#### Larry Zhang B.S.

Curriculum Vitae

Telephone: (408)-952-9318 Website: http://larryzhang.io Email: larryzhang.eng@gmail.com Github: http://github.com/larryzhang95 **Education** 2020 - Present Indiana University, Bloomington (Expected Graduation Date: December 2025) Dual PhD in Intelligent Systems Engineering and Complex Network Systems NSF-NRT Fellowship Awardee 2013 - 2017 University of California, San Diego BS in Electrical Engineering (specialization in Machine Learning and Controls) Academic Positions & Training May 2021 - Present Indiana University, Complex Network Systems Research Assistant (PI: YY Ahn, Co-Advisor) February 2021 - Present Indiana University, Cognitive Science Research Assistant (PI: Michael N. Jones) July 2020 - Present Indiana University, Intelligent Systems Engineering Research Assistant (PI: Greg Lewis, Co-Advisor) Research Assistant (PI: Katy Borner) February 2020 - July 2020 USC, Institute for Creative Technologies Project Assistant (PI(s): Mohammad Soleymani, Stefan Scherer) September 2018 - July 2019 Stanford University, Department of Psychology Research Assistant (PI: Ian Gotlib, Post-Doc: Tiffany Cheing Ho) April 2018 - June 2019 University of Washington - Seattle, Department of Neurology Research Manager (PI: Reza Hosseini Ghomi) UC San Diego, Department of Electrical Engineering September 2016 - June 2017 Undergraduate Researcher (PI: Kenneth Kreutz-Delgado)

### **Industry Positions & Internships**

September 2024 - December 2024 Research Intern, Future Product Innovations (Mentor: Pablo Paredes) June 2024 - September 2024 Sony Group R&D Japan, Human Sensing & Interaction Team Research Intern, Vital Sensing and Estimation (Mentor: Ryotaro Matsukawa) Jan 2024 - May 2024 Research Intern, Wearables (Mentors: Mahbubur Md Rahman, Mehrab bin Morshed) May 2023 - August 2023 Samsung Research America, Digital Health Team

	Research Intern, Wearables (Mentor: Viswam Nathan)
March 2018 - March 2019	Nvidia, Mixed Signal Design Team
	Intern, Mixed Signal Design Validation
June 2016 - September 2016	Nvidia, Mixed Signal Design Team
	Intern, Tooling
Funding & Awards	
August 2023 - December 2023	Accelnet-Multinet Fellow

	Visiting Scholar (\$10,000 stipend)
January 2023 - May 2023	National Institute of Informatics, Japan
	Visiting Scholar (~600,000 Yen stipend)
August 2020 - August 2022	NSF-NRT in Complex Network Systems Fellowship
	Funding for Graduate Studies
	\$34,000 stipend per annum
July 2019 Young Invest	stigator Award, Sage Assembly hosted by Sage Bionetworks

#### **Publications**

### Accepted, in press, or published

\* co-first authors

13. **Zhang L**, Rahman MM, Morshed MB, Zhu L, Zhou H, O'Bryan J, Mendes WB, Kuang J; Towards Cardiac Output Estimation Using Earbud Photoplethysmography Sensor. *47th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)* (2025). In press.

12. 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. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (2025). <u>https://doi.org/10.1109/ICASSP49660.2025.10890816</u>.

11. Kumar AA, Apsel M, **Zhang L**, Xing N, and Jones MN; forager: A Python Package and Web Interface for Modeling Mental Search. *Behavior Research Methods* (2024). <u>https://doi.org/10.3758/s13428-023-02296-x</u>.

10. **Zhang L,** Nathan V, Rosa C, Kuang J, Mendes WB, Gao JA; Morphological Photoplethysmography Features Enhance Stress Detection in Earbud Sensors. *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)* (2024). <u>https://ieeexplore.ieee.org/abstract/document/10782695</u>.

9. **Zhang L**, Kolacz J, Rizzo AA, Scherer S, Soleymani S; Speech Behavioral Markers Align on Symptom Factors in Psychological Distress. *Tenth International Conference on Affective* 

Computing and Intelligent Interaction (ACII) (2022). https://ieeexplore.ieee.org/abstract/document/9953849.

8. **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).* <u>https://escholarship.org/uc/item/67m4g3d9</u>.

7. **Zhang L\***, Ngo AD\*, Burkhardt HA, Thomas JA, Rhoda Au, Hosseini Ghomi R; Neuropathological Test Validation of Speech Markers of Cognitive Impairment *(2021)*. Exploration of Medicine. <u>https://doi.org/10.37349/emed.2021.00044</u>.

6. Tavabi L, Stefanov K, **Zhang L**, Borsari B, Woolley JD, Scherer S, Soleymani M; *Multimodal Automatic Coding of Client Behavior in Motivational Interviewing*. 22nd International Conference on Multimodal Interaction (2020). https://dl.acm.org/doi/10.1145/3382507.3418853.

5. **Zhang L,** Duvvuri R, Konda Lakshmi Chandra K, Nguyen T, Hosseini Ghomi R; *Automated Voice Biomarkers for Depression Systems using an Online Cross-Sectional Data Collection Initiative (2020)*. Depression and Anxiety. <u>https://doi.org/10.1002/da.23020</u>.

4. Thomas JA, Burkhardt HA, Chaudhry S, Ngo AD, Sharma S, **Zhang L**, Au R, Hosseini Ghomi R; Assessing the Utility of Language and Voice Biomarkers for Alzheimer's Disease: Predicting Neuropsychological Measures and Dementia Status in the Framingham Heart Study Cognitive Aging Cohort (2020). Journal of Alzheimer's Disease. <u>https://doi.org/10.3233/JAD-190783</u>.

3. Phi H, Janarthanan S, **Zhang L**, Hosseini Ghomi R; *Voice Biomarker Identification for Effects of Deep-Brain Stimulation on Parkinson's Disease.* (2020) <u>https://arxiv.org/abs/1912.00866.pdf</u>.

2. **Zhang L**, Driscol J, Chen X, Hosseini Ghomi R; Evaluating Acoustic and Linguistic Features of Detecting Depression Sub-Challenge Dataset. *AVEC 2019 9th International Audio/Visual Emotion Challenge and Workshop, ACM Multimedia (2019).* https://doi.org/10.1145/3347320.3357693

1. **Zhang L**, Chen X, Vakil A, Byott A, Hosseini Ghomi R; *DigiVoice: Voice Biomarker Featurization and Analysis Pipeline (2019)*. <u>https://arxiv.org/abs/1906.07222</u>.

# Preprints/Manuscripts Submitted, Under Revision, or Under Review

\* co-first authors

1. **Zhang L**, Paredes P, Chong L, Hong M, Hakimi S, Filipowicz AS, Klenk M; *Wow, Now I See It! - Leveraging Physiology of Surprise to Uncover Desirable Generative Designs (2025).* Under Review

### Preprints/manuscripts in preparation

\* co-first authors

## **Conference Presentations**

\* co-first presenters

6. Apsel M\*, **Zhang L\***, Kumar AA, Jones MN. *Semforager: A pipeline for evaluating semantic foraging methods in semantic fluency research*. Poster to be presented at SCiP(Society for Computation in Psychology) Satellite at Annual Meeting of the Psychonomics Society 2022.

5. **Zhang L**, Jones MN; Using "Semantic Scent" to Predict Item-Specific Clustering and Switching Patterns in Memory Search. Poster presented at Annual Meeting of the Cognitive Science Society 2022, Toronto, Canada.

4. Zhang L, Soleymani M. *Speech Behavioral Markers Align on Symptom Factors in Psychological Distress*. Poster presented at Conference of the International Society for Research on Emotion 2022, Los Angeles, CA.

3. **Zhang L**, Castro N, Cohen T, Hosseini Ghomi R; *Challenges in Estimating Dementia via Verbal Fluency Networks*. Poster presented at Annual Meeting of the Psychonomics Society 2020.

2. **Zhang L**, Castro N, Cohen T, Hosseini Ghomi R; *Probing Speech Generation via Semantic Fluency Networks in Aging Populations as a Proxy of Dementia and Alzheimer's Disease.* Oral Presentation at NetSci-X 2020, Tokyo, Japan.

1. Walker J\*, **Zhang L\***, Hosseini Ghomi R, Gotlib IH, Ho TC (2019) *Acoustic Vocal Features in the Subtyping of Adolescent Depression using Machine Learning*. Poster presented at the Annual Meeting of the Society of Biological Psychiatry, Chicago, IL.

# <u>Service</u>

IU Affective Computing Special Interest Group, Founding Organizer	2022
Luddy Undergraduate Research Opportunities Center, Mentor	2022

### **Reviewing**

Reviewer, BMC BioData Mining

### **Open Source Contributions**

forager - a python package and web interface for modeling mental search: <u>https://github.com/thelexiconlab/forager</u> Digivoice Automatic Voice Analysis Pipeline: <u>https://github.com/NeuroLexDiagnostics/Voice-Analysis-Pipeline</u> DigiPsych Prosodic Feature Extraction: <u>https://github.com/NeuroLexDiagnostics/DigiPsych\_Prosody</u>

### **Technical Skills**

Analysis Modules: TensorFlow, Keras, Pytorch, Sci-kit Learn, Numpy, Scipy, StatsModels, Pandas, Apache Spark, NetworkX, Tensorly, transformers Database Softwares: MySQL, Postgres Visualization Modules: Vega, Altair, Vega-Lite, Plotly, Seaborn, Matplotlib, Gephi, Fury.gl Programming: Python, C, C++, Java, CSS, HTML, UNIX Bash, Julia Other Tools: GitHub, AWS, HPC, Qualtrics, Psychopy, Streamlit, snakemake Spoken Languages: English (Native), Chinese (Fluent), Japanese (Conversational)

## Teaching and Mentorship

Masters Students Kiranmayi Konda Lakshmi Chandra (M.Sc. 2020); Currently Data Scientist at BT Group

### Undergraduate Students

Aoi Sugimoto; Currently B2 Neuroscience Student at Keio University Ting Wei Chou (B.Sc. 2023); Currently Lead Engineer at SVCamp, Masters in CS at UW. Anthony Dinh Ngo (B.Sc. 2022); Currently Data Scientist at Stackline Sungmin Park (B.Eng. 2021); Currently WUSTL PhD in Imaging Science Kathleen Williams (B.Sc. 2021); Currently University of Cincinnati PhD in Biomedical Informatics Ali Byott (B.Sc. 2021); Currently Cloud Software Engineer at Atlassian Sanjeev Janarthanan (B.Sc.2020); Currently University of Colorado Anschutz PhD in Neuroscience

Abbad Vakil (B.Sc. 2020); Currently Software Development Engineer at Stripe Joshua Driscol (B.Sc. 2019); Currently UNM PhD in Geography and Environmental Studies Sherry (Xiaotong) Chen (B.Sc. 2019); Currently UCSB PhD in Computer Science

# High School Students

Ethan Cantrell (2021); Currently Bioengineering Student at Georgia Tech

### **Research Areas and Interests**

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