

# KATHERINE A. KEITH

kak5@williams.edu ◊ <https://kakeith.github.io/>

## EDUCATION

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<b>University of Massachusetts Amherst</b>	2016–2021
Ph.D. in Computer Science, September 2021	<i>Amherst, MA</i>
M.S. in Computer Science, February 2020	
<b>Lewis &amp; Clark College</b>	2011–2015
B.A. in Mathematics with departmental honors, summa cum laude	<i>Portland, OR</i>
Minor: Chinese Language	

## ACADEMIC APPOINTMENTS

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<b>Assistant Professor</b>	July 2022–Present
Department of Computer Science	<i>Williamstown, MA</i>
Williams College	

## RESEARCH EXPERIENCE

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<b>Postdoctoral Young Investigator</b>	September 2021–June 2022
<i>Allen Institute for Artificial Intelligence</i>	<i>Seattle, WA</i>

- Research with the Semantic Scholar team

<b>Graduate Research Assistant</b>	September 2016–August, 2021
<i>University of Massachusetts, Amherst</i>	<i>Amherst, MA</i>

- Natural language processing, machine learning, and computational social science research
- Advisor: Dr. Brendan O'Connor

<b>Research Intern</b>	June–August 2020
<i>AI Discovery Team, Bloomberg</i>	<i>Remote (London, UK team)</i>

- Mentors: Dr. Edgar Meij, Dr. Christoph Teichmann

<b>Research Intern</b>	May–August 2018
<i>CTO Data Science Team, Bloomberg</i>	<i>New York, New York</i>

- Mentor: Dr. Amanda Stent

## GRANTS

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- *Massachusetts Life Sciences Center's* Workforce Development Captial Grant. With Stephen N. Freund, Noah J. Sandstrom, and Victor A. Cazares. Awarded July 2024. (\$744,446 + \$83,200 matching funds)
- Young Investigator Grant from the *Allen Institute for Artificial Intelligence*. Awarded November 2022. (\$100,000)
- *Social Science Research Council (SSRC)/Summer Institutes in Computational Social Science (SICSS)* Research Grant. With Ian Stewart. Awarded 2021. (\$1,200)
- *Kaggle* Open Data Research Grant. Awarded 2020. With Andy Halterman and Sheikh Sarwar. (\$5,000)

## AWARDS & HONORS

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- Bloomberg Data Science Ph.D. Fellowship (2019-2021)
- Outstanding Reviewer, EMNLP 2020
- Awarded *distinction* for Ph.D. candidacy portfolio submitted to the College of Information and Computer Sciences at University of Massachusetts Amherst (December 2019)
- Empirical Methods in Natural Language Processing (EMNLP) Student Travel Scholarship (2017)
- Paul Utgoff Memorial Graduate Scholarship in Machine Learning (2016)
- Rena J. Ratte Memorial Award, Lewis & Clark College (2015)– “*This is the highest academic award given at Lewis & Clark and is given annually to one undergraduate of senior standing whose abilities and commitment have combined to produce work which is consistently of the greatest distinction.*”
- NCAA Division III Cross-Country All-Academic (2012)

## JOURNAL PUBLICATIONS (PEER-REVIEWED)

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2. RCT Rejection Sampling for Causal Estimation Evaluation. **Katherine A. Keith**, Sergey Feldman, David Jurgens, Jonathan Bragg, and Rohit Bhattacharya. *Transactions on Machine Learning Research (TMLR)*. 2023.
1. Causal Inference in Natural Language Processing: Estimation, Prediction, Interpretation and Beyond. Amir Feder, **Katherine A. Keith**, Emaad Manzoor, Reid Pryzant, Dhanya Sridhar, Zach Wood-Doughty, Jacob Eisenstein, Justin Grimmer, Roi Reichart, Margaret E. Roberts, Brandon M. Stewart, Victor Veitch, Diyi Yang. *Transactions of the Association for Computational Linguistics (TACL)*. 2022.

## CONFERENCE PROCEEDINGS (PEER-REVIEWED)

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9. Causal Matching with Text Embeddings: A Case Study in Estimating the Causal Effects of Peer Review Policies. Raymond Z. Zhang, Neha Nayak Kennard, Daniel Scott Smith, Daniel A. McFarland, Andrew McCallum, and **Katherine A. Keith**. In *Findings of the Association for Computational Linguistics (ACL Findings)*. 2023.
8. Words as Gatekeepers: Measuring Discipline-specific Terms and Meanings in Scholarly Publications. Li Lucy, Jesse Dodge, David Bamman, and **Katherine A. Keith**. In *Findings of the Association for Computational Linguistics (ACL Findings)*. 2023.
7. Paying Attention to the Algorithm Behind the Curtain: Bringing Transparency to YouTube’s Demonetization Algorithms. Arun Dunna, **Katherine A. Keith**, Ethan Zuckerman, Narseo Vallina-Rodriguez, Brendan O’Connor, Rishab Nithyanand. In *ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW)*. 2022.
6. Corpus-Level Evaluation for Event QA: The IndiaPoliceEvents Corpus Covering the 2002 Gujarat Violence. Andrew Halterman\*, **Katherine A. Keith\***, Sheikh Muhammad Sarwar\*, and Brendan O’Connor (\* indicates joint first-authors). In *Findings of the Association for Computational Linguistics (ACL Findings)*. 2021.
5. Text and Causal Inference: A Review of Using Text to Remove Confounding from Causal Estimates. **Katherine A. Keith**, David Jensen, and Brendan O’Connor. In *Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL)*. 2020.
4. Modeling financial analysts’ decision making via the pragmatics and semantics of earnings calls. **Katherine A. Keith** and Amanda Stent. In *Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL)*. 2019.

3. Uncertainty-aware generative models for inferring document class prevalence. **Katherine A. Keith** and Brendan O'Connor. In *Proceedings of Empirical Methods in Natural Language Processing (EMNLP)*. 2018.
2. Monte Carlo Syntax Marginals for Exploring and Using Dependency Parses. **Katherine A. Keith**, Su Lin Blodgett, and Brendan O'Connor. In *Proceedings of North American Chapter of the Association for Computational Linguistics (NAACL)*. 2018.
1. Identifying civilians killed by police with distantly supervised entity-event extraction. **Katherine A. Keith**, Abram Handler, Michael Pinkham, Cara Magliozzi, Joshua McDuffie, and Brendan O'Connor. In *Proceedings of Empirical Methods in Natural Language Processing (EMNLP)*. 2017.

## WORKSHOP PUBLICATIONS (LIGHTLY PEER-REVIEWED)

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4. Democratizing Machine Learning for Interdisciplinary Scholars: Reflections on the NLP+CSS Tutorial Series. **Katherine A. Keith** and Ian Stewart. In *Proceedings of the 1st Workshop on Teaching for NLP*. 2023.
3. Literary Intertextual Semantic Change Detection: Application and Motivation for Evaluating Models on Small Corpora. Jackson Ehrenworth and **Katherine A. Keith**. In *Proceedings of the 4th Workshop on Computational Approaches to Historical Language Change at EMNLP*. 2023.
2. Text as Causal Mediators: Research Design for Causal Estimates of Differential Treatment of Social Groups via Language Aspects. **Katherine A. Keith**, Douglas Rice, and Brendan O'Connor. In *Proceedings of the First Workshop on Causal Inference and Natural Language Processing (CI+NLP) at EMNLP*. 2021.
1. Uncertainty over Uncertainty: Investigating the Assumptions, Annotations, and Text Measurements of Economic Policy Uncertainty. **Katherine A. Keith**, Christoph Teichmann, Brendan O'Connor, and Edgar Meij. In *Proceedings of the Fourth Workshop on Natural Language Processing and Computational Social Science (NLP+CSS) at EMNLP*. 2020.

## TEACHING EXPERIENCE

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### Instructor

- CSCI 136: Data Structures & Advanced Programming (Williams College, Spring 2024)  
*2 lecture sections, 4 lab sections, 59 students, 9 TAs*
- CSCI 104: Data Science and Computing For All (Williams College, Fall 2023; Co-instructor with Dr. Stephen Freund)  
*2 instructors splitting: 2 lecture sections, 4 lab sections, 61 students, 8 TAs*
- CSCI 375: Natural Language Processing (Williams College, Spring 2023)  
*2 lecture sections, 46 students, 2 TAs*
- CSCI 104: Understanding Data Through Computation (Williams College, Fall 2022; Co-instructor with Dr. Stephen Freund)  
*2 instructors splitting: 2 lecture sections, 4 lab sections, 48 students, 8 TAs*
- CS335: Machine Learning (Mount Holyoke College, Spring 2020)  
*1 lecture section, 19 students*
- CS191: Ethical Issues Surrounding Artificial Intelligence Systems and Big Data, First Year Seminar (University of Massachusetts Amherst, Fall 2019)

### **Graduate Teaching Assistant**

- CS685: Advanced Natural Language Processing (University of Massachusetts Amherst, Spring 2018)

### **Online Tutorial Instructor**

- *Aggregated Classification Pipelines: Propagating Probabilistic Assumptions from Start to Finish*. NLP+CSS 201 Online Tutorial Series. March 30, 2022.

### **Fulbright English Teaching Assistant**

*U.S. Department of State*

August 2015–June 2016

*Kinmen, Taiwan*

- Taught first through sixth grade ESL courses in a public elementary school.
- Facilitated multi-cultural dialogue and events.

## **STUDENT RESEARCH MENTORING**

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### **Student Research Mentees**

- Jacob Chen (Undergraduate Research, Summer 2023; Post-baccalaureate Research Assistant, Spring 2024)
- Justin Cheigh (Research Independent Study, Spring 2024)
- Angus Li (Undergraduate Research, Summer 2023; Research Assistant Fall 2023)
- Serah Park (Undergraduate Research, Summer 2023)
- Lucy Li (PhD intern at AI2, 2022) – *Winner of AI2's Outstanding Intern of the Year Award*
- Sirius Just (Undergraduate Honors Thesis, AY 2019-2020; REU, Summer 2019)
- Tamas Palfi (REU, Summer 2019)
- Hieu Phan (REU, Summer 2019)
- Aaron Mueller (REU, Summer 2017)

### **Undergraduate Honors Thesis Committee Member (Second Reader)**

- Max Ellis (AY 2023-2024)
- Elijah Tamarchenko (AY 2022-2023)

## **SPEAKING ENGAGEMENTS**

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### **Invited Talks**

- American Causal Inference Conference, “Statistical Innovations in Causal Inference with Text as Data: Emerging Trends and Future Directions” invited session. Talk entitled “Text as a High-Dimensional Causal Confounding Variable: An Empirical Framework for Evaluation” — May 16, 2024.
- Institute for Analytical Sociology (online). “Melding NLP and Causal Inference” — February 8, 2023.
- Discussant, New Directions in Analyzing Text as Data (TADA), 2023.
- University of Iowa, Computer Science Colloquium. “Melding NLP and Causal Inference” — September 8, 2023.
- Williams College Statistics Colloquium “Automated Event Extraction for News-Based Counterdata”—October 19, 2022.
- Williams College Computer Science Colloquium—November 15, 2019
- Rutgers University’s Natural Language Processing Group—November 6, 2019
- Lewis & Clark College’s Mathematical Sciences Colloquium—September 24, 2018

## Guest Lectures

- Stanford University, CS 293 / EDUC 473: Empowering Educators via Language Technology. “Causal Effect Estimation with Text Data”—October 25, 2023.
- University of Massachusetts Amherst, COMPSCI 692L: Seminar, Natural Language Processing, “RCT Rejection Sampling for Causal Estimation Evaluation”—May 2, 2023
- Georgia Institute of Technology, CS-6471: Computational Social Science, “Text and Causal Estimation: Text as Causal Confounders and Mediators”—March 28, 2022
- University of Massachusetts Amherst, Natural Language Processing—November 13, 2020
- Mount Holyoke College, Natural Language Processing—November 13, 2019
- Mount Holyoke College, Natural Language Processing—October 10, 2018
- University of Massachusetts Amherst, Advanced Natural Language Processing—April 26, 2018

## SERVICE & OUTREACH

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### Williams College Service

- Colloquium Organizer, Computer Science Department, AY 2023-2024
- Computer Science Women Organizer, Computer Science Department, AY 2023-2024
- Underrepresented Identities in Computer Science (UniCS) Faculty Mentor, Computer Science Department, AY 2022-2023

### Leadership Roles in the Research Community

- Co-organizer, *NLP+CSS* workshop at NAACL 2024. June 21, 2024.
- Area Chair, *Computational Social Science and Cultural Analytics Track*, EMNLP 2023.
- Organizing Committee/Program Committee. New Directions in Analyzing Text as Data (TADA), 2023.
- Co-organizer, *NLP+CSS* workshop at EMNLP. December 7, 2022.
- Co-organizer, *CS+NLP 201: Beyond the Basics* online tutorial series (Fall 2021)
- Co-organizer and Panel Moderator, *First Workshop on Causal Inference and Natural Language Processing* at EMNLP 2021. November 10, 2021.

### Reviewer / Referee

- *NeurIPS*: 2024
- *NSF Ad-Hoc Reviewer*: 2024
- *TACL*: 2023
- *ACL Rolling Review (ARR)*: Since 2022
- *TADA*: 2022, 2023
- *Journal of Data Science*: February, 2022
- *Science Advances*: October, 2021
- *Workshop of Teaching NLP*: 2021
- *ACL*: 2020, 2021, 2023
- *NAACL*: 2019, 2021
- *EACL*: 2021
- *CoNLL*: 2020
- *EMNLP*: 2020
- *ICWSM*: 2019, 2020

### Other Outreach Roles

- Panelist, Teaching at Teaching Intensive Institutions, University of Massachusetts Amherst (October 20, 2023)

- Panelist, University of Massachusetts CSWomen panel on “Applying to Research Internships and Jobs” (November 19, 2021)
- Panelist, NSF CSGrad4US Mentoring Program panel on “What I wish I knew when I started graduate school” (November 24, 2021)
- PhD Applicant Support Mentor for Underrepresented Students (November 2020) University of Massachusetts Amherst
- Panelist, CS Graduate School Q&A Panel (May 1, 2020) Cape Cod Community College
- Co-chair, CSWomen (February 2019–January 2020) University of Massachusetts Amherst Computer Science Women’s Group
- Social Co-Chair, CSWomen (January 2017–January 2019) University of Massachusetts Amherst Computer Science Women’s Group
- Student Volunteer, Women in Engineering and Computing Career Day (October 28, 2019) University of Massachusetts Amherst
- “What is computer science?” 7th Grade Guest Lecture (Jan. 3, 2018 and Jan. 7, 2019) Chief Joseph Middle School, Bozeman, Montana
- Organizer, CICS Graduate Male Ally Workshop Series (September 2017– May 2018) University of Massachusetts Amherst
- Student Volunteer, Girls Inc. Eureka! Summer Workshop (August 1 & 3, 2017) University of Massachusetts Amherst
- Student Volunteer, Women in Engineering and Computing Career Day (October 24, 2016) University of Massachusetts Amherst

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## PROFESSIONAL DEVELOPMENT

### Workshops on Academia: Research, Teaching, and/or Mentoring

- Faculty Success Program (12-weeks online; Fall 2023) by National Center for Faculty Development and Diversity (NCFDD).—*Intensive online program over the course of twelve weeks consisting of weekly group calls, weekly homeworks, and one-on-one coaching.*
- Participated in *Claiming Williams Day* “Creating an Inclusive Classroom” Workshop with Dr. Anika Daniels-Osaze. February 2, 2023.
- Participated in the Computing Research Association (CRA)’s Career Mentoring Workshop. Washington DC, February 24-25, 2022.
- Computing Research Association of Women (CRA-W) Graduate Cohort (2017, 2018)

### Roundtables

- Williams Roundtable Program: Research Discussion Group, Spring 2023. (\$500 stipend)

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## FOREIGN LANGUAGES

### Chinese (Mandarin)

HSK Level 4 (test passed April 16, 2016)

CET Beijing: 16-week language-intensive immersion program (Spring 2014)