



## Xianghao Zhan

- Ph.D. Student in Bioengineering, admitted Autumn 2019
- Ph.D. Minor, Biomedical Data Science
- Student Employee, DASH
- 📄 Curriculum Vitae available Online

### Bio

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#### BIO

Xianghao Zhan is a 5th -year Ph.D. candidate at Stanford Bioengineering. He obtained his M.S in Bioengineering in 2021 and his M.S in Statistics in 2023 both at Stanford. Before that he got B. Eng. in Control Science and Engineering (Automation) and his B. Art in English Language and Literature with Summa Cum Laude at Chu Kochen Honors College, Zhejiang University, China, in 2019.

Under the guidance of Prof. Oliver Gevaert and Prof. David B. Camarillo, he mainly focuses on the optimization of computational modeling of traumatic brain injury with machine learning and animal modeling based on biomechanical and radiological data. His research interests and projects also extend to the data mining of free-text clinical notes with natural language processing, biomedical data fusion for COVID-19 patient outcome prediction, machine learning reliability quantification with conformal prediction, reliability-based semi-supervised learning, and domain adaptation for biomedical sensory systems (with artificial olfaction systems and surface electromyography systems). He has published 18 peer-reviewed articles as a first/co-first author (IF 131.3) in such journals as NPJ Digital Medicine, IEEE Transactions on Biomedical and Health Informatics, IEEE Transactions on Biomedical Engineering, Journal of Sport and Health Science, with 4 first-author journal articles under review. He has been a peer reviewer for 16 journals including Annals of Biomedical Engineering, Journal of Neurotrauma, Computer methods in biomechanics and biomedical engineering.

In addition to his research, he has two master degrees while pursuing his Ph.D. degree: BIOE 2021 and STATS 2023. He has taken more than 10 data science and machine learning courses at Stanford with course project experiences and technical background with UNet-based image segmentation, BERT, Transformer-XL, DeepSEA, BPNNet, VAE/SSVAE, flow model, energy-based model cycle-GAN, CNN-based image classification, LSTM-based clinical event prediction, Bi-LSTM-based neural machine translation, BERT, DCT/DWT/STFT, PCA, DRCA, NFL, convex optimization.

His research is recognized by the field and he was awarded with IET Postgraduate Research Award for an Outstanding Researcher (one awardee across the globe, first Chinese), Siebel Scholar Class of 2024, IET Healthcare Technology William James Award (one awardee across the globe), Stanford Interdisciplinary Graduate Fellowship (highest honor for interdisciplinary Stanford graduates), Pfeiffer Research Foundation Fellow, AMIA Trainee Award (six awardees, the only Chinese), American Society of Neurotrauma Trainee Award (20 awardees, the only Chinese), Chu Kochen Scholarship (12/23,000), Ten most Preeminent Students of Zhejiang University (10/36,000), Chinese National Scholarship (Top 0.2%).

He is dedicated to support underrepresented minorities. He has been a program leader for Stanford Summer Research Program and mentored 3 undergrads from the underrepresented minorities. He has been a research mentor at Foothill College for two years and mentored latino students from local community college. Additionally,

he is a sports fan with 13 Stanford Intramural champions (10 volleyball, 3 tennis) and two medals from regional volleyball tournaments. He enjoys the sport passion and team spirits as a captain.

## HONORS AND AWARDS

- The Gustavus and Louise Pfeiffer Research Graduate Fellowship, Stanford University (09/25/2023)
- Siebel Scholar Class of 2024, Siebal Foundation (08/24/2023)
- 2022 IET Postgraduate Scholarship for an Outstanding Researcher, The Institute of Engineering and Technology (7/31/2022)
- 2022 Stanford Interdisciplinary Graduate Fellowship (SIGF), Stanford University, Wu Tsai Neuroscience Institute (5/27/2022)
- 2022 IET Healthcare Technologies Student and Early Career Awards - William James Award, The Institute of Engineering and Technology (9/23/2022)
- Pfeiffer Research Foundation Fellow, Stanford University (09/17/2022)
- 2021 Chinese Government Award for Outstanding Self-financed Students Abroad, Chinese Ministry of Education (7/28/2022)
- 8-time Intramural Volleyball Champions, Stanford University (08/18/2023)
- 3-time Intramural Tennis Champions, Stanford University (8/27/2021)
- 2023 AMIA IS23 LEAD Trainee and Early Career Meeting Scholarship, American Medical Informatics Association (2/22/2023)
- 2022 National Neurotrauma Society Trainee Travel Award, American National Neurotrauma Society (6/29/2022)
- 2022 IET National Travel Award, The Institute of Engineering and Technology (10/6/2022)
- ISCB 2022 Best Presenter Award (CAMDA Tract), International Society of Computational Biology (7/12/2022)
- ISMB/ECCB 2021 Best Talk Award (CAMDA Tract), ISMB/ECCB (7/30/2021)
- IET PresentIn10 Competition Category Winner of Healthy Lives; International Grand Finalist (Top 3), The Institution of Engineering and Technology (7/6/2021)
- James Clark Graduate Fellowship, Stanford University (09/14/2020)
- 2019 IET Cyber-systems and Robotics Research Article Contest. Second Prize. (Top 5 Awardee), IET Cyber-systems and Robotics (11/24/2019)
- Winner of IET Present Around The World National Final 2019, Institute of Engineering and Technology(IET) (5/31/2019)
- 2019 IEEE International Conference on Bioinformatics and Computational Biology Best Presenter, 2019 IEEE International Conference on Bioinformatics and Computational Biology (3/24/2019)
- Chu Kochen Scholarship (Summa Cum Laude), Zhejiang University (12/31/2018)
- Ten Most Preeminent Students of 2017, Zhejiang University (12/31/2017)
- Chinese National Scholarship, Ministry of Education of the People's Republic of China (12/31/2016)
- Excellent Graduate of Zhejiang Province, Department of Education of Zhejiang Province (7/1/2019)
- First-level fellowship of Chinese Instrument and Control Society, Chinese Instrument and Control Society (4/28/2019)
- Cambridge Trust International Scholarship, University of Cambridge (2/18/2019)
- 2018-2020 Zhebao-Ali Jike Award Project, Zhejiang University (1/2/2020)
- Chu Kochen Honors College Preeminence Scholarship, Chu Kochen Honors College, Zhejiang University (12/20/2018)
- Chunhui Scholarship and Chunhui Star Honor, College of Control Science and Engineering, Zhejiang University (06/01/2019)

## PROFESSIONAL AFFILIATIONS AND ACTIVITIES

- Student Member, American Medical Informatics Association (2023 - present)
- Student Member, IEEE Engineering in Medicine and Biology Society (2022 - present)
- Student Member, American National Neurotrauma Society (2022 - present)
- Graduate Student Member, Chinese Neurotrauma Scholar Association (2022 - present)
- Student Member, The Institution of Engineering and Technology (IET) (2021 - present)
- Member, Chinese Automation Society (2018 - present)

- Member, Chinese Instrument and Control Society (2019 - present)

## EDUCATION AND CERTIFICATIONS

- Master of Science, Stanford University , STATS-MS (2023)
- Master of Science, Stanford University , BIOE-MS (2021)
- B. Eng, Zhejiang University , Automation (Control Science and Engineering), Summa Cum Laude (2019)
- B. Art, Zhejiang University , English Language and Literature, Summa Cum Laude (2019)
- Non-degree programme, University of Cambridge , Graduation Project on Acoustic Particle Trapping (2019)
- Non-degree programme, UCLA , Cross-disciplinary Scholars in Science and Engineering, Radiology and MRI (2018)

## SERVICE, VOLUNTEER, AND COMMUNITY WORK

- Program Manager at Stanford Summer Research Program (5/1/2021 - 9/1/2021)
- Research Mentor at Foothill College SLI Internship (1/12/2022)
- Volunteer of Stanford Brain Day (2/27/2020 - 2/27/2020)
- Captain of Chu Kochen Honors College Men's Volleyball Team (December 12, 2016 - October 30, 2018)
- Teaching assistant at University of Washington/University of Wisconsin China Summer Lab (June 27, 2018 - July 10, 2018)
- Volunteer and organizer of AIESEC International Volunteer Project in Zhengzhou (July 1, 2016 - August 1, 2016)
- Volunteer at Ramsey County Library System in Minnesota (June 1, 2015 - July 10, 2015)
- Leader of Chu Kochen International and Translation Workshop (September 1, 2018 - July 21, 2019)
- Member at Zhejiang University Youth League (September 14, 2015 - September 2, 2016)
- Member at Chu Kochen Honors College Student Union (September 14, 2015 - September 1, 2016)
- “Big Data and New Development Motivation in Guiyang Province” Summer social practice and field trip (August 1, 2016 - August 15, 2016)
- Founder of ZML Lab-A Platform for the Publication of Science and Sharing of Researches (10/22/2019)
- Captain of Lightning Storm, Winner of Stanford Intramural Volleyball League Division 1-2020 (1/22/2020 - 3/3/2020)
- Cofounder of Case Crossover COVID-19 Science Communication Platform (3/23/2020)

## PERSONAL INTERESTS

In my spare time, I love playing volleyball, badminton, tennis and singing. I have award-winning experiences respecting these four hobbies in my undergraduate life. You could find me if planning to play volleyball, beach volleyball, badminton and tennis or if you plan to go karaoke. Meanwhile, I am keen and passionate in languages. I love communicating with different people in English, doing C-E bilingual translation and I am currently learning Spanish for half a year. With these interests, I am really eager to make more friends here on Stanford Campus.

## LINKS

- My linkedIn: <https://www.linkedin.com/in/xianghao-sam-zhan-1140a616b/>

## Research & Scholarship

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### RESEARCH INTERESTS

- Brain and Learning Sciences
- Data Sciences
- Literacy and Language

## Publications

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### PUBLICATIONS

- **A wearable hydraulic shock absorber with efficient energy dissipation** *INTERNATIONAL JOURNAL OF MECHANICAL SCIENCES*  
Cecchi, N. J., Liu, Y., Vegesna, R. V., Zhan, X., Yang, W., Campomanes, L., Grant, G. A., Camarillo, D. B.  
2024; 270
- **Differences In Strain Distribution Across Brain Regions In Non-concussive Collegiate Football Head Impacts**  
Le Flao, E., Zhan, X., Cecchi, N. J., Liu, Y., Callan, A. A., Watson, L. P., Pang, C., Grant, G. A., Zeineh, M. M., Camarillo, D. B.  
LIPPINCOTT WILLIAMS & WILKINS.2023: 416
- **Toward more accurate and generalizable brain deformation estimators for traumatic brain injury detection with unsupervised domain adaptation.** *ArXiv*  
Zhan, X., Sun, J., Liu, Y., Cecchi, N. J., Le Flao, E., Gevaert, O., Zeineh, M. M., Camarillo, D. B.  
2023
- **Padded Helmet Shell Covers in American Football: A Comprehensive Laboratory Evaluation with Preliminary On-Field Findings.** *Annals of biomedical engineering*  
Cecchi, N. J., Callan, A. A., Watson, L. P., Liu, Y., Zhan, X., Vegesna, R. V., Pang, C., Le Flao, E., Grant, G. A., Zeineh, M. M., Camarillo, D. B.  
2023
- **Machine-learning-based head impact subtyping based on the spectral densities of the measurable head kinematics.** *Journal of sport and health science*  
Zhan, X., Li, Y., Liu, Y., Cecchi, N. J., Raymond, S. J., Zhou, Z., Alizadeh, H. V., Ruan, J., Barbat, S., Tiernan, S., Gevaert, O., Zeineh, M. M., Grant, et al  
2023
- **Correction: Identifying Factors Associated with Head Impact Kinematics and Brain Strain in High School American Football via Instrumented Mouthguards.** *Annals of biomedical engineering*  
Cecchi, N. J., Domel, A. G., Liu, Y., Rice, E., Lu, R., Zhan, X., Zhou, Z., Raymond, S. J., Sami, S., Singh, H., Rangel, I., Watson, L. P., Kleiven, et al  
2023
- **Laboratory And On-field Testing Of A Commercially Available Padded Helmet Cover**  
Cecchi, N. J., Callan, A. A., Watson, L. P., Liu, Y., Zhan, X., Zeineh, M. M., Grant, G. A., Camarillo, D. B.  
LIPPINCOTT WILLIAMS & WILKINS.2022: 45
- **Piecewise Multivariate Linearity Between Kinematic Features and Cumulative Strain Damage Measure (CSDM) Across Different Types of Head Impacts.** *Annals of biomedical engineering*  
Zhan, X., Li, Y., Liu, Y., Cecchi, N. J., Gevaert, O., Zeineh, M. M., Grant, G. A., Camarillo, D. B.  
2022
- **Reliably Filter Drug-induced Liver Injury Literature with Natural Language Processing and Conformal Prediction.** *IEEE journal of biomedical and health informatics*  
Zhan, X., Wang, F., Gevaert, O.  
2022; PP
- **A REAL-TIME SYSTEM TO MONITOR BRAIN STRAIN TO DETECT DANGEROUS HEAD IMPACTS**  
Zhan, X., Liu, Y., Gevaert, O., Zeineh, M., Camarillo, D.  
MARY ANN LIEBERT, INC.2022: A22
- **Find the spatial co-variation of brain deformation with principal component analysis.** *IEEE transactions on bio-medical engineering*  
Zhan, X., Liu, Y., Cecchi, N. J., Gevaert, O., Zeineh, M., Grant, G., Camarillo, D. B.  
2022; PP
- **Unsupervised Cross-User Adaptation in Taste Sensation Recognition Based on Surface Electromyography** *IEEE Transactions on Instrumentation and Measurement*  
Wang, H., Zhan, X., Liu, L., Ullah, A., Li, H., Gao, H., Wang, Y., Hu, R., Li, G.  
2022; 71
- **Translational models of mild traumatic brain injury tissue biomechanics** *Current Opinion in Biomedical Engineering*  
Zhan, X., Oeur, A., Liu, Y., Zeineh, M. M., Grant, G. A., Margulies, S. S., Camarillo, D. B.  
2022; 24

- **CPSC: Conformal prediction with shrunken centroids for efficient prediction reliability quantification and data augmentation, a case in alternative herbal medicine classification with electronic nose** *IEEE Transactions on Instrumentation and Measurement*  
Liu, L., Zhan, X., Yang, X., Guan, X., Wu, R., Wang, Z., Luo, Z., Wang, Y., Li, G.  
2022
- **Towards a comprehensive delineation of white matter tract-related deformation.** *Journal of neurotrauma*  
Zhou, Z., Li, X., Liu, Y., Fahlstedt, M., Georgiadis, M., Zhan, X., Raymond, S. J., Grant, G., Kleiven, S., Camarillo, D. B., Zeineh, M.  
2021
- **Identifying Factors Associated with Head Impact Kinematics and Brain Strain in High School American Football via Instrumented Mouthguards.** *Annals of biomedical engineering*  
Cecchi, N. J., Domel, A. G., Liu, Y., Rice, E., Lu, R., Zhan, X., Zhou, Z., Raymond, S. J., Sami, S., Singh, H., Rangel, I., Watson, L. P., Kleiven, et al  
2021
- **Predictive Factors of Kinematics in Traumatic Brain Injury from Head Impacts Based on Statistical Interpretation.** *Annals of biomedical engineering*  
Zhan, X., Li, Y., Liu, Y., Domel, A. G., Alizadeh, H. V., Zhou, Z., Cecchi, N. J., Raymond, S. J., Tiernan, S., Ruan, J., Barbat, S., Gevaert, O., Zeineh, et al  
2021
- **Time Window of Head Impact Kinematics Measurement for Calculation of Brain Strain and Strain Rate in American Football.** *Annals of biomedical engineering*  
Liu, Y., Domel, A. G., Cecchi, N. J., Rice, E., Callan, A. A., Raymond, S. J., Zhou, Z., Zhan, X., Li, Y., Zeineh, M. M., Grant, G. A., Camarillo, D. B.  
2021
- **AI-based analysis of CT images for rapid triage of COVID-19 patients.** *NPJ digital medicine*  
Xu, Q., Zhan, X., Zhou, Z., Li, Y., Xie, P., Zhang, S., Li, X., Yu, Y., Zhou, C., Zhang, L., Gevaert, O., Lu, G.  
2021; 4 (1): 75
- **Rapid Estimation of Entire Brain Strain Using Deep Learning Models** *IEEE Transactions on Biomedical Engineering*  
Zhan, X., Liu, Y., Raymond, S. J., Vahid Alizadeh, H., Domel, A. G., Gevaert, O., Zeineh, M. M., Grant, G. A., Camarillo, D.  
2021: 11
- **Boost AI Power: Data Augmentation Strategies with Unlabeled Data and Conformal Prediction, a Case in Alternative Herbal Medicine Discrimination with Electronic Nose** *IEEE Sensors Journal*  
Liu, L., Zhan, X., Wu, R., Guan, X., Wang, Z., Pilanci, M., Luo, Z., Li, G., Wang, Y.  
2021: 1-11
- **Structuring clinical text with AI: Old versus new natural language processing techniques evaluated on eight common cardiovascular diseases** *Patterns*  
Zhan, X., Humbert-Droz, M., Mukherjee, P., Gevaert, O.  
2021: 100289
- **The relationship between brain injury criteria and brain strain across different types of head impacts can be different** *Journal of Royal Society Interface*  
Zhan, X., Li, Y., Liu, Y., Domel, A. G., Vahid Alidazeh, H., Raymond, S. J., Ruan, J., Barbat, S., Tienan, S., Gevaert, O., Zeineh, M., Grant, G., Camarillo, et al  
2021; 18 (20210260)
- **An Optimized Deep Convolutional Neural Network for Dendrobium Classification Based on Electronic Nose** *Sensors and Actuators A: Physical*  
Wang, Y., Diao, J., Wang, Z., Zhan, X., Zhang, B., Li, N., Li, G.  
2020; 302
- **An electronic nose-based assistive diagnostic prototype for lung cancer detection with conformal prediction** *Measurement*  
Zhan, X., Wang, Z., Yang, M., Luo, Z., Wang, Y., Li, G.  
2020
- **Particle Trapping with Modulated Acoustic Wave** *2019 Chinese Automation Congress*  
Zhan, X., Li, N., Stevenson, A. C., Li, G., Hu, R.  
2019
- **Fast T1, T2 evaluation with machine learning for quantitative cardiac MRI** *2019 Annual Meeting of International Society of Magnetic Resonance in Medicine*  
Zhan, X., Shao, J., Hu, P.  
ISMRM.2019

- **Feature Engineering in Discrimination of Herbal Medicines from Different Geographical Origins with Electronic Nose** *2019 IEEE 7th International Conference on Bioinformatics and Computational Biology*  
Zhan, X., Guan, X., Wu, R., Wang, Z., Wang, Y., Li, G.  
2019: 7
- **Discrimination between Alternative Herbal Medicines from Different Categories with the Electronic Nose** *SENSORS*  
Zhan, X., Guan, X., Wu, R., Wang, Z., Wang, Y., Li, G.  
2018; 18 (9)
- **NU-WAY, an Application of Numerical Methods in Campus Running Route Evaluation**  
Zhan Xianghao, Yang Xikai, Zhang Jianming, IEEE  
IEEE.2018: 798–803
- **Online conformal prediction for classifying different types of herbal medicines with electronic nose** *IET Doctoral Forum on Biomedical Engineering, Healthcare, Robotics and Artificial Intelligence 2018 (BRAIN 2018)*  
Zhan, X., Guan, X., Wu, R., Wang, Z., Wang, Y., Luo, Z., Li, G.  
IET Digital Library.2018: 8

## PRESENTATIONS

- Fast T1, T2 Evaluation with Machine Learning for quantitative Cardiac MRI - International Society of Magnetic Resonance in Medicine(ISMRM) 2019 (May 12, 2019 - May 17, 2019)
- Online conformal prediction for classifying different types of herbal medicines with electronic nose. - IET Doctoral Forum on Biomedical Engineering, Healthcare, Robotics and Artificial Intelligence 2018 (November 4, 2018 - 11/4/2018)
- Feature engineering in discrimination of herbal medicines from different geographical origins with electronic nose. - IEEE 7th International Conference on Bioinformatics and Computational Biology (March 20, 2019 - March 21, 2019)
- Application of machine learning in deafness prediction with mitochondrial DNA mutations. - 5th National Undergraduates' Innovation Forum in Basic Medical Sciences (May 23, 2018 - May 27, 2018)
- Discrimination of alternative herbal medicine of different categories and origins with electronic nose. - 11th National University Student Innovation Forum (October 7, 2018 - October 12, 2018)