

Ian Stewart

Researcher in natural language processing.

2260 Hayward Street
Ann Arbor, MI 48109
✉ ianbstew@umich.edu
📄 ianbstewart.github.io

I apply natural language processing and statistical models to understand social behavior in online discussions. I am especially interested in detecting language variation, such as writing style differences, and explaining patterns in language use with social signals, such as audience expectations.

Education

- 2015–2020 **Georgia Institute of Technology**, *Ph.D. in Human-Centered Computing*.
Thesis: "The laws of LOL: computational approaches to sociolinguistic variation in online discussions"
Advised by Jacob Eisenstein and Diyi Yang.
- 2010–2014 **Dartmouth College**, *A.B. Linguistics (cum laude), minor in Computer Science*.
Thesis: "African American English syntax in Twitter."
Advised by James Stanford and Sravana Reddy.

Awards

- March 2017 **Honorable Mention**, NATIONAL SCIENCE FOUNDATION GRADUATE RESEARCH FELLOWSHIP.
Runner-up in annual Graduate Research Fellowship competition. Award includes increased access to supercomputing resources.
- August 2016 **Tuition Reimbursement Award**, PACIFIC NORTHWEST NATIONAL LABORATORY.
Awarded to PhD interns in the National Security Internship Program who demonstrated outstanding performance in their summer research project. Covers one semester of graduate school tuition.
- August 2015 **Great Promise Award**, CHARLES RIVER ANALYTICS.
Awarded to an intern in each company division who shows significant promise as a software engineer.
- May 2014 **Academic Achievement Award**, DARTMOUTH COLLEGE LINGUISTICS DEPARTMENT.
Awarded to a graduating student who has demonstrated considerable commitment to research in linguistics.

Skills

- Programming languages Java (proficient), Python (proficient), R (intermediate), \LaTeX (intermediate), Javascript/d3 (beginner)
- Programming libraries sklearn, statsmodels, pytorch, gensim, nltk, Beautiful Soup, matplotlib, pandas
- Natural languages English (native), French (fluent), Japanese (beginner), Spanish (beginner), Māori (beginner)

Research

- Sep 2020 – present **Visiting Research Investigator**, UNIVERSITY OF MICHIGAN.
○ Developing socially-aware natural language processing techniques.
○ Mentoring current students in independent computational social science research.
- Aug 2015 – Aug 2020 **Graduate Research Assistant**, GEORGIA INSTITUTE OF TECHNOLOGY.
○ Developed computational methods to describe and predict language variation in online discussions.
○ Applied linguistic analysis to understand social dynamics in real-life scenarios, e.g. breaking news events.
○ Adapted statistical models such as causal inference and survival analysis to test theories of sociolinguistic variation.

- Dec 2013 – **Undergraduate Research Assistant**, DARTMOUTH COLLEGE LINGUISTICS DEPARTMENT.
- June 2014
- Designed regular expressions to extract non-standard sentence patterns (syntax) characteristic of African American English (AAE) in Twitter data.
 - Determined correlation between AAE and community-level demographics: e.g. lower percentage AAE in communities with higher median age.
 - Provided sociolinguistic evidence for diversity among AAE speakers.

Work

- May 2018 – **PhD Fellow**, Max Planck Institute for Demographic Research.
- Aug 2018
- Leveraged Facebook advertising API to assess immigrant behavior in the US.
 - Collected, organized and analyzed large-scale data with statistical models to test hypotheses on immigrant assimilation.
 - Engaged with interdisciplinary research team to set up survey for follow-up analysis.
- May 2016 – **PhD Intern**, Pacific Northwest National Laboratory.
- Aug 2016
- PhD intern through the National Security Internship Program.
 - Formulated and tested methods to predict word dynamics over time in social media data.
 - Implemented unsupervised clustering and smoothing to group semantically related words.
 - Corroborated connection between distributional semantic meaning (measured with word vectors) and frequency dynamics.
- June 2014 – **Software Engineer Intern**, Charles River Analytics.
- Aug 2015
- Contributed to agent-based social network generation model (in AnyLogic and Java MASON), in collaboration with two scientists.
 - Designed pipeline for social network synthesis and analysis, implementing metrics such as the network clustering coefficient and community modularity.
 - Extracted parameters from large-scale social media data for network generation model, such as distribution of languages across Twitter users.

Teaching assistantships

- Jan - May 2020: Natural language processing (CS 7650)
- Sep - Dec 2015: Introduction to artificial intelligence (CS 6601)

Graduate Coursework

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| - Social Computing | - Natural Language Understanding |
| - Design of Online Communities | - Nonparametric Statistics |
| - Information Visualization | - Time Series Analysis |

Publications

- 2020 I. Stewart, D. Yang, J. Eisenstein. Characterizing Collective Attention via Descriptor Context: A Case Study of Public Discussions of Crisis Events. ICWSM. Atlanta, GA.
- 2019 I. Stewart, R. Flores, T. Riffe, I. Weber, E. Zagheni. Rock, rap, or reggaeton? Assessing Mexican immigrants' cultural assimilation using Facebook data. WebConf. San Francisco, CA.
- 2018 I. Stewart, J. Eisenstein. Making "fetch" happen: the influence of social and linguistic context on nonstandard word growth and decline. EMNLP. Brussels, Belgium.
- 2018 I. Stewart, Y. Pinter, J. Eisenstein. Si o no, que penses? Catalanian independence and linguistic identity on social media. NAACL. New Orleans, LA.
- 2017 I. Stewart, S. Chancellor, M. De Choudhury, J. Eisenstein. #anorexia, #anarexia, #anarexyia: Characterizing Online Community Practices with Orthographic Variation. IEEE Big Data, SocialNLP Workshop. Boston, MA.
- 2017 F. Hohman, S. Soni, I. Stewart, J. Stasko. A Viz of Ice and Fire: Exploring Entertainment Video Using Color and Dialogue. Workshop on Visualization for the Digital Humanities. Phoenix, AZ.

- 2017 I. Stewart, D. Arendt, E. Bell, S. Volkova. Measuring, Predicting and Visualizing Short-Term Change in Word Representation and Usage in VKontakte Social Network. ICWSM. Montreal, Canada.
- 2015 E. Stickgold, B. Skarin, I. Stewart, C. Lofdahl. Extending generative models of large scale networks. 24th Conference on Behavior Representation in Modeling and Simulation (BRiMS). Washington, D.C.
- 2014 I. Stewart. Now we stronger than ever: African American syntax on Twitter. EACL. Gothenburg, Sweden.

Non-archival presentations

- 2019 I. Stewart. What natural language processing should do for LGBTQ people. Queer in AI Workshop at NeurIPS. Vancouver, Canada.
- 2017 I. Stewart, J. Eisenstein. Social and Distributional Predictors of the Success of Lexical Innovations in Online Writing. New Ways of Analyzing Variation (NWAV). Madison, WI.
- 2017 I. Stewart, J. Eisenstein. #thighgap to #thyghgapp: Incrementation of Orthographic Variation on Instagram. Diversity and Variation in Language Conference (DiVar1). Atlanta, GA.
- 2015 I. Stewart. We some young kings: Communities, age, and African American English online. 2015 Annual Meeting of the American Dialect Society. Portland, Oregon.

Invited talks

- 2020 "Through the language glass: What NLP can reveal about sociolinguistic variation." NLP@GT talk.
- 2019 "Language change tutorial." Updated materials and presented tutorial at IC2S2 in Amsterdam.
- 2019 "Why do you talk like that? Minority languages and politics." Guest lecture for "Applications of Linguistics" course at Georgia Tech.
- 2018 "Language and computers...and society!" Guest lecture for "Language and Computers" course at Georgia Tech.
- 2018 "Is it social or linguistic? Examining internal factors in language change." Workshop on New Methods in Computational Sociolinguistics. Leiden, Netherlands.

Reviewing

- 2020 ICWSM, ACL, EMNLP, W-NUT.
- 2019 ICWSM, NAACL (outstanding reviewer), ACL, Language Change workshop, W-NUT.
- 2018 ICWSM, NAACL, EMNLP, Workshop on Noisy User-generated Text (W-NUT).
- 2017 ICWSM, EMNLP, CoNLL.
- 2016 EMNLP.

Service

- 2019 Co-leader for Human-Centered Computing seminar (weekly discussion for PhD students).
- 2018-2019 Co-Chair of Graduate Student Council Travel Fund Committee.
- 2018 Reviewer for President's Undergraduate Research Awards (PURA) applicants.

Interests

- Music making
- Cookie baking
- Language learning
- Letter kerning