

Katie Spoon

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Research Interests

Computational social science – big data, administrative records, surveys, networks, text analysis

Social inequalities – in education, careers, health, and their policy implications

Science of science – faculty retention, workforce development, institutional prestige

Diversity, equity and inclusion (DEI) – marginalized experiences in science, backlash to DEI, policy

Deep learning – AI for social good, computer vision, natural language processing

Education

Ph.D. in Computer Science, University of Colorado Boulder Advisors: Aaron Clauset & Dan Larremore	2020 – 2025 (Expected)
M.A. in Education Policy, University of Colorado Boulder Advisor: Kevin Welner Thesis: <i>Quantifying Inequitable Education Pathways to STEM Careers</i>	2022 – 2024
M.S. in Computer Science, Indiana University Bloomington Advisors: David Crandall & Katie Siek Thesis: <i>Detecting Dyslexia in Handwriting Using Neural Networks</i>	2018 – 2019
B.S. in Computer Science with highest honors, Minor: Math, Indiana University Bloomington	2015 – 2019

Selected Employment

Data Science Fellow via Coding it Forward; 80 fellows selected from 4,500+ applications U.S. Census Bureau, <i>Enhancing Health Data Group</i> (Remote)	June 2024 –
Research Engineer IBM Research, <i>Artificial Intelligence Hardware Group</i> (San Jose, CA)	June 2019 – Aug 2020

Honors & Awards

Achievement Reward for College Scientists , ARCS Foundation \$7,500 award of “unrestricted funding to create new knowledge & innovative technology”	2024 – 2025
Rising Star in Data Science , UC San Diego, UChicago, and Stanford “Celebrating and fast-tracking the careers of exceptional data scientists”	2024
NSF Graduate Research Fellowship \$37,000/year and tuition for three years of graduate school	2021 – 2024
National Center for Women in Technology Collegiate Award \$10,000 award “recognizing technical contributions to projects with high innovation & impact”	2019
Provost’s Award for Outstanding Undergraduate Research and Creative Activity , Indiana Univ. Mathematics & Natural Sciences winner, one of five categories total	2019
Graduate Teaching Assistant of the Year , Indiana Univ.	2019
Emerging Research Scholar , Center of Excellence for Women & Technology, Indiana Univ.	2015 – 2016

Publication & Presentation Awards

Annual Outstanding Research Paper , Univ. Colorado	2024
Bell Family Endowed Computer Science Award , “recognizing outstanding research”, Univ. Colorado	2024
Research Expo Winner , Univ. Colorado	2024
Publication Recognition Award , Univ. Colorado	2023
Best Poster Award , International Conference on Machine Learning	2019
Highlighted Proposal , Global Challenges Workshop, Computer Vision and Pattern Recognition	2019

Publications

* contributed equally † listed alphabetically ◦ mentee coauthor

In Preparation

1. Gendered devaluation underlies faculty retention [[Pre-print](#)] 2024
K. Spoon, ◦J. Mendy, ◦M. Martinez, M. Galesic, D. B. Larremore, A. Clauset, L. A. Rivera.
Under Review.
2. Backlash to diversity, equity and inclusion efforts among faculty 2024
K. Spoon, ◦J. Mendy, L. Ekpe, and L. A. Rivera. *Draft available upon request.*
3. The elite undergraduate backgrounds of U.S. professors 2024
***K. Spoon**, *E. Lee., A. Clauset, D. B. Larremore. *Draft available upon request.*

Peer-Reviewed Journal Articles

4. Book bans in political context: Evidence from U.S. public schools [[Paper](#)] 2024
† *M. S. O. Goncalves, *I. Langrock, *J. LaViolette, ***K. Spoon**. *PNAS Nexus*.
5. Gender and retention patterns among U.S. faculty [[Paper](#)] 2023
K. Spoon, N. LaBerge, K. H. Wapman, S. Zhang, A. C. Morgan, M. Galesic, B. K. Fosdick, D. B. Larremore, and A. Clauset. *Science Advances*.
Annual Outstanding Research Paper, 2024
Bell Family Endowed Computer Science Award, 2024
Publication Recognition Award, 2023
6. Towards software-equivalent accuracy on transformer-based deep neural networks with analog memory devices [[Paper](#)] 2021
K. Spoon, H. Tsai, A. Chen, M.J. Rasch, S. Ambrogio, C. Mackin, A. Fasoli, A. Friz, P. Narayanan, M. Stanisavljevic, and G.W. Burr. *Frontiers in Computational Neuroscience*.
7. Noise-resilient DNN: Tolerating noise in PCM-based AI accelerators via noise-aware training 2021
S. Kariyappa, H. Tsai, **K. Spoon**, S. Ambrogio, P. Narayanan, C. Mackin, A. Chen, M. Quereshi, and G.W. Burr. *IEEE Transactions on Electron Devices*.

Peer-Reviewed Conference Papers

8. Mushroom-type phase change memory with projection liner: An array-level demonstration of conductance drift and noise mitigation 2021
R. L. Bruce, et al. [including **K. Spoon**]. *IEEE International Reliability Physics Symposium (IRPS)*.
9. Fully on-chip MAC at 14nm enabled by accurate row-wise programming of PCM-based weights and parallel vector-transport in duration-format 2021
P. Narayanan, et al. [including **K. Spoon**]. *Symposium on VLSI Technology*.
10. Neuromorphic computing with phase change, device reliability, and variability challenges 2020
C. Mackin, et al. [including **K. Spoon**]. *IEEE International Reliability Physics Symposium (IRPS)*.
11. Reducing the impact of phase-change memory conductance drift on the Inference of large-scale hardware neural networks 2019
S. Ambrogio, M. Gallot, **K. Spoon**, H. Tsai, C. Mackin, M. Wesson, S. Kariyappa, P. Narayanan, C.C. Liu, A. Kumar, A. Chen, and G.W. Burr. *65th IEEE International Electron Devices Meeting (IEDM)*.
Ranked 2nd/98 papers

Peer-Reviewed Workshop Papers

12. Accelerating deep neural networks with analog memory devices 2020
K. Spoon, S. Ambrogio, P. Narayanan, H. Tsai, C. Mackin, A. Chen, A. Fasoli, A. Friz, and G.W. Burr. *International Memory Workshop*.
13. Can we (and should we) use AI to detect dyslexia in children's handwriting? [[Paper](#)] 2019
K. Spoon, D. Crandall, K. Siek, and M. Fillmore. *AI for Social Good Workshop, NeurIPS*.
14. Towards detecting dyslexia in children's handwriting using neural networks [[Paper](#)] 2019
K. Spoon, D. Crandall, and K. Siek. *AI for Social Good Workshop, International Conference*

on Machine Learning (ICML).

Book Chapters

15. Accelerating deep neural networks with analog memory devices 2022
K. Spoon, S. Ambrogio, P. Narayanan, H. Tsai, C. Mackin, A. Chen, A. Fasoli, A. Friz and G.W. Burr.
In *Machine Learning & Non-Volatile Memories*. Ed. C. Zambelli, Springer.

Essays and Perspectives

16. Gendered devaluation and retention among U.S. faculty [\[Issue\]](#) 2024
K. Spoon and A. Clauzet. *Committee on the Status of Women in the Economics Profession (CSWEP)*
News 2, 7–10.

Grants

- Quantifying the origins and impacts of book bans in U.S. schools, **\$1,500** 2022
PI, with Isabelle Langrock (co-PI), Jack LaViolette (co-PI) and Marcelo S.O. Goncalves (co-PI)
Russell Sage Foundation & Social Science Research Council

Travel Funding

- Conference Support Fellowship**, CU Boulder, \$2000 2024
Graduate Student Travel Grant, CU Boulder, \$450 2024
Graduate Student Travel Grant, CU Boulder, \$450 2023
Summer Institute in Computational Social Science, full travel funding 2022
CVPR Global Challenges Workshop, full travel funding 2019
ICML AI for Social Good Workshop, travel scholarship & registration fee waiver 2019
NCWIT annual conference, full travel funding 2019
Grace Hopper Celebration of Women in Computing, full travel funding 2016

Presentations

Gendered retention patterns in academia

- (Planned) Rising Stars in Data Science, *Talk* Nov 2024
(Planned) Association for the Study of Higher Education, *Talk* Nov 2024
University of Colorado Boulder Academic Leadership Conference, **Invited Talk** Aug 2024
Athena Fellowship for Girls in STEM Panel, **Invited Talk** Aug 2024
International Conference on the Science of Science & Innovation, *Talk* July 2024
Kilpatrick Group, University of Colorado Boulder Applied Mathematics, **Invited Talk** Apr 2024
Academic Analytics Research Center, **Invited Talk** Feb 2024
University of Colorado Boulder Computer Science Research Expo, Poster **Expo Winner.** Feb 2024
International Conference on Computational Social Science, *Poster* July 2023
University of Colorado Boulder Office of Faculty Affairs, **Invited Talk** Dec 2023
Atlanta Conference on Science & Innovation Policy, *Talk* May 2023
Women in Network Science & Diversify NetSci Satellite, *Talk* July 2022
International Conference on Computational Social Science, *Talk* July 2022
International Conference on the Science of Science & Innovation, *Talk* June 2022

Measuring community-level risk of declining healthcare access

- Coding it Forward Public Technology Showcase, *Talk* [12 fellows selected] Aug 2024

Quantifying inequitable education pathways to scientific and technical careers

- (Planned) Association for the Study of Higher Education, *Talk* Nov 2024

International Conference on the Science of Science & Innovation, *Talk* July 2024
American Educational Research Association Annual Meeting, *Poster* Apr 2024

Quantifying the origins and impacts of book bans in U.S. schools
International Conference on Computational Social Science, *Talk* July 2023

The elite undergraduate backgrounds of U.S. professors
International Conference on Computational Social Science, *Poster* July 2022
International Conference on the Science of Science & Innovation, *Poster* June 2022

Accelerating deep neural networks
International Memory Workshop, *Invited Talk* May 2020

Towards detecting dyslexia in children's handwriting using neural networks
American Handwriting Analysis Foundation, *Invited Talk* Nov 2019
AI for Social Good Workshop, NeurIPS, *Poster* Dec 2019
AI for Social Good Workshop, ICML, *Poster* **Best poster award. [Poster]** June 2019
AI for Social Good Workshop, ICML, *Talk* June 2019
Computer Vision for Global Challenges Workshop, CVPR, *Talk* June 2019

Teaching

Guest Lectures, Univ. Colorado Fall 2024
PHIL 2800: Ethical Puzzles and Moral Conflicts

Professional Development Teaching Assistant, IBM Research Fall 2019
IBM Research Upskilling Class on Deep Learning
Designed and gave mini-lectures; held office hours

Lead Graduate Assistant Instructor, Indiana Univ. Fall 2018; Spring 2019
CS C343: Introduction to Data Structures & Algorithms
Designed lab activities, homework assignments, test questions, in-class activities;
Led lab sections; held office hours, study sessions; evaluated projects, homework, tests;
Managed a staff of 12 teaching assistants

Undergraduate Teaching Assistant, Indiana Univ. Spring 2018
CS C343: Introduction to Data Structures & Algorithms
Led lab sections; held office hours, study sessions; evaluated projects, homework, tests

Undergraduate Teaching Assistant, Indiana Univ. Fall 2016; Spring 2017; Fall 2017
CS C241: Discrete Mathematics for Computer Science
Led lab sections; held office hours, study sessions; evaluated projects, homework, tests

Research Mentoring

Joanna Mendy 2022 – 2023
Univ. Colorado Sociology & Political Science undergraduate student (2022)
Univ. Colorado Information Science graduate student (2023)
Project: *Gendered devaluation underlies faculty retention*

Maria Martinez Summer 2022
Univ. Colorado School of Education graduate student
Project: *Gendered devaluation underlies faculty retention*

Swag Das Spring 2022
Univ. Colorado Computer Science undergraduate student
Project: *Beliefs about why women leave academia*

Jordan Roos Spring 2022

Univ. Colorado Biomedical Engineering undergraduate student
Project: *Academic fields with less women are more stressful*

Service

Graduate & Family Housing Resident Council Secretary & Treasurer	2024 –
CU Computer Science PhD Application Mentor	2020 –
You're @ CU Research Program Graduate Student Mentor	2022
McNair Scholars Graduate Student Mentor	2021 – 2022
CU Engineering Mentor for Underrepresented First-Year Undergraduates	2020 – 2022
Lead Ambassador, IU Luddy School of Informatics, Computing & Engineering	2016 – 2019
Software Development Intern, Serve IT Nonprofit Technology Clinic	2016 – 2017

Reviewer for: *Behaviour Research and Therapy, eLife, The Lancet Regional Health - Americas, Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, Research Policy, Social Policy & Administration*

Additional Employment

Research Assistant Indiana University Computer Vision Lab (Bloomington, IN)	Sep 2017 – June 2019
Research Intern IBM Research, <i>Artificial Intelligence Hardware Group</i> (San Jose, CA)	Summer 2018
Research Intern MIT Lincoln Laboratory, <i>Machine Learning Group</i> (Boston, MA)	Summer 2017
Research Assistant Indiana University Kelley School of Business (Bloomington, IN)	Aug 2016 – Sep 2017
Research Assistant NSF Research Experience for Undergraduates (Bloomington, IN)	Summer 2016

Professional Activities

Atlanta Academy on Science and Innovation Policy at Georgia Tech Selected participant. Funded by Georgia Tech School of Public Policy.	2024
Summer Institute in Computational Social Science at Duke University Selected participant. Funded by the Russell Sage Foundation.	2022
Grad Cohort for Women Workshop , Computing Research Association (CRA) Selected participant. (Remote)	2021