

Larry Zhang B.S.
Curriculum Vitae

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Objective

Apply computational and cognitive models to develop cheap and noninvasive measures of wellbeing and neuropsychiatric state. Developed measures will be used to design intelligent affective interfaces for applications such as automatic therapy analysis, stress monitoring in the workplace, and continuous monitoring systems for psychiatric risk.

Education

2020 - Present

Indiana University, Bloomington

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)

September 2016 - June 2017

UC San Diego, Department of Electrical Engineering

Undergraduate Researcher (PI: Kenneth Kreutz-Delgado)

Funding & Awards

August 2023 - December 2023

Accelnet-Multinet Fellow

Visiting Scholar (Conditional Acceptance)

January 2023 - May 2023

National Institute of Informatics, Japan

Visiting Scholar (Conditional Acceptance)

August 2020 - August 2022

NSF-NRT in Complex Network Systems Fellowship

Funding for Graduate Studies

\$34,000 stipend per annum

July 2019

Young Investigator Award, Sage Assembly hosted by Sage Bionetworks

Ongoing Projects

Reference Organ Visualization (Brain)

Predictive Models of Semantic Memory Search

Tensor Decomposition of Edge Time Series in Functional Brain Connectivity

Vocal Analysis of Schizophrenia Patients with Oxytocin Intervention

Synchrony of Heart Rate Variability and Movement Behavior in Intimate Disclosure

Publications

Accepted, in press, or published

* co-first authors

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)*.

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

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*. (<https://doi.org/10.37349/emed.2021.00044>)

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

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

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. (<https://doi.org/10.3233/JAD-190783>)

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

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

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

Preprints/Manuscripts Submitted, Under Revision, or Under Review

* co-first authors

Preprints/manuscripts in preparation

* co-first authors

7. Bueckle A, **Zhang L**, Buehling K, Cross LE, Herr BW, Borner K. Graphical Interface Usability of Knowledge Graphs for Precision Medicine Applications.

6. **Zhang L**, Lewis GF, Cohen AS, Bradley E, Woolley J. Vocal Affect as a Key Identifier of Symptom Pathology in Schizophrenia Patients.

5. **Zhang L**, Jones MN, Todd PM. Generalization of Semantic Foraging via Switch-Cue Prediction.

4. **Zhang L**, Chou TW, Lewis GF. Cross-Modal Synchronization of Behavior and Physiology in newly-formed couples.

3. **Zhang L**, Jo Y, Betzel R, Sporns O, Ahn YY. Tensor Decomposition Methods for Measuring High Amplitude Co-fluctuation Phenomena in Functional Brain Networks with applications in Connectome Fingerprinting.

2. Apsel M* , **Zhang L***, Kumar AA*, Jones MN. Semforager: A pipeline for evaluating semantic foraging methods in semantic fluency research.

1. **Zhang L** , Chandio BQ, Bueckle A, Börner K; Cross-Mapping Anatomical Brain Atlases in MNI Space for Tissue Registration (2021).

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.

Service

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

Reviewing

Reviewer, BMC BioData Mining 2021

Professional Affiliations

April 2019 - March 2020

Neurolex Diagnostic Laboratories

Neurolex Research, Research Manager

March 2018 - April 2019

Nvidia Corporation

Mixed Signal Design Validation Team, Engineer

Open Source Contributions

Digivoice Automatic Voice Analysis Pipeline:

<https://github.com/NeuroLexDiagnostics/Voice-Analysis-Pipeline>

DigiPsych Prosodic Feature Extraction:

https://github.com/NeuroLexDiagnostics/DigiPsych_Prosody

Technical Skills

Analysis Modules: TensorFlow, Keras, Pytorch, Sci-kit Learn, Numpy, Scipy, StatsModels, Pandas, Apache Spark, NetworkX, Tensorly

Database Softwares: MySQL, Postgres

Visualization Modules: Vega, Altair, Vega-Lite, Plotly, Seaborn, Matplotlib, Gephi

Programming: Python, C, C++, Java, CSS, HTML, UNIX Bash, Julia

Teaching and Mentorship

Current Mentorship:

Undergraduate Students

Ting Wei Chou (B.Sc. 2023); Currently Computer Science Student at IU Bloomington.

Previous Mentorship:

Masters Students

Kiranmayi Konda Lakshmi Chandra (M.Sc. 2020); Currently Data Scientist at Jio

Undergraduate Students

Anthony Dinh Ngo (B.Sc. 2022); Currently Data Scientist at Allstate

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 Oracle

Sanjeev Janarthanan (B.Sc.2020) Currently Data Analyst at Princeton Neuroscience Institute

Abbad Vakil (B.Sc. 2020); Currently Software Development Engineer at Amazon

Joshua Driscoll (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