

WILLIAM JONGWON HAN

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EDUCATION

PhD in Mechanical Engineering

Carnegie Mellon University, College of Engineering

Aug. 2023 - Present

Pittsburgh, PA

BA in Psychological Science

University of California, Irvine, School of Social Science

Sep. 2020 - Jun. 2022

Irvine, CA

RESEARCH INTEREST

William Han's research interest is in multimodal learning, particularly with physiological signals, for applications in cognitive science, embodied artificial intelligence (AI), and healthcare. He works with vision and language as well. He is also interested in studying the connections and interactions between heterogeneous modalities.

PUBLICATIONS AND PREPRINTS

- **William Han**, Chaojing Duan, Michael Rosenberg, Emerson Liue, Ding Zhao. "ECG-Byte: A Tokenizer for End-to-End Generative Electrocardiogram Language Modeling." ArXiv.org, 18 Dec. 2024, arxiv.org/abs/2412.14373.
- Xilun Zhang*, Shiqi Liu*, Peide Huang, **William Han**, Yiqi Lyu, Mengdi Xu, Ding Zhao. "Dynamics as Prompts: In-Context Learning for Sim-To-Real System Identifications." ArXiv.org, 27 Oct. 2024, arxiv.org/abs/2410.20357.
- Jieliu Qiu*, **William Han***, Xuandong Zhao, Shangbang Long, Christos Faloutsos, Lei Li . Evaluating Durability: Benchmark Insights into Multimodal Watermarking. ArXiv.org, 6 Jun. 2024, arxiv.org/abs/2406.03728v1. **DMLR 2024**.
- Jieliu Qiu, **William Han**, Winfred Wang, Zhengyuan Yang, Linjie Li, Jianfeng Wang, Christos Faloutsos, Lei Li, Lijuan Wang. Entity6K: A Large Open-Domain Evaluation Dataset for Real-World Entity Recognition. ArXiv.org, 19 Mar. 2024, arxiv.org/abs/2403.12339.
- **William Han**, Diana Gomez, Avi Alok, Chaojing Duan, Michael Rosenberg, Douglas Weber, Emerson Liu, Ding Zhao. Interpretation of Intracardiac Electrograms Through Textual Representations. ArXiv.org, 1 Feb. 2024, arxiv.org/abs/2402.01115. **CHIL 2024**.
- Jieliu Qiu , Jiacheng Zhu , **William Han**, Aditesh Kumar, Karthik Mittal, Claire Jin, Zhengyuan Yang, Linjie Li, Jianfeng Wang, Bo Li, Ding Zhao, Lijuan Wang. MultiSum: A Dataset for Multimodal Summarization and Thumbnail Generation of Videos. arXiv.org. doi:<https://doi.org/10.48550/arXiv.2306.04216>. **CVPR 2024 (highlight, 11.9%)**.
- Jieliu Qiu*, Jiacheng Zhu*, Shiqi Liu, **William Han**, Jingqi Zhang, Chaojing Duan, Michael Rosenberg, Emerson Liu, Douglas Weber, Ding Zhao. Automated Cardiovascular Record Retrieval by Multimodal Learning between Electrocardiogram and Clinical Report. ArXiv.org, 13 Apr. 2023, arxiv.org/abs/2304.06286. **Machine Learning for Health 2023**.
- Jieliu Qiu*, Mengdi Xu*, **William Han***, Seungwhan Moon, Ding Zhao. Embodied Executable Policy Learning with Language-based Scene Summarization. [online] arXiv.org. doi:<https://doi.org/10.48550/arXiv.2306.05696>. **NAACL 2024**.
- Jieliu Qiu*, **William Han***, Jiacheng Zhu, Mengdi Xu, Michael Rosenberg, Emerson Liu, Douglas Weber, Ding Zhao. "Transfer Knowledge from Natural Language to Electrocardiography: Can We Detect Cardiovascular Disease through Language Models?" ArXiv:2301.09017 [Cs], 21 Jan. 2023, arxiv.org/abs/2301.09017. **EACL 2023 Findings**.

- **William Han***, Jielin Qiu*, Jiacheng Zhu, Mengdi Xu, Douglas Weber, Bo Li, Ding Zhao. Can Brain Signals Reveal Inner Alignment with Human Languages? ArXiv:2208.06348 [Cs, Q-Bio], 10 Aug. 2022, arxiv.org/abs/2208.06348. **EMNLP 2023 Findings**.

EXPERIENCE

Research Intern May 2024 - Present
Allegheny General Hospital *Pittsburgh, PA*

- Work on deep learning for cardiac electrophysiology.

Research Intern Oct. 2022 - Apr. 2023
Honda Research Institute, USA *San Jose, CA*

- Develop algorithms for visual-language navigation and vision question answering.
- Work on object detection, visual relation detection, and scene graph generation for micromobility applications.

Research Intern Mar. 2022 - Mar. 2023
Carnegie Mellon University; Safe AI Lab *Remote, CA*

- Work on reinforcement learning for embodied AI using image captioning and large language models.
- Research on intersections between natural language processing and physiological signals and their applications in downstream tasks, such as sentiment analysis, disease detection, and relation detection.

Research Intern Dec. 2021 - Dec. 2022
University of California, Irvine; Center for Artificial Intelligence in Diagnostic Medicine *Irvine, CA*

- Construct U-Net for segmentation of blood vessels in histopathological images for Alzheimer's Disease.
- Design algorithms for detection and segmentation of invasive, in situ, and normal cells in histopathological images using transfer learning.

Machine Learning Engineer Intern Jun. 2022 - Oct. 2022
Foretify.ai *Remote, CA*

- Create and deploy multiple geographic information system (GIS) applications through ArcGIS
- Integrate machine learning models into GIS to do tasks such as travel safety prediction, solar panel construction forecasting, object detection, and chatbot.
- Develop GANs for generating cartographic maps from satellite imagery.

Tutor Jan. 2020 - Oct. 2022
One2One Tutoring *Remote, CA*

- Teach Mathematics, Social Studies, Science, and English for 40+ students in grades 6 through 12.

EXTRA-CURRICULAR ACTIVITIES

WIKMM Project Leader Sep. 2021 - Jun. 2022
AI Club at UCI *Irvine, CA*

- Lead a team of 5 AI club members and establish WIKMM, a project that aims to build state of the art classification and segmentation models for invasive, in situ, and normal cells in histopathological images.

SEW.NLP Group Leader May 2022 - Jun. 2022
UCI Machine Learning Hackathon 2022 *Irvine, CA*

- Lead a group of 3, including myself, and build a Question Answering model pretrained on BERT and XLNet for scientific documents in the UCI ML repository.

pests.ai Group Leader Mar. 2022 - Apr. 2022
AI LA Open Innovation Challenge 2022 *Los Angeles, CA*

- Lead a group of 5, including myself, and develop an GIS application for predicting and mapping potential areas goldspotted oak borers (GSOB) and invasive shot hole borers (ISHB) might infiltrate.

HONORS/AWARDS

- Graduate Research Fellowship from College of Engineering, CMU 2023 - 2028
- Overall Runner Up (2nd place) for UCI Machine Learning Hackathon 2022
- Overall Runner Up (2nd place) for AI LA Open Innovation Challenge 2022
- Best Project Proposal Award 2021 for AI Club at UCI
- Dean's List, UCI 2020 - 2022

TALKS

Can Brain Signals Reveal Inner Alignment with Human Languages? Jul. 2023
Oral Presentation at ICML Workshop 2023 Machine Learning for Multimodal Healthcare Data *Honolulu, HI*

Embodied Executable Policy Learning with Language-based Scene Summarization. Jul. 2023
Oral Presentation at ICML Workshop 2023 Interactive Learning with Implicit Human Feedback *Honolulu, HI*

Towards Interpretable Representation Learning for Physiological Signals. Aug. 2024
Invited Talk at National Autonomous University of Mexico (UNAM) *Mexico City, Mexico*

PROFESSIONAL SERVICES

Reviewer

CVPR (2023), NeurIPS (2023), ICML (2023), EMNLP (2023), ICLR (2024, 2025)

Organization

Research Roundtable Junior Chair at Machine Learning for Health 2023

TEACHINGS

- **CMU AI for Humanities (82-183)** Feb. 2024
Guest Lecture on LLMs in Healthcare. *Pittsburgh, PA*

MENTORED STUDENTS

- Avi Alok, M.S. Student at CMU → Data Scientist at HiLabs

SKILLS

Technical Skills	Python, Pytorch, TensorFlow, Linux, C/C++, MATLAB, CUDA, OpenCV, R, JavaScript, Rust
Soft Skills	Leadership, Communication, Management, Teaching, Research, Learning