

# Elizabeth H. Hall, PhD

[bethhallphd@gmail.com](mailto:bethhallphd@gmail.com)

[www.elizabethhhall.com](http://www.elizabethhhall.com)

Last Updated: August 2026

## Specialization

---

Applied AI researcher and technical lead specializing in the tech transfer of state-of-the-art AI from research prototype to shipped product. I develop novel evaluation methodologies, benchmarks, and KPIs for generative and multimodal AI systems, leveraging large-scale data analysis, feature engineering, and user behavior to improve model performance while balancing compute and resource constraints for scalable solutions. At every stage, I bring scientific rigor and a focus on user delight, leading cross-disciplinary teams to build high-performance systems that raise the bar for operational excellence at a global scale.

## Experience

---

**2025 Audio Research, Meta Reality Labs, Hardware UX Researcher** **Seattle, WA**

- Technically led 7 targeted studies quantifying speech-enhanced Voice Quality on hardware prototypes; drove recommendations with org leaders that enabled the on-time 0-to-1 launch of Conversation Focus on Meta Ray-Bans at Connect 2025
- Defined KPI protocols and evaluation benchmarks for e2e latency in real-time communication on Meta AI glasses over Bluetooth enabled broadcast
- Spearheaded the development and Meta-wide distribution of a VR/AR research platform for assessing immersive telepresence with lifelike, generative multisensory avatars, partnering cross-functionally across research and engineering teams
- Managed and mentored a team of 4 assistants and interns evaluating advanced spatial audio rendering and ray-tracing algorithms, making architectural trade-offs across integrated and distributed AR/VR systems with limited compute resources
- Designed evaluative experiments for all stages of prototype-to-production development; experience working with tactile transducers, digital sensors, and the Martini sync protocol for device pairing over Bluetooth

**Press:** [Spatial Audio for AR / VR Developers, Meta Horizon Oct. 2025](#); [Conversation Focus with Meta Ray Ban Glasses](#)

**Skills:** Extended Reality, Hardware Engineering, Electroacoustics, Avatars & Embodied AI

**2020 – 2024 Center for Mind & Brain, UC Davis, Research Fellow** **Davis, CA**

- Led a 4-year research program on multisensory attention in VR, securing over \$230K in funding from the Office of Naval Research
- Managed and trained 10 assistants on eyetracking and display calibration
- Developed psychophysical framework for assessing 3D depth perception & image distortion
- Designed 6DoF object detection and eye-tracking systems analysis across multiple VR and AR branded devices
- Developed and benchmarked vision-language transformer models on 200k semantic segmentations across images of complex, cluttered environments

- Published 7 scientific papers in high-impact journals and invited to present by ICCV, Psychonomic Society, and the Vision Science Society

**Press:** [New VR Research on Attention to Support Children and Adults with ADHD](#)

**Skills:** Research Management, Virtual Reality Development, Eye-tracking, 3D-geometry

## **2023 Amazon Alexa, Customer Behavior, Data Science Intern** **Seattle, WA**

- Developed an LSTM in Python to predict device engagement and behavior from 10+ million Alexa users with new releases across Entertainment, Shopping, and Smart Home
- Reweighted features to align forecasts with A/B test results, achieving 93% accuracy
- Built feature engineering pipeline to process millions of customers' data through Amazon data-storage system improving data processing for Amazon Devices weekly telemetry dashboard

**Skills:** Extract, Transform, Load (ETL), SQL, Amazon Web Services (AWS), Data Intelligence

## **2019 – 2021 DARPA, Project SCORE, Statistical Consultant** **Remote**

- Statistical consulting work in partnership with the University of Melbourne for the DARPA SCORE and Replicats project.
- Supported the development and deployment of automated tools that enable DoW personnel to quickly calibrate the validity of behavioral science claims / results.

**Press:** [Nature News: Automated Tools to Rate Research Reproducibility](#)

**Skills:** Science Policy, Forecasting

## **2016 – 2018 NIMH, Laboratory of Brain & Cognition, Research Fellow.** **Bethesda, MD**

- Designed online experiments to collect and evaluate human data and semantic segmentations using JavaScript and Amazon Mechanical Turk, collecting data from over 2,000 participants
- Recorded 7T BOLD fMRI signal and applied multivariate pattern analyses and neural network based-decoding to identify stimulus perception within the visual cortex and hippocampus

**Press:** [New Map of Meaning in the Brain Changes Ideas about Memory](#), [Our Memory is Even Better than Experts Thought](#)

**Skills:** Neuroimaging, Neural Networks, Multivariate Statistics, Scene Semantics, Javascript

## **2015 – 2016 Basque Center for Cognition, Brain & Language, Research Fellow** **Spain**

## **Education**

---

|             |                                                                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2025</b> | Ph.D. Psychology, Vision Science, University of California, Davis<br><i>Dissertation: Object Attention in Scene Perception and Memory</i> |
| <b>2016</b> | M.Sc Cognitive Neuroscience of Language, University of the Basque Country                                                                 |
| <b>2015</b> | B.A. Psychobiology focus, Bennington College                                                                                              |

## **Certifications & Skills**

---

**Machine learning & AI:** generative AI (LLMs, VLMs, diffusion models); vision-language transformers and multimodal models; natural language processing; model validation, error analysis, and benchmark design; computer vision, semantic object segmentation, scene understanding; representation learning and embeddings; eye-tracking and gaze estimation;

perceptual and psychophysical evaluation of image and rendering, electroacoustics, 3D geometry, hardware and research algorithm prototypes, avatars and embodied AI

**Programming:** Python, C++, C#, SQL, R, MATLAB, Javascript, HTML, CSS, Bash

**Frameworks & infrastructure:** PyTorch, TensorFlow, OpenCV, Open3D, HuggingFace, scikit-learn, pandas, NumPy, SciPy; AWS, S3, Spark, ETL pipelines, Docker, Linux, large-scale distributed training

**Methods:** experimental design and A/B testing; psychometrics and forced-choice preference studies; annotation quality and statistical reliability; KPI and benchmark definition for AI/GenAI systems; preregistered, reproducible pipelines

**Certifications:** International Telecommunications Union, AI Governance Fundamentals (2026); Correlation One: Data Science (2023); Neuromatch Academy: Computational Neuroscience (2020), Deep Learning (2021), NeuroAI (2024)

## Funding and Awards

---

### *Fellowships*

2023 – 2024 University of California President’s Dissertation Year Fellowship (\$53,000)  
2020 – 2023 National Defense Science and Engineering Fellowship (\$180,000)  
2016 – 2018 National Institutes of Health Intramural Research Training Award (\$80,000)  
2011 – 2015 Bennington College Brockway Faculty Scholarship (\$120,000)

### *Awards*

2023 Early Career Scientist Travel Grant, National Eye Institute (\$1000)  
2023 Outstanding Mentor Award, UC Davis Psychology (\$75)  
2021 Diverse Mentoring Award, UC Davis Psychology (\$500)  
2021 Travel Award, UC Davis Graduate Student Association (\$500)  
2021 Best Talk Award (tied for 2<sup>nd</sup> place), UC Davis Psychology (\$50)  
2020 Best Talk Award (tied for 1<sup>st</sup> place), UC Davis Psychology (\$100)  
2020 Most Creative Methodology, UC Davis Psychology (\$50)  
2019 Travel Award, UC Davis Graduate Student Association (\$500)  
2019 Professional Development Travel Award, UC Davis Psychology (\$500)  
2018 NeuroFest Poster Award (3<sup>rd</sup> place), UC Davis Neuroscience (\$100)

## Publications

---

**\*joint first-author**

1. DeVeaux, C., **Hall, E.H.**, et al. Audiovisual Realism in MR: Investigating the Effects of Room Acoustics on Co-Presence with Photorealistic Avatars. IEEE VR, Seoul, 2026.
2. **Hall, E.H.**, & Loh, Z. Objects in Focus: A New Eye-Tracking and Scene Segmentation Dataset for Computer Vision. International Computer Vision Conference, Honolulu, 2026.
3. **Hall, E.H.**,\* Forloines, M.R.,\* Henderson, J.M, & Geng, J.J. (*under review, Visual Cognition*). Eye gaze during route learning in a virtual task.

4. **Hall, E. H.**, & Geng, J. J. (2024). Object-based attention during scene perception elicits boundary contraction in memory. *Memory & Cognition*, 1-13.
5. **Hall, E.H.**,\* Peacock, C.E.,\* & Henderson, J.M. (2023). Objects are prioritized for attention based upon meaning during passive scene viewing. *Psychonomic Bulletin & Review*, 1-13.
6. Richie-Halford, A., Cieslak, M., Ai, L., [et al, including **Hall, E.H.**] (2022). An analysis-ready and quality controlled resource for pediatric brain white-matter research. *Scientific Data*, 9(1), 616.
7. Loh, Z., **Hall, E.H.**, Cronin, D., Henderson, J.M. (2022). Working memory control predicts fixation duration in scene-viewing. *Psychological Research*. 1-12.
8. **Hall, E.H.**, Bainbridge, W.A., & Baker, C.I. (2021). Highly similar and competing visual scenes lead to diminished memory for details in memory drawings. *Memory*, 30(3), 279-292.
9. Bainbridge, W.A., **Hall, E.H.**, Baker, C.I. (2020). Distinct representational structure and localization for visual encoding and recall during visual imagery. *Cerebral Cortex*, bhaa329.
10. Cronin, D.A., **Hall, E.H.**, Goold, J., Hayes, T.H., & Henderson, J.H. (2020) Eye movements in real-world scene photographs: General characteristics and effects of viewing task. *Frontiers in Psychology* 10: 2915.
11. Bainbridge, W.A, **Hall, E.H.**, & Baker, C.I. (2019). Highly diagnostic and detailed content of visual memory revealed during free recall of real-world scenes. *Nature Communications*.

## Conference Presentations

---

12. **Hall, E.H.** & Geng, J.J. (2023). Object-based Attention in Scene Perception. Psychonomic Society. San Francisco, CA. Talk.
13. **Hall, E.H.**, & Geng, J.J. (2023). Object-based attention during scene perception elicits boundary contraction in memory. Vision Science Society. St. Pete's Beach, FL. Talk.
14. **Hall, E.H.** & Geng, J.J. (2022). Target search leads to tunnel memory for real-world environments. National Defense Science and Engineering conference. Boston, MA. Poster.
15. **Hall, E.H.**, & Geng, J.J. (2021). Thematic object relationships are judged as stronger than taxonomic relationships in a two-alternative forced choice task. Object Perception, visual Attention, and visual Memory. Virtual conference. Poster.
16. Loh, Z., **Hall, E.H.**, Cronin, D.A. & Henderson, J.H. (2021). Assessing the influence of task and working memory capacity on eye-movement characteristics during scene-perception. Western Psychological Association. Virtual conference. Poster.
17. **Hall, E.H.**, & Geng, J.J. (2021). Co-occurrence statistics from vision and language capture thematic relationships between objects. Vision Science Society. Virtual conference. Poster.
18. Bainbridge, W.A., **Hall, E.H.**, & Baker, C.I. (2019). Differences in the neural representations of visual content between encoding and free recall across the brain. Society for Neuroscience. Chicago, IL. Poster.
19. Bainbridge, W.A., **Hall, E.H.**, & Baker, C.I. (2019). Comparing the categorical structure of perceived and recalled images in visual cortex and hippocampus. Vision Sciences Society. St. Pete Beach, FL. Poster.
20. **Hall, E.H.**, Bainbridge, W.A., & Baker, C.I. (2019). Investigating visual free recall of highly similar and competing scene stimuli. Vision Sciences Society. St. Pete Beach, FL. Poster.

21. **Hall, E.H.**, Bainbridge, W.A., & Baker, C.I. (2019). Creating false memories: Investigating visual recall of multiple exemplars in a single category. Cognitive Neuroscience Society. San Francisco, CA. Poster.
22. Bainbridge, W.A., **Hall, E.H.**, & Baker, C.I. (2018). Comparing the neural correlates of visual encoding and free recall. Organization for Human Brain Mapping. Singapore. Poster.
23. **Hall, E.H.**, Bainbridge, W.A., & Baker, C.I. (2018). Comparing memory based on visual recall, visual recognition, and verbal recall. Vision Sciences Society. St. Pete Beach, FL. Poster.
24. Bainbridge, W.A., **Hall, E.H.**, & Baker, C.I. (2018). Visual recall memory contains highly detailed and precise object and spatial information. Vision Sciences Society. St. Pete's Beach, FL. Talk.
25. Bainbridge, W.A., **Hall, E.H.**, & Baker, C.I. (2018). Visual free recall of real-world scenes reveals high capacity and exquisite detail in memory. Cognitive Neuroscience Society. Boston, MA. Poster.
26. **Hall, E.H.**, Bainbridge, W.A., Baker, C.I. (2018). Investigating neural signatures of visual encoding and recall using 7T fMRI. Cognitive Neuroscience Society, Boston, MA. Poster.
27. **Hall, E. H.**, W. A. Bainbridge, C. I. Baker (2017). Quantifying the resolution and capacity of memory during free recall of real-world visual scenes. Society for Neuroscience, Washington, D.C. Poster.

## Invited Talks

---

|      |                                                                 |
|------|-----------------------------------------------------------------|
| 2024 | Carnegie Mellon University, Lab in Multisensory Neuroscience    |
| 2024 | Meta Reality Labs, Display Systems                              |
| 2023 | University of California, Merced, Management of Complex Systems |

## Teaching and Mentoring

---

### *Courses*

|             |                                                                  |
|-------------|------------------------------------------------------------------|
| Spring 2020 | Human Memory, <i>Teaching Assistant</i> , UC Davis               |
| Fall 2019   | Perception and Sensation, <i>Teaching Assistant</i> , UC Davis   |
| Spring 2019 | Introduction to Psychology, <i>Teaching Assistant</i> , UC Davis |

### *Mentees - Meta*

|      |             |                   |
|------|-------------|-------------------|
| 2025 | Sharon Wong | Meta Reality Labs |
| 2025 | Andy Shaw   | Meta Reality Labs |

### *Mentees - UC Davis*

|             |                   |                   |                                                                        |
|-------------|-------------------|-------------------|------------------------------------------------------------------------|
| 2023 – 2024 | Akshit Prathipati | Neurophysiology   |                                                                        |
| 2023 – 2024 | Nancy Cao         | Psychology        |                                                                        |
| 2022 – 2023 | Maya Tochimoto    | Cognitive Science |                                                                        |
| 2022 – 2023 | Tiffany Kim       | Disease Biology   | Pursuing <i>JD</i> from <i>USC</i>                                     |
| 2019 – 2021 | Ruilin Cai        | Computer Science  | Pursuing <i>MEng</i> from <i>UCLA</i>                                  |
| 2019 – 2021 | Zoe Loh           | Cognitive Science | Pursuing <i>PhD</i> from <i>UC Merced</i><br>Provost's Research Fellow |

|             |                 |            |                                                                       |
|-------------|-----------------|------------|-----------------------------------------------------------------------|
| 2019 – 2020 | Anthony Lagunda | Psychology | First-author pub. <i>Psych. Research</i><br>Provost's Research Fellow |
|-------------|-----------------|------------|-----------------------------------------------------------------------|

## Service

---

### Public Engagement

- 2023            Panelist, 1<sup>st</sup> Annual UCD Cog. Sci. Conference, “Jobs in Cognitive Science”
- 2020 – 2021   Brown Bag Organizer, UCD Perception, Cognition, and Cognitive Neuroscience
  - Organized grad talks and outside speakers from *Meta Reality Labs*, *Plos One*, *University of Chicago*, and *Columbia University*
- 2019 – 2021   Post-publication peer reviewer, University of Melbourne, DARPA Score program
  - Reviewed credibility of published research articles in business, economics, political science, and psychology
- 2017 – 2018   STEM Ambassador, DC STEM Network
  - Speaker at DC public schools and local STEM events about science research opportunities for high school students

### Professional Memberships

Vision Science Society, Females of Vision et al (FoVea), Society for Neuroscience, Psychonomic Society, Women in Data Science, Cognitive Neuroscience Society

### Ad-Hoc Reviewer

Memory, Psychological Research, Psychological Review, Psychonomic Bulletin & Review, Memory & Cognition, Quarterly Journal of Experimental Psychology, Journal of Experimental Psychology: General, Heliyon, Scientific Reports, Journal of Cognitive Psychology, Nature Human Behavior