Larry Zhang

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EXPERIENCE

TOYOTA RESEARCH INSTITUTE — Los Altos, CA
Human Centered AI Intern (*Mentor: Pablo Paredes*) — September 2024 − December 2024
- Ran 40+ subject study using eye-tracking pipeline to test hypotheses related to design creativity
- Submitted manuscript to HCI venue(s) with follow-up work in progress to improve design processes
- Leveraged Vision Transformer, Text-2-Image, and YOLO models to advance experimental development

SONY R&D JAPAN — Tokyo, Japan
Human Sensing and Interaction Research Intern — June 2024 − August 2024
- Proposed and developed end-to-end domain adaptation based processing pipeline for EEG (F1 > 0.9)
- Evaluated transfer learning & self-supervised learning approaches for EEG analysis (confidential task)
- Accelerated model evaluation by parallelizing model training to rapidly iterate over several experiments

SAMSUNG RESEARCH AMERICA, Digital Health Lab — Mountain View, CA
Research Intern (*Mentors: Mahbubur Rahman & Mehrab Bin Morshed*) — January 2024 − May 2024
- Led first-of-a-kind feasibility study of earbud PPG non-invasive cardiac monitoring algorithm (patented)
- Improved algorithmic performance by ~7%; closely aligned performance (r = ~0.7) with gold standard
- Submitted first author paper to ICASSP; supported follow-up paper on multimodal ML approach

Research Intern (*Mentor: Viswam Nathan*) — May 2023 − September 2023
- Developed reproducible and scalable pipeline optimizing stress detection in earbud PPG sensors
- Improved stress detection performance by ~17% via new quality-checked morphological features
- Published first author paper at EMBC, technology patented/adopted into internal development pipeline

NATIONAL INSTITUTE OF INFORMATICS — Tokyo, Japan
Visiting Research Intern (*Inviting Professor: Noriko Kando*) — Jan 2023 − May 2023
- Developed physiological sensing for measuring engagement in "Unforgettable Museum Experience"
- Piloted use of Polar Verity Sense PPG data to measure emotional arousal and cognitive engagement
- Validated measures of emotional arousal and cognitive engagement via IRB-approved pilot studies

INDIANA UNIVERSITY BLOOMINGTON — Bloomington, IN
Research Assistant (*Co-Advised by Gregory Lewis & YY Ahn*) — August 2020 - Present
- Investigate psychophysiology of media & network embeddings to develop LLM chatbot to probe beliefs
- Investigated dynamical systems and machine learning methods to predict individual brain activity
- Published paper on predictive model of semantic memory search, led development of public codebase

USC INSTITUTE OF CREATIVE TECHNOLOGIES — Playa Vista, CA
Research Assistant (*Co-Advised by Mohammad Soleymani & Stefan Scherer*) — February 2020 − July 2020
- Developed vocal and linguistic feature extraction and representation extraction pipelines for analysis
- Published paper on automatic coding in therapy sessions via multimodal machine learning approach
- Published first author paper linking multimodal speech behaviors to psychological distress symptoms

NEUROLEX DIAGNOSTICS — Remote, San Jose, CA
Research Manager — April 2019 − January 2020
- Led research efforts and data science projects; managed and developed projects for 20 tribe members
- Developed computational analysis direction for clients including Harvard, Stanford, Biogen, LEO I-Lab
- Explored machine learning and signal processing methodology for internal product improvement

STANFORD SNAP LAB — Palo Alto, CA
Research Assistant (*Co-advised by Tiffany Chieng Ho & Ian Gotlib*) — August 2018 − June 2019
- Lead machine learning analysis across psychiatric data (digital phenotyping, voice, survey data)
- Piloted collaboration across institutions to develop robust ML models on language and acoustic data
- Co-first author abstract accepted to Society for Biological Psychiatry Conference 2019 on research

UW DIGIPSYCH LAB — Remote, San Jose, CA
Research Assistant (*Advised by Reza Hosseini Ghomi*) — April 2018 − June 2019
- Head developer of lab's data science team; supervised 12 undergraduate and graduate students.

- Built acoustic models of depression with near-SOTA performance on non-curated clinical datasets
- Published four manuscripts on voice biomarkers for depression, suicidal ideation, and cognitive decline

NVIDIA MIXED SIGNAL TEAM   Santa Clara, CA
Mixed Signal Intern   *March 2018 –March 2019*
- Deployed automation framework to accelerate data collection and analysis from key GPU endpoints
- Established end-to-end analytics framework for circuit verification insights from millions of datapoints
- Achieved 94% accuracy classifying silicon health of data; predicted parameters within ±0.5 loss range

FEATURED PUBLICATIONS

- **Zhang L**, Rahman MM, Morshed MB, Zhu L, Zhou H, O'Bryan J, Mendes WB, Kuang J; Feasibility of Cardiac Output Estimation Using Earbud Photoplethysmography Sensor, EMBC **2025.**
- Zhou H, Rahman MM, Morshed MB, Li Y, Islam MS, **Zhang L,** Bae J, Rosa C, Mendes WB, Kuang J; Know Your Heart Better: Multimodal Cardiac Output Monitoring using Earbuds, ICASSP **2025**
- **Zhang L**, Nathan V, Rosa C, Kuang J, Mendes WB, Gao JA; Morphological Photoplethysmography Features Enhance Stress Detection in Earbud Sensors. EMBC **2024**.
- Kumar AA, Apsel M, **Zhang L**, Xing N, Jones MN; forager: A Python package and web interface for modeling mental search. Behavioral Research Methods **2023**.
- **Zhang L**, Kolacz J, Rizzo AA, Scherer S, Soleymani S; Speech Behavioral Markers Align on Symptom Factors in Psychological Distress. Affective Computing and Intelligent Interaction (ACII) **2022**.
- **Zhang L**, Jones MN; Using "Semantic Scent" to Predict Item-Specific Clustering and Switching Patterns in Memory Search. Proceedings of the 43rd Annual Meeting of the Cognitive Science Society **2022.**
- **Zhang L,** Ngo AD, Thomas JA, et al. Neuropsychological Test Validation of Speech Markers of Cognitive Impairment in Framingham Cognitive Aging Cohort. Exploration of Medicine **2021**.
- Tavabi L, Stefanov K, **Zhang L**, et al. Multimodal Automatic Coding of Client Behavior in Motivational Interviewing. International Conference on Multimodal Interaction (ICMI) **2020.**
- Thomas JA, Burkhardt HA, Chaudhry S, et al. Assessing the Utility of Language and Voice Biomarkers to Predict Cognitive Impairment in the Framingham Heart Study Cognitive Aging Cohort Data. Journal of Alzheimers Disorder **2020**.
- **Zhang L,** Duvvuri R, Chandra K, et al. Automated voice biomarkers for depression symptoms using an online cross-sectional data collection initiative. Depression and Anxiety **2020**.

AWARDS, FUNDING, AND RECOGNITION

NSF AccelNet-Multinet Fellowship, Visiting Scholar	August 2023 – December 2023
Japan National Institute of Informatics, Visiting Scholar	January 2023 – May 2023
NSF-NRT Research Fellowship	August 2020 – August 2022
Young Investigator Award, Sage Assembly hosted by Sage Bionetworks	July 2019

EDUCATION

INDIANA UNIVERSITY BLOOMINGTON, LUDDY SCHOOL   Bloomington, IN
Dual Ph.D. in Intelligent Systems Engineering and Informatics   *August 2020 - Present*
Specialization in Neuroengineering and Complex Network Systems   GPA: 3.97/4.0
UNIVERSITY OF CALIFORNIA, SAN DIEGO, JACOBS SCHOOL OF ENGINEERING   San Diego, CA
B.S. in Electrical Engineering w/ Machine Learning and Controls Specialization   *June 2017*

SKILLS/ACTIVITIES

Research	Multimodal Behavior Sensing, Physiological Signal Processing, Time-Series Analysis, Affective Computing, Machine Learning, Cognitive Modeling, Contrastive Learning, Transfer Learning, Self-Supervised Learning, Domain Adaptation, Network Neuroscience, Human Computer Interaction, Data Visualization, User Studies, Eye Tracking, EEG, PPG, Scalable and Reproducible Science
Programming Languages	Python, C, C++, Java, MATLAB, CSS, HTML, Julia
AI/ML/DS Modules	Pytorch, Keras, Tensorflow, Tensorly, OpenCV, Scikit-learn, NumPy, Matplotlib, Seaborn, Plotly, Librosa, opensmile, transformers
Tools	GitHub, AWS, HPC, Qualtrics, Psychopy, Streamlit, snakemake
Languages	English & Chinese (Fluent), Japanese (Moderate)