Jiayu Chen

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EDUCATION

University of Georgia | Athens, GA | Aug 2024 - Present
Ph.D. in Electrical and Computer Engineering | GPA: 4.0/4.0 | Advisor: Prof. Wenzhan Song

Hohai University | Nanjing, China | Sep 2020 - May 2024
B.Eng. in Software Engineering | GPA: 4.80/5.00

SELECTED IMPACTS

- Rapidly prototyped a chair-based health monitoring system. MillerKnoll, one of the world's largest furniture manufacturers, purchased 15 units for a pilot now under evaluation after laboratory visits by multiple senior vice presidents.
- Developed the core contactless respiration-monitoring algorithm for BedDot (G1), contributing to FDA 510(k) clearance K253274 as a breathing-frequency monitor (June 2026). FDA validation covered 52 adults and reported a respiratory-rate MAE of 1.77 breaths/min.
- U.S. patent application is filed for SeismoApnea, a contact-free bed-mounted geophone system for overnight apnea/hypopnea detection, total sleep time estimation, and sleep-apnea severity classification.

SELECTED PUBLICATIONS

- **J. Chen**, et al. *SelfDenoiser: Self-supervised Seismic Signal Denoiser for Continuous and Contactless Cardiac Monitoring. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (PACM IMWUT)*, 9(4), 2025. **[CORE A* | CCF-A]**
- Y. Song*, **J. Chen***, et al. *Contactless Sleep Apnea Detection with Bodyseismography. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (PACM IMWUT)*, 10(2), 2026. **[CORE A* | CCF-A]**
- Y. Song*, **J. Chen***, et al. *Attention Feature Fusion with Cluster Contrastive Learning for Snoring and Breath-Holding Detection Using Seismic Sensing. IEEE International Conference on Pervasive Computing and Communications (PerCom)*, 2026. **[CORE A* | CCF-B]**
- Y. Song*, **J. Chen***, et al. *SeatVitals: Geophone-Based Unobtrusive Vital Sign Monitoring for Office Environments.* Accepted, *Computing in Cardiology (CinC)*, 2026.

* Equal contribution.

UNDER REVIEW

- **Jiayu Chen**, Zixuan Zeng, Yingjian Song, Jiahui Li, Zhenlin An, Xiang Zhang, Fei Dou, Deepak Das, Bradley Phillips, and WenZhan Song. *SeismoApnea: Bodyseismography-Based Overnight Sleep Apnea Monitoring and Apnea-Hypopnea Index Estimation.* Under review.
- **Jiayu Chen**, Yida Zhang, Zixuan Zeng, Yuanyuan Zhang, Yingjian Song, Xinyu Shi, Xiao Yin, Bradley G. Phillips, Zhenlin An, Xiang Zhang, Fei Dou, and WenZhan Song. *SeismoHRV: Rhythm Transfer from ECG for Robust Bodyseismography HRV Monitoring.* Under review.
- **Jiayu Chen**, Yingjian Song, Zixuan Zeng, Yida Zhang, Yuanyuan Zhang, Yixuan Li, Bradley G. Phillips, Xiang Zhang, Fei Dou, Deepak Kumar Das, and Wenzhan Song. *Contactless Snoring and Central Sleep Apnea Monitoring with BodySeismography: Attention Feature Fusion and Cluster-Level Contrastive Learning.* Under review.

PRESENTATIONS

- **Poster Presentation.** *Body Seismography for Infant Vital Signs Monitoring.* Pediatric Healthcare Innovation Summit, Atlanta, GA, 2025.
- **Conference Oral Presentation.** *Contactless Bed-Based Bodyseismography for Sleep Staging and Sleep Apnea Monitoring.* HRX 2026 Innovation Summit, Atlanta, GA, 2026.

Jiayu Chen | Research Curriculum Vitae

RESEARCH EXPERIENCE

University of Georgia | Ph.D. | Athens, GA | Aug 2024 - Present

- **Sleep Monitoring**
  - **Respiration Rate:** Developed the core contactless respiratory-rate (RR) algorithm for FDA-cleared BedDot (G1). FDA validation covered 52 adults and reported a respiratory-rate MAE of 1.77 breaths/min.
  - **Sleep Respiratory Disorder:** Developed SeismoApnea, a contact-free tri-axial geophone system for overnight sleep-apnea monitoring that estimates total sleep time (TST), Apnea-Hypopnea Index (AHI), and four-class apnea severity. Across 80 overnight recordings, the system achieved an AHI ICC of 0.870 and a severity macro F1 of 73.11%. FDA clearance is being pursued specifically for AHI estimation.
- **Cardiovascular Monitoring**
  - **SelfDenoiser:** Developed and deployed a self-supervised temporal-spectral framework trained on 11,392 hours of ICU BCG recordings as the core denoising module for contactless cardiac monitoring; it is part of a filed FDA submission for HR monitoring.
  - **HRV:** Developed SeismoHRV by transferring rhythm knowledge from over 30,500 hours of public ECG to contactless HRV estimation. Across more than 7,100 hours of seismic data from 534 subjects, ECG pretraining reduced SDRR, RMSSD, and pRR50 errors by 43.5%, 32.1%, and 32.7%, respectively.
- **Office Health Monitoring:** MillerKnoll, one of the world's largest furniture manufacturers, purchased 15 units for a pilot now under evaluation after laboratory visits by multiple senior vice presidents. Developed a contactless vital-sign monitoring system for real-world office environments, achieving heart-rate and respiratory-rate MAEs of approximately 3.9 bpm and 2.4 breaths/min, with 88% and 21% temporal coverage, respectively.
- **Infant Monitoring:** Data collection is underway at Children's Healthcare of Atlanta (CHOA) using a contactless tri-axis geophone system in bassinet, incubator, and crib settings. Preliminary signal-quality analysis demonstrates the feasibility of monitoring occupancy, heart rate, respiratory rate, sleep/wake states, and crying.

TECHNICAL SKILLS

Methods: Self-Supervised Learning, Contrastive Learning, Time-Series Modeling, Signal Processing
Frameworks: PyTorch, scikit-learn, NumPy, SciPy, pandas
Signals: BCG/BSG, ECG, PPG
Systems: Real-Time Inference, MQTT, InfluxDB, Grafana, Linux
Programming: Python, C, SQL, LaTeX, Git

HONORS AND SERVICE

Honor: National Scholarship of China (top 2% of undergraduate students)
Peer Review: ACM IMWUT/UbiComp; IEEE Journal of Biomedical and Health Informatics (JBHI)
Teaching: Teaching Assistant, CSEE 8300: Principles of Cyber-Physical Systems