

Langdon Holmes

PHD STUDENT - COGNITIVE SCIENCE

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Education

Vanderbilt University PHD IN COGNITIVE SCIENCE, MINOR IN QUANTITATIVE METHODS	EXPECTED 2027 Nashville, TN
California State University, Long Beach MASTER OF ARTS IN LINGUISTICS Comprehensive paper: "Automatic Extraction of Collocations from Language Learner Writing"	2021 Long Beach, CA
University of California, Los Angeles BACHELOR OF ARTS IN COMPARATIVE LITERATURE Two semesters at Universidad Nacional Autónoma de México	2016 Los Angeles, CA
Orange Coast College TRANSFERRED WITH HONORS One semester at Cambridge University	2014 Costa Mesa, CA

Languages and Technologies

Languages	Python, TypeScript, R, SQL, Spanish (proficient)
ML / NLP	PyTorch, Hugging Face transformers, spaCy, scikit-learn, Weights & Biases
LLM Systems	vLLM inference, retrieval-augmented generation (pgvector), structured outputs (Pydantic), comparative-judgement and LLM-as-judge evaluation
Statistics	PyMC (hierarchical Bayesian modeling), lme4, lavaan (SEM, factor analysis), networktools, tidyverse, pandas, NumPy
Backend / Web	FastAPI, Next.js, React, Postgres, Drizzle, Supabase, pytest
Infrastructure	Kubernetes, Helm, Docker, Terraform, GitHub Actions, AWS (ECS, S3), Google Cloud, Modal, Vercel

Grants and Awards

\$50,000	I-Corps (Technical Lead), NSF	2026
\$30,000	Automated Math Scoring Challenge (Grand Prize), NAEP	2023
\$30,000	Creation of PII dataset for Kaggle Competition (PI), The Learning Agency	2022
\$6,000	Student Summer Research Award, Calstate Long Beach Office of Research	2020

Peer-reviewed Publications

JOURNAL ARTICLES

Holmes, L., Crossley, S. A., Morris, W., & Choi, J. S. (2026). Word Predictability as a Measure of Second Language Proficiency. *Language Learning*.

Crossley, S. A., Holmes, L., & Morris, W. (2026). Assessing the reliability and validity of large language models in automatic essay scoring. *Assessing Writing*, 69, 101082.

Holmes, L., Morris, W., Crossley, S. A., & Choi, J. S. (2026). Assessing Fairness in Finetuned Scoring Models with Demographically Restricted Training Data. *Assessing Writing*, 68, 101032.

Morris, W., Crossley, S. A., Holmes, L., & Choi, J. S. (2025). Distinguishing Effective Writing Styles in the PERSUADE Corpus. *Journal of Writing Research*, 17(2), 209–245.

Morris, W., Crossley, S. A., Holmes, L., Ou, C., Dascalu, M., & McNamara, D. (2025). Formative Feedback on Student-Authored Summaries in Intelligent Textbooks Using Large Language Models. *International*

- Morris, W., Holmes, L., Choi, J. S., & Crossley, S. A. (2025). Automated Scoring of Constructed Response Items in Math Assessment Using Large Language Models. *International Journal of Artificial Intelligence in Education*, 35(2), 559–586.
- Holmes, L., Crossley, S. A., Sikka, H., & Morris, W. (2023). PILO: An open-source system for personally identifiable information labeling and obfuscation. *Information and Learning Sciences*, 124(9/10), 266–284.
- Crossley, S. A., & Holmes, L. (2023). Assessing receptive vocabulary using state-of-the-art natural language processing techniques. *Journal of Second Language Studies*, 6(1), 1–28.

CONFERENCE PROCEEDINGS

- Holmes, L., Morris, W., Min, A., & Crossley, S. A. (in press). Source-Text-Conditioned Cloze Generation for Discourse Comprehension Assessment in Intelligent Textbooks. In *Proceedings of the Artificial Intelligence in Measurement and Education Conference*. AIME-Con, Pittsburgh, Pennsylvania.
- Holmes, L., Morris, W., Crossley, S. A., & Choi, J. S. (in press). Assessing the Reliability and Construct Representation of LLM-based Language Proficiency Scores. In *Proceedings of the Artificial Intelligence in Measurement and Education Conference*. AIME-Con, Pittsburgh, Pennsylvania.
- Morris, W., Holmes, L., & Crossley, S. A. (in press). Psychometric Analysis of LLM Differential Sensitivity to Word Predictability using Explanatory MFRM. In *Proceedings of the Psychometrics Workshop at the International Learning Analytics and Knowledge Conference*. LAK, Dublin, Ireland.
- Holmes, L., Coscia, A., Crossley, S. A., Choi, J. S., & Morris, W. (in press). LLM Prompt Evaluation for Educational Applications. In *Proceedings of the Workshop on Epistemics and Decision-Making in AI-Supported Education*. AIED, Palermo, Italy. Preprint: arXiv:2601.16134.
- Shen, S., Wise, A. F., Morris, W., Holmes, L., Hinze, S. R., & Crossley, S. A. (2026). The Effects of AI Feedback on College Students' Reading and Writing Performance in an Intelligent Text Framework. In *Proceedings of the 16th International Learning Analytics and Knowledge Conference*, 876–882. LAK, Dublin, Ireland.
- Crossley, S. A., Morris, W., Choi, J. S., & Holmes, L. (2025). Exploratory Assessment of Learning in an Intelligent Text Framework: iTELL RCT. In *Proceedings of the Twelfth ACM Conference on Learning @ Scale*, 2–12. L@S, Palermo, Italy.
- Morris, W., Holmes, L., Choi, J. S., & Crossley, S. A. (2025). Uncovering Differential Sensitivity Toward Linguistic Features of Cohesion in Large Language Models. In *Artificial Intelligence in Education (Lecture Notes in Computer Science, Vol. 15882)*, 227–234. AIED, Palermo, Italy.
- Crossley, S. A., Choi, J. S., Morris, W., Holmes, L., & Joyner, D. (2025). AI Enhanced Intelligent Texts and Learning Gains. In *Proceedings of the 6th Workshop on Intelligent Textbooks (CEUR Workshop Proceedings, Vol. 4010)*, 17–24. AIED, Palermo, Italy.
- Coscia, A., Holmes, L., Morris, W., Choi, J. S., Crossley, S. A., & Endert, A. (2024). iScore: Visual Analytics for Interpreting How Language Models Automatically Score Summaries. In *Proceedings of the 29th International Conference on Intelligent User Interfaces*, 787–802. IUI, Greenville, South Carolina.
- Kim, M. K., Kim, J., Bae, Y., Morris, W., Holmes, L., & Crossley, S. A. (2024). How AI Evaluates Learner Comprehension: A Comparison of Knowledge-Based and Large Language Model (LLM)-Based AI Approaches. In *Proceedings of the 18th International Conference of the Learning Sciences*. ISLS, Buffalo, New York.
- Crossley, S. A., Tian, Y., Choi, J. S., Holmes, L., & Morris, W. (2024). Plagiarism Detection Using Keystroke Logs. In B. Paaßen & C. Demmans Epp (Eds.), *Proceedings of the 17th International Conference on Educational Data Mining*, 476–483. EDM, Atlanta, Georgia.

- Holmes, L., Crossley, S. A., Wang, J., & Zhang, W. (2024). The Cleaned Repository of Annotated Personally Identifiable Information. In B. Paaßen & C. Demmans Epp (Eds.), *Proceedings of the 17th International Conference on Educational Data Mining*. EDM, Atlanta, Georgia.
- Crossley, S. A., Choi, J. S., Morris, W., Holmes, L., Joyner, D., & Gupta, V. (2024). Using Intelligent Texts in a Computer Science Classroom: Findings from an iTELL Deployment. In *Proceedings of the 8th Educational Data Mining in Computer Science Education Workshop*. EDM, Atlanta, Georgia.
- Choi, J. S., Morris, W., Holmes, L., & Crossley, S. A. (2024). Focus Time and Writing Performance in an Intelligent Textbook. In *Proceedings of the Educational Data Mining in Writing and Literacy Instruction Workshop*. EDM, Atlanta, Georgia.
- Morris, W., Choi, J. S., Holmes, L., Gupta, V., & Crossley, S. A. (2024). Automatic Question Generation and Constructed Response Scoring in Intelligent Texts. In *Proceedings of the Workshop on Leveraging Large Language Models for Next Generation Educational Technologies (CEUR Workshop Proceedings, Vol. 3840)*. EDM, Atlanta, Georgia.
- Holmes, L., Crossley, S. A., Morris, W., Sikka, H., & Trumbore, A. (2023). Deidentifying Student Writing with Rules and Transformers. In *Artificial Intelligence in Education: Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky (Communications in Computer and Information Science, Vol. 1831)*, 708–713. AIED, Tokyo, Japan.
- Morris, W., Crossley, S. A., Holmes, L., Ou, C., McNamara, D., & Dascalu, M. (2023). Using Large Language Models to Provide Formative Feedback in Intelligent Textbooks. In *Artificial Intelligence in Education: Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky (Communications in Computer and Information Science, Vol. 1831)*, 484–489. AIED, Tokyo, Japan.
- Morris, W., Crossley, S. A., Holmes, L., & Trumbore, A. (2023). Using Transformer Language Models to Validate Peer-Assigned Essay Scores in Massive Open Online Courses (MOOCs). In *Proceedings of the 13th International Learning Analytics and Knowledge Conference*, 315–323. LAK, Arlington, Texas.
- Holmes, L., Crossley, S. A., Hayes, N., Kuehl, D., Trumbore, A., & Gutu-Robu, G. (2022). De-Identification of Student Writing in Technologically Mediated Educational Settings. In *Polyphonic Construction of Smart Learning Ecosystems (Smart Innovation, Systems and Technologies, Vol. 908)*, 177–189. SLERD, Bucharest, Romania.

Invited Talks

- Holmes, L. (2026, February 23). *Transforming Learning Experiences with Personalized Data Intelligence in iTELL*. Data Science in Education Meetup.
- Holmes, L. (2024, October 30). *Automated Deidentification of Student Writing*. Manifold Research Seminars.
- Holmes, L., Morris, W., Choi, J. S., & Crossley, S. A. (2024, March 4). *How'd they do it? A conversation with research teams using NLP to score the Nation's Report Card*. Stanford Sporadic Psychometrics Seminar (SSPS).
- Holmes, L. (2024, February 23). *PII and Deidentification*. The Million Tutor Moves Observatories Project.
- Durkin, K., Holmes, L., & Adler, R. (2024, February 22). *AI and Education*. Presentation for U.S. Senator Marsha Blackburn's Office.
- Holmes, L. & Crossley, S. A. (2023, February 2). *Explainable AI*. Foundational AI Series at AI-ALOE.
- Holmes, L. & Crossley, S. A. (2022, August 19). *Deidentification in the AI-ALOE Pipeline*. The 2022 AI-ALOE Research Showcase for the National Science Foundation.
- Holmes, L. & Crossley, S. A. (2022, April 26). *De-identification of Student Writing in Massive Open Online Courses*. The 2022 AI-ALOE external advisory board meeting.

Conference Presentations

- Holmes, L., Morris, W., Choi, J.S., & Crossley, S. A. (2025) *National Assessment of Educational Progress Scoring Challenge: First Place Solution*. The 26th international Conference on Artificial Intelligence in Education, Palermo, Italy.
- Holmes, L., Morris, W., Choi, J.S., & Crossley, S. A. (2025) *iTELL: Intelligent texts for enhanced lifelong learning*. The 26th international Conference on Artificial Intelligence in Education (Interactive Events), Palermo, Italy.
- Holmes, L. (2025, February 3-5). *Dependency Bigrams as a Measure of Collocation Use in Learner Writing*. Winter Society for Text & Discourse, Boulder, Colorado.
- Holmes, L., Crossley, S. A., Morris, W., & Suh Choi, J. (2024, March 16-19). *AI Assessments of Word Predictability and L2 Language Proficiency*. American Association for Applied Linguistics, Houston, Texas.
- Holmes, L. & Crossley, S. A. (2023, November 16). *Word Surprisal Predicts Language Learner Proficiency*. Society for Computation in Psychology, San Francisco, California.
- Hatami, S. & Holmes, L. (2023, March 22-24). *The relationship between out-of-school exposure to English for pleasure and Iranian EFL learners' lexical proficiency*. TESOL International Convention and English Language Expo, Portland, Oregon.
- Hatami, S. & Holmes, L. (2023, March 18-21). *The relationship between out-of-school exposure to English for pleasure and Iranian EFL learners' lexical proficiency*. American Association for Applied Linguistics, Portland, Oregon.
- Hatami, S. & Holmes, L. (2020, October 8-10). *Out-of-school exposure to English and productive lexical proficiency*. The CATESOL 2020 State Conference, Online.
- Holmes, L. (2020, February 1). *Creating an infographic syllabus*. The CATESOL 2020 Orange County regional Conference, Mission Viejo, California.

Roles

Edumonia

Mar. 2026 - PRESENT

CTO AND CO-FOUNDER

Nashville, TN

- Co-founded a Vanderbilt spinout commercializing iTELL, an AI-enhanced intelligent textbook platform licensed from the university and used by 1,000+ learners across a dozen university courses and on-the-job training programs
- Architected and built the platform end to end in Python and TypeScript: LLM pipelines for question generation and constructed-response scoring, and a content management system with vector store, which has been used to produce 100+ courses
- Designed a hierarchical Bayesian model that adapts the passing threshold on end-of-page writing tasks to each learner's estimated ability, pooling evidence from the individual and their cohort
- Own deployment and operations across a self-managed Kubernetes GPU cluster, AWS, and Vercel; hired and managed a contract cloud engineer
- Work on iTELL secured \$125K in commercialization funding from Vanderbilt and industry partners

Vanderbilt University

Sep. 2022 - PRESENT

RESEARCH ASSISTANT, LEARNING AND EDUCATIONAL ANALYTICS RESEARCH LAB

Nashville, TN

- Co-developed iTELL, an intelligent textbook framework built within the NSF AI-ALOE Institute, deployed in university classrooms and evaluated in a randomized controlled trial (now spun out as Edumonia)
- Supervise ~5 data science master's students and computer science undergraduates contributing to iTELL development
- Developing and evaluating systems for the automatic deidentification of student writing
- Conducting research on the validity and fairness of AI-based writing assessments
- Designed and maintain a lab-owned high-performance compute cluster

Georgia State University

RESEARCH ASSISTANT, AI INSTITUTE FOR ADULT LEARNING AND ONLINE EDUCATION

- Analyzed student learning outcomes in massive open online courses
- Created workflows that promote collaboration on large, complex datasets
- Presented motivation, methods, and findings to stakeholders

Sep. 2021 - Sep. 2022

Atlanta, GA

California State University, Long Beach

GRADUATE ASSISTANT, DEPARTMENT OF LINGUISTICS

- Assisted with literature review, manuscript preparation, and data analysis
- Managed the Anthropology and Linguistics laboratory

Sep. 2019 - Jun. 2021

Long Beach, CA

Teaching

Vanderbilt University

TEACHING ASSISTANT, DATA SCIENCE INSTITUTE

- Assisting with curriculum development for a natural language processing course
- Lecturing on LLM-based natural language processing methods
- Holding regular office hours for supplemental instruction and student mentorship

Jan. 2024 - PRESENT

Nashville, TN

YMCA and Georgia State University

INSTRUCTIONAL DESIGN CONSULTANT

- Consulted on the development of a community-based English curriculum for parents of immigrant children
- Organized focus groups with prospective students and interviews with experts to inform the course design

May. 2022 - Sep. 2022

Atlanta, GA

Georgia State University

INSTRUCTOR OF RECORD, INTENSIVE ENGLISH PROGRAM

- Instructor of record for In-class Writing for University Exams
- Created a content-based syllabus motivated by student input focused on anthropology

Sep. 2021 - Dec. 2021

Atlanta, GA

Various institutions

ESL AND WRITING INSTRUCTOR

- Taught and tutored English and academic writing at Irvine Valley College, Orange Coast College, the UCLA Undergraduate Writing Center, Poly Language Institute, and schools in Santiago and Mexico City
- Designed curricula from pre-kindergarten through university level; trained and observed peer instructors

2014 - 2019

USA, Chile, Mexico

Academic Service

PEER REVIEWER

<i>Assessing Writing</i>	2026
<i>Artificial Intelligence in Measurement and Education Conference (AIME-Con)</i>	2026
<i>SoftwareX</i>	2026
<i>International Conference on Artificial Intelligence in Education (AIED)</i>	2026
<i>IEEE Computer</i>	2025
<i>Educational Data Mining</i>	2022-2025
<i>Language Testing</i>	2025
<i>Language Learning</i>	2024
<i>Journal of Information and Learning Sciences</i>	2024
<i>International Journal of Artificial Intelligence in Education</i>	2023-2024
<i>Behavior Research Methods</i>	2023
<i>International Society of the Learning Sciences</i>	2023
<i>Language Assessment Quarterly</i>	2022

COMMITTEES

Co-chair of the Learning Innovation Incubator Advisory Committee

2024 - PRESENT

Honors

Carol Bander Graduate Student Initiative — California TESOL Foundation

Feb. 2020

San Diego Chapter Grant — California TESOL San Diego Chapter

Apr. 2019

Departmental Honors — UCLA Department of Comparative Literature

Jun. 2016

References

References are available upon request.