# Megan E. Hillis, Ph.D.

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## EDUCATION

**Dartmouth College, Guarini School of Graduate and Advanced Studies** **2019-2025**
*Ph. D. in Cognitive Neuroscience*
Dissertation Committee: Dr. David J. M. Kraemer (chair), Dr. Emily S. Finn, Dr. Jeremy R. Manning, & Dr. Rachel G. Pizzie
Dissertation: *Neural patterns reflect semantic representation in novice sign language learners*

*Master of Science in Psychological and Brain Sciences*
Thesis Committee: Dr. David J. M. Kraemer (chair) & Dr. Donna Coch
Thesis: *Overlapping semantic representations of sign and speech in novice sign language learners*

**State University of New York at Geneseo** **2015-2019**
*Bachelor of Arts in Psychology with Honors, Minor in German Language*
GPA: 3.94, summa cum laude
Thesis Advisor: Dr. Jeffrey Mounts
Honors Thesis: *The Dorsal Visual Stream and Object Recognition: Weighing the evidence for dorsal category sensitivity*

**Freie Universität Berlin** **Jan-May 2018**
*European Studies Program, Berlin, Germany*
Passed German Language proficiency course at the C1 level

## RESEARCH

**Dartmouth College** **Aug 2019-present**
**Cognitive Neuroscience of Learning Lab (PI: David J. M. Kraemer)**
Postdoctoral Scholar and Lecturer (June 2025-present)
Graduate Researcher (Aug 2019-June 2025)

- Collaborated on multidisciplinary research across Psychological & Brain Sciences, Education, and Computer Science departments focused on neural correlates of learning and understanding
- Developed stimuli and led data collection for multiple projects, including behavioral, virtual/mixed reality, mobile EEG, and fMRI paradigms.
- Used Python and R for multivariate data analysis, including with HPC systems
- Mentored undergraduate researchers in study design, data collection, and analysis

**State University of New York at Geneseo** **Oct 2016-May 2019**
**Visual Attention Lab (PI: Jeffery Mounts)**
Undergraduate Research Assistant

- Led data collection multiple studies of behavioral human research focusing on magnocellular vs. parvocellular visual processing.
- Conducted original research project from experiment design to presentation of results
- Used SPSS, R, and Python-based software (PsychoPy) for stimulus creation and data analysis

## PUBLICATIONS

### Preprints:

**Hillis, M. E.**, & Kraemer, D. J. M. (2025). Initial signs of learning: Decoding newly-learned vocabulary from neural patterns in novice sign language learners. *bioRxiv.* https://doi.org/10.1101/2025.04.11.648265

Cetron, J.S.*, **Hillis, M.E.***, Diamond, S. G., May, V. V., & Kraemer, D. J. M. (under review). First-class learning: Neural patterns reflect students' conceptual grasp following an introductory STEM lesson. *co-authors contributed equally to this work

### Published:

Blanchet, J. B., **Hillis, M. E.**, Lee, Y., Shao, Q., Zhou, X., Balkcom, D., & Kraemer, D. J. M. (2025). Enhancing the Educational Potential of Online Movement Videos: System Development and Empirical Studies with TikTok Dance Challenges. *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*, 1–19. https://doi.org/10.1145/3706598.3714062

Blanchet, J., **Hillis, M. E.**, Lee, Y., Shao, Q., Zhou, X., Kraemer, D. J. M., & Balkcom, D. (2023). LearnThatDance: Augmenting TikTok Dance Challenge Videos with an Interactive Practice Support System Powered by Automatically Generated Lesson Plans. *Adjunct Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology*, 1–4. https://doi.org/10.1145/3586182.3615801

Blanchet, J., **Hillis, M.E.**, Lee, Y., Shao, Q., Zhou, X., Kraemer, D.J.M., Balkcom, D. (2023) Automatic Generation and Teaching of Dance Lessons from Video. *Proceedings of the 24th International Workshop on Mobile Computing Systems* (145-145)

**Hillis, M.E.,** Aubrey, B., Blanchet, J., Shao, Q., Balkcom, D., Zhou, X., & Kraemer, D. J. M. (2022) Overlapping semantic representations of sign and speech in novice sign language learners. *Proceedings of the Annual Meeting of the Cognitive Science Society*. 44 (44)

Alfred, K. A., **Hillis, M. E.**, & Kraemer, D. J. M. (2020) Individual differences in the neural localization of relational networks of semantic concepts. *Journal of Cognitive Neuroscience*, 3(33), 1-12

Shao, Q., Sniffen, A., Blanchet, J., **Hillis, M.**, Shi, X., Haris, T., Liu, J., Lamberton, J., Malzkuhn, M., Quandt, L., Mahoney, J., Kraemer, D., Zhou, X., & Balkcom, D. (2020). Teaching American Sign Language In Mixed Reality. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*. 4(4), 1-27

## TALKS

Cognitive Science Weekly Speaker Series, Hanover, NH May 2025
*Decoding newly learned vocabulary from neural patterns in novice sign language learners*

Cognitive Science Weekly Speaker Series, Hanover, NH Oct 2022
*Characterizing changes in knowledge and learning with multivariate fMRI*

Cognitive Neuroscience Society Data Blitz, San Francisco, CA Mar 2022
*Decoding knowledge of newly-learned language from neural representations of semantic meaning*

GREAT Day Symposium, Geneseo, NY May 2019
*The Dorsal Visual Stream and Object Recognition: Weighing the evidence for dorsal category sensitivity*

## POSTERS

**Hillis, M.E.**, Kraemer, D.J.M. (2025) Neural patterns reflect quiz performance in novice sign language learners. *Cognitive Neuroscience Society*, Boston, MA, USA.

**Hillis, M.E.**, Shao, Q., Lee, Y., Blanchet, J., Zhou, X., Balkcom, D., & Kraemer, D.J.M. (2024) Using biosignals to predict cognitive load in an adaptive learning task. *International Mind, Brain, and Education Society*, Leuven, Belgium.

**Hillis, M.E.,** Aubrey, B., Blanchet, J., Shao, Q., Balkcom, D., Zhou, X., & Kraemer, D. J. M. (2024). Neural decoding of semantic representations from novice sign language learners reflects newly-acquired vocabulary. *Cognitive Neuroscience Society*, Toronto, Ontario CAN.

**Hillis, M.E.,** Aubrey, B., Blanchet, J., Shao, Q., Balkcom, D., Zhou, X., & Kraemer, D. J. M. (2023). Decoding knowledge of newly-learned language from neural representations of semantic meaning. *Cognitive Neuroscience Society*, San Francisco, CA, USA.

**Hillis, M.E.,** Aubrey, B., Blanchet, J., Shao, Q., Balkcom, D., Zhou, X., & Kraemer, D. J. M. (2022) Overlapping semantic representations of sign and speech in novice sign language learners. *Cognitive Science Society*, Toronto, Ontario CAN

**Hillis, M.E.,** Aubrey, B., Blanchet, J., Shao, Q., Balkcom, D., Zhou, X., & Kraemer, D. J. M. (2022). Sign and speech share semantic representation in novice sign language learners. *International Mind, Brain, and Education Society*, Montreal, Quebec CAN

Alfred, K., **Hillis, M.E.**, & Kraemer, D. (2020) Individual Differences in Patterns of Semantic Distance. *Society for the Neuroscience of Creativity*, Boston MA, USA

Mounts, J., Edwards, A., Matyasovszky, G., **Hillis, M.E.** & Nguyen, A. (2017) *The Effects of Endogenous Attention on Spatial and Temporal Processing*. GREAT Day Symposium, Geneseo NY, USA

## TEACHING

**Dartmouth College – Sole Instructor**
- Modeling Mind and Behavior (COGS 50.8) Anticipated Fall 2025

**Dartmouth College Teaching Apprenticeships and Lectures**
- Major Seminar in Cognitive Science (Guest Lecturer) Fall 2022, Spring 2025

- Principles of Human Brain Mapping with fMRI (TA, Lab Instructor) Spring 2022
- Introduction to Neuroscience (TA, Guest Lecturer) Fall 2021
- Laboratory in Psychological Science (TA, Guest Lecturer, Lab Instructor) Summer 2020 & 2021

**Girl Scouts of Northeastern New York**

- Nature Education Specialist (designed & led STEM programs for scouts aged 5-18) Summer 2019

## PROFESSIONAL ACTIVITIES AND SERVICE

**Workshops and Trainings Attended**

- Methods In Neuroscience at Dartmouth (MIND) Summer School Aug 2023
- Cognitive Science Preconference: Deep Learning for Brain Encoding and Decoding Jul 2022
- DCAL Future Faculty Teaching Series (8-week workshop) Jan-Mar 2021
- Software Carpentry Workshop in Python and Git Dec 2019

**Dartmouth College Service**

- Graduate Research Roundtable (Co-organizer) 2021-22
- Psychological and Brain Sciences Social Committee (Volunteer) Ad Hoc, 2021-25
- PBS Dept. Graduate Peer Mentor 2021-23
- PBS Dept. Working Group Advisory Committee (Member) 2021

## AWARDS & SOCIETIES

Edward Curry Scholarly Achievement Award Awarded 2019
Edgar Fellows – Geneseo Merit Scholars Inducted 2016
Phi Eta Sigma – First Year Honor Society Inducted 2016
Phi Beta Kappa – Honor Society Inducted 2019
Psi Chi – Psychology Honor Society Inducted 2019

## SKILLS

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|---|---|
| **Programming & Analysis:** | Python (7 years' experience)<br>R (3 years' experience)<br>fMRI analysis tools including AFNI, FSL, fMRIprep, FreeSurfer |
| **Languages:** | English (native)<br>German (C1 Effective Operational Proficiency) |
| **Other:** | OpenBCI mobile biosensing devices<br>Experimental design and implementation with PsychoPy, Qualtrics, Google Office Tools (including Google Apps scripting), Amazon Mechanical Turk<br>Adobe Photoshop |