Yuanyuan Zhou

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https://zhouyuanyuan6.github.io/

SUMMARY

Proficient in multi-modal physiological signals analysis, state space modelling, closed-loop control, and machine learning, and 3D models design and manufacturing with hands-on experience.

EDUCATION

University of Maryland, College Park, MD, United States **Jan 2022-Expected May 2026**
Ph. D student in Mechanical Engineering GPA: 3.8/4.0

Tennessee State University, Nashville, TN, United States **Aug 2016-May 2019**
M.S. in Mechanical & Manufacturing Engineering GPA: 4.0/4.0

Zhejiang University, Zhejiang Province, China **Sep 2012-Jun 2016**
B.S. in Energy and Environment System Engineering GPA: 3.88/4.0

SKILLS / MAIN COURSES

Programming Skills: C#, MATLAB, Python
Computer Tools: AutoCAD, SolidWorks, Simulink, Office Suite
Main Courses: Machine Design, Thermodynamics, Fluid Mechanics, Advanced System Control, Dynamic Systems, Engineering Optimization, Applied Machine Learning, Fundamentals of AI and deep learning

EXPERIENCE AND PROJECT

Graduate Research Assistant, *University of Maryland, MD* *Jan 2022-Present*

- Developed a state-space model with Georgia Tech team, for the first time, to capture cardiovascular responses to acute mental stress and stress mitigating effect of transcutaneous median nerve stimulation.
- Developed a novel inference-based algorithm for continuous mental stress states tracking, utilizing wearable-enabled multi-modal physiological signals and advanced machine learning techniques to ascertain stress probability with a high level of confidence which outperformed state-of-the-art.
- Evaluated the performance of commercial ECG and PPG wearables in monitoring heart rate and variability across exercise intensities in collaboration with Johns Hopkins APL. Additionally, developed analytic formulas to determine the required sampling rate for accurately calculating heart rate and its variability for the first time.
- Collaborated with teams from Georgia Tech and the University of Maryland, Baltimore County, to conduct hemodynamic data analysis during hemorrhage and resuscitation procedures and develop deep learning algorithm to estimate invasive cardiac output via non-invasive measures.
- Conducted data analysis on obstructive sleep apnea using the large-scale Multi-Ethnic Study of Atherosclerosis dataset in collaboration with University of Washington.

Assistant Manager, *Wonder Porcelain Group LLC, TN* *Jan 2020-Jan 2022*

- Drove and implemented plantwide lean manufacturing and continuous improvement program.
- Set up Spare Parts Inventory Management System and managed vendors to maintain great relationship.
- Oversaw and coordinated $1M ‘Crusher and Conveyor System Installation Project’ efficiently.

Mechanical Engineer, *Wonder Porcelain Group LLC, TN* *Oct 2018- Jan 2020*

- Supervised Sorting & Quality Control Department and established a comprehensive workforce-equipment-production system to increase production efficiency by 30% and overall quality by 2%.
- Coordinated $10M Company Expansion Project’s equipment installation, modification, and test.
- Assisted contract engineers in designing and modifying CAD drawings using AutoCAD.

Graduate Research Assistant, *Tennessee State University, TN* *Aug 2016-May 2019*

- Created 3D CAD models by SolidWorks and rendered them in the virtual environment.
- Conducted multi-modal sensors (lidar, radar) modeling and imagery data generation in the virtual environment and developed machine learning based image processing algorithm.
- Engaged in advanced transportation system research, including numerical analysis on operational control of high-speed capsular vehicles.

SELECTED PUBLICATIONS

- **Zhou, Y.**, Masoumi Shahrbabak, S., Bahrami, R., Rahman, F. N., Sanchez-Perez, J. A., Gazi, A. H., Inan, O. T., & Hahn, J. O. (2025). Non-Pharmacological Mitigation of Acute Mental Stress-Induced Sympathetic Arousal: Comparison Between Median Nerve Stimulation and Auricular Vagus Nerve Stimulation. Sensors, 25(5), 1371. https://doi.org/10.3390/s25051371
- **Zhou, Y.**, Parreira, J. D., Shahrbabak, S. M., Sanchez-Perez J. A., Rahman F., Gazi, A. H., Inan, O. T., & Hahn, J. O. (2024). A Synthetic Multi-Modal Variable to Capture Cardiovascular Responses to Acute Mental Stress and Transcutaneous Median Nerve Stimulation. IEEE transactions on bio-medical engineering, PP, 10.1109/TBME.2024.3453121. https://doi.org/10.1109/TBME.2024.3453121
- **Zhou, Y.**, Mousavi, A. S., Chalumuri, Y. R., Parreira, J. D., Modak, M., Sanchez-Perez, J. A., Gazi, A. H., Inan, O. T., & Hahn, J. O. (2024). Inference-enabled tracking of acute mental stress via multi-modal wearable physiological sensing: A proof-of-concept study. Biocybernetics and Biomedical Engineering, 44(4), 771–781. https://doi.org/10.1016/J.BBE.2024.09.004
- **Zhou, Y.**, Lindsey, B., Snyder, S., Bell, E., Reider, L., Vignos, M., Bar-Kochba, E., Mousavi, A., Parreira, J., Hanley, C., Shim, J. K., & Hahn, J. O. (2024). Sampling rate requirement for accurate calculation of heart rate and its variability based on the electrocardiogram. Physiological measurement, 45(2), 10.1088/1361-6579/ad252d. https://doi.org/10.1088/1361-6579/ad252d

SELECTED CONFERENCE PRESENTATIONS

- "A State Space Model to Capture Cardiovascular Responses to Acute Mental Stress and Transcutaneous Median Nerve Stimulation", *IEEE-EMBS International Conference on Body Sensor Networks (Chicago, USA)*, Oct 2024 (Poster).
- "A Synthetic Multi-Modal Variable to Capture Cardiovascular Responses to Acute Mental Stress and Transcutaneous Median Nerve Stimulation", *IEEE Engineering in Medicine and Biology Society (Orlando, USA)*, Jul 2024 (Poster).
- "Mental Stress Tracking via Multi-Modal Wearable Physiological Sensing and Collective Inference", *IEEE-EMBS International Conference on Biomedical and Health Informatics (Pittsburgh, USA),* Oct 2023 (Oral).

AWARDS & HONORS

- Outstanding Graduate Research Award AY2024-25, University of Maryland Feb 2025
- Student Travel Award, IEEE-EMBS BSN conference, Chicago, USA Oct 2024
- 3rd Place of 40th TSU Annual Research Symposium Oral Presentation, Tennessee State University, Nashville, USA Apr 2018
- "Excellent Bachelor Dissertation Award", Zhejiang University, Hangzhou, China Jun 2016
- "Outstanding Merits", Zhejiang University, Hangzhou, China Oct 2014
- "Provincial Merit Student", Hebei Province, China May 2012

CERTIFICATE

Engineer in Training Certificate (EIT), Tennessee State May 2018