.” IBM Collaborative User Experience Research Lab (CUE), IBM T.J. Watson Research Center, Cambridge, MA, June 2011.

“Visual Stories: Adapting Narratology for InfoVis.” F. I. R. S. T. (Featured Information Research Student Talks), University of Michigan School of Information, October 2010.

INVITED PANELS & INTERVIEWS

Panelist. *Communicating uncertainty and probabilistic information about TC tracks, timing and severity.* Workshop on Advancing Risk Communication With Decision-Makers for Tropical Cyclones. National Academies of Science, Engineering, & Medicine (NASEM). Moderator Ann Bostrom. Panelists Lace Padilla.

Panelist. *Manifestation of Gender and Intersectional Bias in Artificial Intelligence.* Northwestern Pritzker School of Law Conference on Gender and Intersectional Bias in Artificial Intelligence. Moderator Dan Linna. Panelists: Hammon, K., Rahman, H., Worsley, M.

Panelist. *ChatGPT and Generative Artificial Intelligence.* Northwestern Center for Advancing Safety of Machine Intelligence. Moderator: Kris Hammond. Panelists: David Leake, Ben Lorica.

Panelist. *Future Paths.* Princeton Workshop on Reproducibility in Machine Learning. Moderator Arvind Narayanan. Panelists: Hofman, J., Stewart, B.

Panelist. *CDC ERASE Maternal Mortality Workshop 2021.* Moderator Amanda Makulec. Panelists: Fowlers, A., Schwabish, J.

Panelist. *CDC Data Visualization Day 2021.* Moderator Amanda Makulec. Panelists: Burn-Murdoch, J., Meeks, E.

Panelist. “Communicating uncertainty.” *Computation+Journalism 2020.* Moderator Alberto Cairo. Panelists: Christiansen, J., D’Ignazio, C.

Interview. “Uncertainty Representations.” Data Skeptic podcast, Interpretability series. <https://dataskeptic.com/blog/episodes/2020/uncertainty-representations> 2020.

Panel organizer/chair. **Hullman, J.**, “The State-of-the-Art and Future of Uncertainty Visualization.” Panelists: Kay, M., Kirby, M., and Padilla, L. *Joint Statistical Meetings of the American Statistical Association (JSM) 2019.*

Panelist. “What Makes a Successful Data Visualization,” *Joint Statistical Meetings of the American Statistical Association (JSM) 2019.* Moderator/chair: Du Toit, N., Fingerson, L., Robbins, N. and Tyner, S.

Interview. “Visualizing Uncertainty with Jessica Hullman and Matthew Kay.” Data Stories Podcast. <http://datastori.es/134-visualizing-uncertainty-with-jessica-hullman-and-matthew-kay/> 2019.

Interview. "IEEE VIS 2018 Highlights with Jessica Hullman and Robert Kosara." Data Stories Podcast. <https://datastori.es/130-highlights-from-ieee-vis-2018/>, 2018.

Panelist. "Data Visualization in Psychology: Some Principles and Practices." *Conference of the Association of Psychological Science (APS) 2018*. Moderator Kevin Lanning. Panelists: Tverksy, B., Wickham, H.

Interview. "IEEE VIS 2017 Highlights with Jessica Hullman and Robert Kosara." Data Stories Podcast. <http://datastori.es/108-review-of-ieee-vis17-with-jessica-hullman-and-robert-kosara/>, 2017.

Interview. "IEEE VIS 2016 Highlights with Jessica Hullman and Robert Kosara." Data Stories Podcast. <http://datastori.es/86-highlights-from-ieee-vis16-with-jessica-hullman-and-robert-kosara/>, 2016.

Panelist. Invited panel on "How Can We Improve Empirical Research on Understanding Visual Information?" *IEEE InfoVis 2016*. Moderator Pierre Dragicevic. Panelists: Haroz, S., Kay, M., Rensink, R.

Panelist. Invited panel on "Critical Visualization." *IEEE InfoVis 2016*. Moderator Angus Forbes. Panelists: Offenhuber, D., Paris-Westbrook, J., Trowbridge, A.

Panelist. "The Art and Science of Data Visualization." University of Washington eScience. Panelists: Heer, J., Howe, B., 2015.

Interview. Narrative Visualization Research with Jessica Hullman. Data Stories Podcast. <http://datastori.es/ds40-narrative-vis-research-w-jessica-hullman/>, 2014

TEACHING

Northwestern University, Evanston, IL

Instructor and creator

- CS 497: Explanation and Reproducibility in Data-Driven Science, 2023-2024.
- CS 396/496: Interactive Information Visualization, 2019-current
- JOUR 474, Data Analysis & Communication for Journalists, 2018-2021

Instructor

- Introduction to Graduate Studies in Computer Science, 2021-current.

The University of Washington, Seattle, WA

Instructor and creator

- INFO 474, Interactive Information Visualization, 2015-2018.
- INFX 562, Interactive Information Visualization, 2015-2018

The University of California, Berkeley, CA

Co-instructor (with M. Agrawala)

- CS294-10 Visualization. 2014

The University of Michigan, Ann Arbor, MI

Graduate Student Instructor

- SI 649/749 Information Visualization. 2011
- SI 508/708 Networks: Theory and Application. 2011
- Russian 347. 2007
- Russian 348. 2007-2008
- English 367. 2006-2007

PH.D. STUDENT ADVISING & COMMITTEES

Chair. Dawei Xie. Ph.D. student, Northwestern University Computer Science.

Chair. Kelly Jiang. Ph.D. student, Northwestern University Computer Science.
Co-chair. Negar Kamali. Ph.D. student, Northwestern University Computer Science.
Chair. Ziyang Guo. Ph.D. student, Northwestern University Computer Science.
Co-chair. Abhraneel Sarma. Ph.D. student, Northwestern University Computer Science.
Co-chair. Paula Kayongo (2024). Ph.D. student, Northwestern University Computer Science.
Chair. Priyanka Nanayakkara (2024). Ph.D. student, Northwestern University Technology & Social Behavior.
Chair. Hyeok Kim. (2024) Ph.D student, Northwestern University Computer Science.
Chair. Dongping Zhang. (2024) Ph.D student, Northwestern University Technology & Social Behavior.
Chair. Alex Kale Kim (2022). Ph.D. student, University of Washington Information School.
Chair. Yea Seul Kim (2020). Ph.D. student, University of Washington Information School.
Committee member. Lukas Lazarek. Ph.D. student, Northwestern University Computer Science. Defended 2024.
Committee member. Ethan Manilow. Ph.D. student, Northwestern University Computer Science. Defended 2022.
Committee member. Younghoon Kim. Ph.D. student, University of Washington Computer Science & Engineering. Defended 2020.
Committee member. Daniel Epstein. Ph.D. student, University of Washington Computer Science & Engineering. Defended 2018.
Committee member. Ray Hong, Ph.D student, University of Washington Human-Centered Design & Engineering. Defended 2018.

PROFESSIONAL SERVICE

Scientific Advisor

Member of CSAC, Council of Scientific Advisors to the U.S. Census, Jun 2022 – Dec. 2022.

Associate Editor

IEEE Transactions on Visualization and Computer Graphics (TVCG), Nov 2021-current,

Conference Organization

ACM FAccT 2023, Program Chair

IEEE VIS 2022, Posters Chair

Computation+Journalism 2021 General Chair

IEEE VIS 2021, 2020 Organizing Committee: Tutorials Chair

IEEE VIS 2019 Organizing Committee: Community Chair

Computation+Journalism 2020 Program Chair

Program Committees

IEEE VIS 2021, 2020, CHI 2019; IEEE InfoVis 2019, 2018, 2016; EuroVis S.T.A.R. 2018, 2017; HILDA 2017, 2018; Computation+Journalism 2016, 2017, 2018; BELIV 2016; IEEE InfoVis 2016; ACM UIST 2015

INSTITUTIONAL SERVICE

Ginni Rometty Chair Committee, Northwestern University Computer Science. 2024.

Faculty Hiring Committee, Northwestern University Computer Science. 2023.

Technology & Social Behavior Ph.D. Admissions Committee, Northwestern University. 2021, 2019.

Strategic Planning Committee, Northwestern University Computer Science. 2019-2022.

Curriculum Committee, Northwestern University Journalism. 2018-2019.

Open Faculty Search Committee, University of Washington Information School. 2017-2018.

Data Science Lecturer search (Chair), University of Washington Information School. 2016-2017.
Admissions Committee. University of Washington Information School. 2016-2018.