

Adam N. Goodkind

CONTACT INFORMATION

Northwestern University
Department of Communication Studies
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RESEARCH STATEMENT

I study social interactions through the lens of keystroke timing, using HCI theories in combination with linguistic analysis. My thesis is titled *Using keystrokes to predict social dynamics in online dialogue*. It identifies how we can use timing differences in keystrokes to recover many of the same social cues we usually detect in signals such as tone-of-voice or pauses, but are lost in text-based digital communication. The thesis brings together HCI, Cognitive Science, NLP and statistical modeling. I have a passion for applying findings from HCI to creating more useful tools for users, alongside creating engaging visualizations to improve understanding.

EDUCATION

PhD, Northwestern University

Media, Technology & Society Program

2019–Present

PI: Darren Gergle (CollabLab)

Dissertation: [Using keystrokes to predict social dynamics in online dialogue](#)

Linguistics Department

2016–2019

PI: Clinton Bicknell (Language & Computation Lab)

Honors:

Data Science Fellowship

Cognitive Science Specialist

M.A., CUNY Graduate Center

2016

Computational Linguistics

M.A. Thesis: [Utilizing Linguistic Context To Improve Identification in Typed Text](#)

Thesis Advisors: Prof. Andrew Rosenberg and Prof. Martin Chodorow

B.A., Columbia University

2007

Religion (Study of Science & Religion)

RESEARCH EXPERIENCE

Research Assistant, CollabLab, Evanston, IL, USA

2019–Present

PI: Darren Gergle

- Running a crowdsourced experiment for my dissertation utilizing keystroke-level analysis to understand and predict both social and cognitive differences in keystroke timing and linguistic choices.
- Creating machine learning models, including neural networks, to predict social dynamics based on keystroke timing.
- Supervise a Research Assistant tasked with creating a JavaScript interface and setting up a database for experiments.

Research Assistant, LangComp Lab, Evanston, IL, USA

2017–2019

PI: Clinton Bicknell

- Researched how linguistic predictability, measured with neural language models, affects sentence processing via eye-tracking.
- Investigated autism diagnoses using linguistic markers, using semantic similarity (word vectors) and pragmatic deficiencies.

Research Assistant, CUNY Speech Lab, New York, NY, USA

2012–2016

PI: Andrew Rosenberg

- Managed DARPA-funded initiative to improve security and personal authentication in computer use, by predicting keystroke and language patterns with machine learning algorithms.

Research Assistant, Columbia NLP Group, New York, NY, USA

2006–2007

PI: Rebecca Passonneau

NON-ACADEMIC
EMPLOYMENT

- PhD Data Science Intern**, Vail Systems, Chicago, IL, USA **Summer 2020**
- Created experiments to empirically evaluate the quality of text-to-speech (TTS) systems
- Software Developer in Test Intern**, Microsoft, Redmond, WA, USA **Summer 2013**
- Developed website (back- and front-end) to diagnose licensing issues with Microsoft products
 - Developed decision-making pipeline to aid in issue diagnosis
- Operations Analyst**, Goldman Sachs, Multiple Locations, USA **2008–2011**
- Team Leader for Technology Enhancements
 - Created software to streamline daily asset delivery workflow, from 3 hours to 25 minutes

LANGUAGES

Computer: Java, Python, R (ggplot2, plotly, lme4), C++, L^AT_EX, Decent with {HTML, JavaScript, React, CSS}

Human: American Sign Language (ASL), Hebrew, Latin

HONORS AND
AWARDS

- Dissertation Research Support**, Northwestern Dept. of Communication Studies **2022**
- Incubation Prize**, Hack4Rare Hackathon (Recursion Pharmaceuticals & CTF) **2021**
- Best Paper Award**, Cognitive Modeling & Computational Linguistics (CMCL) **2018**
- Developmental Sciences Cluster Fellowship - Finalist**, Northwestern University **2018**
- Data Science Fellowship**, Northwestern University **2016–2017**
- USS Donald and Mary Ellen Passantino Scholarship**, CUNY Graduate Center **2015**
- Google Lime Connect Scholarship-Finalist** **2014**
- Thomas W. Smith Academic Fellowship**, CUNY Graduate Center **2013–2014**
- National Science Foundation, Undergraduate Research Grant**, Columbia University **2007**
- Albert A. List Academic Fellowship** **2003–2007**
- King's Crown Award for Outstanding Leadership**, Columbia University **2006**

SELECT
PUBLICATIONS

- 2021 **Goodkind, A.** TypeShift: A User Interface for Visualizing the Typing Production Process. [\[arXiv paper\]](#)
- Goodkind, A.**, Bicknell, K. Local word statistics affect reading times independently of surprisal. [\[arXiv paper\]](#)
- 2020 **Goodkind, A.** An analytic model for human subjective judgements of computer-generated synthetic voice (TTS) quality. Technical Report for Vail Systems. Chicago, IL.
- 2018 **Goodkind, A.**, Lee, M., Martin, G. E., Losh, M., & Bicknell, K. Detecting language impairments in autism: A computational analysis of semi-structured conversations with vector semantics. In *Proceedings of the Inaugural Meeting of the Society for Computation in Linguistics*. Salt Lake City, UT: Linguistic Society of America. [\[paper\]](#) [\[slides\]](#)
- Goodkind, A.** & Bicknell, K. Predictive power of word surprisal for reading times is a linear function of language model quality. In *Proceedings of the 8th Workshop on Cognitive Modeling and Computational Linguistics (CMCL 2018)*. Salt Lake City, UT: Linguistic Society of America. [\[paper\]](#) [\[slides\]](#)
- 2016 **Goodkind, A.**, Brizan D.G. & Rosenberg, A. *Utilizing Overt and Latent Linguistic Structure to Improve Keystroke-Based Authentication*. [Image and Vision Computing: Best of Biometrics Special Issue](#).
- 2015 **Goodkind, A.**, Brizan D.G. & Rosenberg, A. *Improvements to Keystroke-Based Authentication By Adding Linguistic Context*. [7th IEEE Conference on Biometrics: Theory, Applications and Systems \(BTAS 2015\)](#). [\(Slides\)](#)
- Goodkind, A.** & Rosenberg, A. *Muddying The Multiword Expression Waters: How Cognitive Demand Affects Multiword Expression Production*. [11th Workshop on Multiword Expressions at NAACL-HLT 2015](#). [\(Slides\)](#)
- Brizan, D. G.*, **Goodkind, A.***, Koch, P., Balagani, K., Phoha, V. V., & Rosenberg, A. *Utilizing Linguistically-Enhanced Keystroke Dynamics to Predict Typist Cognition and Demographics*. [International Journal of Human-Computer Studies, October 2015, vol. 84, 57-68](#).

- 2014 Locklear, H., Govindarajan, S., Sitova, Z., **Goodkind, A.**, Brizan, D., Rosenberg, A., Phoha, V., Gasti, P., & Balagani, K. *Continuous Authentication with Cognition-centric Text Production and Revision Features*. *Biometrics (IJCB), 2014 IEEE International Joint Conference*.
- 2013 Serwadda, A., Balagani, K., Wang, Z., Koch, P., Govindarajan, S., Pokala, R., **Goodkind, A.**, Brizan, D.G., Rosenberg, A., & Phoha, V. *Scan-based Evaluation of Continuous Keystroke Authentication Systems*. *IT Professional*, 15(4), 20-23.
- 2008 **Goodkind, A.** *Tracking the Emergence of Narrative Competence in Story Retelling*. *Quebec Student Journal of Linguistics*, Vol. 3.
- 2007 Passonneau, R. J., **Goodkind, A.**, & Levy, E. T. *Annotation of Children's Oral Narrations: Modeling Emergent Narrative Skills for Computational Applications*. *Florida Artificial Intelligence Research Society (FLAIRS)*, 253-258.
- 2006 Passonneau, R., McKeown, K., Sigelman, S., & **Goodkind, A.** *Applying the Pyramid Method in the 2006 Document Understanding Conference*. *Proceedings of the 2006 Workshop of the Document Understanding Conference (DUC)*.

PRESENTATIONS

- 2018 Lee, M.A., Martin, G.E., **Goodkind, A.**, Bicknell, K., Maltman, N., Bush, L., Losh, M. *A Multi-Method Approach to Characterizing Pragmatic Language Development in Individuals with FXS*. Paper presented at the International Fragile X Conference, Cincinnati, OH, July, 2018
- Goodkind, A.** *Complex Data Visualization: Visualizing language production dynamics via keystroke analysis*. Presentation at Inaugural Data Science Research Day, Northwestern University Institute on Complex Systems, 25 June 2018. ([Slides](#))
- Goodkind, A.** *Demo of TypeShift software system for tracking keystroke dynamics* at Individual Differences Workshop, Northwestern University, 30 May 2018. ([Code](#))
- Lee, M.A., Martin, G.E., **Goodkind, A.**, Bicknell, K., Maltman, N., Bush, L., Losh, M. *A longitudinal, multi-method analysis of pragmatic language in ASD and related developmental disabilities*. Poster presented at the International Society for Autism Research, May, 2018, Rotterdam, Netherlands
- Goodkind, A.** & Bicknell, K.. *Low-level language statistics affect reading times independently of surprisal*. Poster presentation at the 31st annual CUNY Conference on Human Sentence Processing, UC Davis, Davis, California, 15–17 March 2018.
- 2015 Goldman, N. & **Goodkind, A.** *Worth 1,000 Words: The Linguistics of Emoji and Emoji of Linguistics*. SQUID X: 10th Annual Conference Showcasing Quirky and Original Ideas in Development. New York, NY April 24, 2015. ([Slides](#))
- 2014 **Goodkind, A.** *Detecting Multi-word Expressions Through Typing Patterns*. *15th Texas Linguistics Society Conference, Austin, TX, October 24-26, 2014* ([Slides](#))
- Goodkind, A.** *Detecting Multi-word Expressions in Computer Keyboard Produced Text*. *CUNY Research Day*, New York, NY

TEACHING
EXPERIENCE**Teaching Assistant***Northwestern University*

- Communication Studies 246: Intro to Health Communication (Prof. Kimberly Pusateri), 2021
- Communication Studies 351: Technology & Human Interaction (Prof. Darren Gergle), 2021
- Linguistics 220: Language & Society (Prof. Annette D'Onofrio), 2018
 - Guest lecture on quantitative data analysis
- Cognitive Science 210: Language & the Brain (Profs. Matt Goldrick & Mark Beeman), 2019
- Linguistics 221: Language & Prejudice (Prof. Erin Leddon), 2019