Harshit Sharma

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Google Scholar, LinkedIn, Github

EDUCATION

Ph.D. Computer and Information Science, Arizona State University, Tempe, AZ (exp.) 05/27
(GPA: **3.98/4.0**)
B.S. Computer and Information Science, BMS College of Engineering, Bangalore, India 2019
(GPA: **4.0/4.0**)

EXPERIENCE

Graduate Research Associate, (Fulton Fellowship), School of Computing and Augmented Intelligence, Arizona State University
Supervised by Dr. Asif Salekin 2024–Present

- Implemented AI-driven models for analyzing human-centric data in the *Ubiquitous and Intelligent Sensing (UIS) Lab*, focusing on fairness, privacy, and interpretability.
- Pioneered diffusion-based generative models for acoustic-articulatory representation learning.
- Conceptualized novel fairness enhancing mechanisms for human-centric Federated learning using loss landscape properties.
- Building privacy and utility preserving synthetic data generation pipelines for human-centric data.
- Worked with advanced UWB sensors (Estimote,Vayyar,Walabot) and point cloud data for detecting health biomarkers and human presence.
- Engineered deep learning solutions for real-time analysis of physiological signals (heart rate, skin conductance), IMU sensor data, and audio features (formants, MFCCs).
- Conducted fairness and explainability (XAI) evaluations using SHAP and LIME to interpret deep learning and machine learning models.
- Designed affect detection models leveraging thermal and RGB images for human emotion and stress recognition.
- Developed novel multi-modal fusion techniques integrating wearable sensor data (Empatica E4, Biopac) for psycho-physiological arousal analysis.

Research Assistant, Syracuse University, College of Engineering and Computer Science
Supervised by Dr. Asif Salekin 2020–2024

Research Assistant, M.I.N.D Lab Syracuse University 2019
Supervised by Dr. Mark Costa

- Developed a NodeJS and Neo4j graph database backend for analyzing and collecting physiological data, supporting mindfulness interventions in AR/VR.

RESEARCH FOCUS

My research advances trust in multimodal human sensing by developing machine learning methods that are interpretable, fair, and privacy-preserving. I focus on algorithmic techniques that generalize across heterogeneous data sources, mitigate spurious correlations, and protect sensitive information in complex real-world environments. While my methods are evaluated in applications such as monitoring opioid use disorder (OUD), stuttering, depression, and stress, the core contribution lies in building trustworthy foundations for human-centered AI. My research integrates principles from machine learning, ubiquitous computing, and algorithmic fairness to support reliable and equitable sensing systems.

PROGRAMMING COMPETENCES

Languages and Libraries: Python, Julia, Java, C++, NodeJS, Android, Pytorch, Pytorch Mobile, Keras, Librosa, Optuna, Pandas, Numpy, Matplotlib, scikit-learn, SQL, SHAP, LIME, Captum, Praat, PraatIO, AI Fairness 360, Flower Framework

MENTORING

Teaching Assistant 2021-2022

- CIS 675 (Design and Analysis of Algorithms)
- CIS 477 (Intro/Analysis of Algorithms)

PUBLICATIONS

[1] **Harshit Sharma**, Yi Xiao, and Asif Salekin. "From Wearables to Depth: Training-Time IMU Supervision for Contactless Stress Detection" (Under Submission IMWUT 2026)

[2] **Harshit Sharma***, Shaily Roy*[1], and Asif Salekin. "CurvFed: Curvature-Aligned Federated Learning." https://arxiv.org/abs/2404.19725 (Accepted IMWUT 2026).

[3] **Harshit Sharma**, Hao Zhang, Jakub Krzych, Lawrence Jones, Asif Salekin and Sucheta Soundarajan. "From Lab to Farm: Characterizing UWB-Based TDOA Localization Reliability for Dairy Cattle Monitoring" (Poster). (Accepted for IEEE DCOSS-IoT 2026)

[4] Roy, Shaily, **Harshit Sharma**, Dan Adler, Tanzeem Choudhary and Asif Salekin. "Ethical Fairness without Demographics". (Under review IMWUT 2026).

[5] Xiao, Yi, **Harshit Sharma**, Dessa Bergen-Cico, Asif Salekin. "ReSPIRE: Resilience-Conditioned Stress-Pretrained Inference for Craving Detection in Opioid Use Disorder". (Under review IMWUT 2026)

[6] Villa-Sánchez, Bernardo, Alexandra M. Reed, **Harshit Sharma**, Asif Salekin, Brianna Branson, Elyana Chacon, and Sydney Y. Schaefer. "Examining task-related stress and engagement associated with a performance-based test of functional cognition in older adults" The American journal of occupational therapy 2026 (Under review)

[7] Oesterle, Tyler S., Yi Xiao, Nicholas L. Bormann, Dessa K. Bergen-Cico, Benjamin Lai, **Harshit Sharma**, and Asif Salekin. 'Wearable-derived measures of stress physiology in patients with opioid use disorder treated with methadone: A stress-task study in a real-world clinic with healthy controls." Addiction 2025 (Under Major revisions)

[8] Xiao, Yi, **Harshit Sharma**, Sawinder Kaur, Dessa Bergen-Cico, and Asif Salekin. "Human Heterogeneity Invariant Stress Sensing." Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 9, no. 3 (2025): 1-42. https://dl.acm.org/doi/abs/10.1145/3749465

[9] Xiao, Yi, **Harshit Sharma**, Victoria Tumanova, and Asif Salekin. "Psychophysiology-aided Perceptually Fluent Speech Analysis of Children Who Stutter." In Proceedings of the *ACM/IEEE 16th International Conference on Cyber-Physical Systems* (with CPS-IoT Week 2025), pp. 1-11. 2025. https://dl.acm.org/doi/abs/10.1145/3716550.3722019.

[10] Kaur, Sawinder, Avery Gump, Yi Xiao, Jingyu Xin, **Harshit Sharma**, Nina R. Benway, Jonathan L. Preston, and Asif Salekin. "CRoP: Context-wise Robust Static Human-Sensing Personalization." *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 9, no. 2 (2025): 1-34. https://dl.acm.org/doi/abs/10.1145/3729483.

[11] Xiao, Yi, **Harshit Sharma**, Zhongyang Zhang, Dessa Bergen-Cico, Tauhidur Rahman, and Asif Salekin. "Reading Between the Heat: Co-Teaching Body Thermal Signatures for Non-intrusive Stress Detection." *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 4, Article 189 (December 2023), 30 pages. https://doi.org/10.1145/3631441.

[12] Testa, Brian, Yi Xiao, **Harshit Sharma**, Avery Gump, and Asif Salekin. "Privacy Against Real-Time Speech Emotion Detection via Acoustic Adversarial Evasion of Machine Learning." *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 7, 3, Article 126 (September 2023), 30 pages. https://doi.org/10.1145/3610887.

[13] **Harshit Sharma**, Yi Xiao, Victoria Tumanova, and Asif Salekin. "Psychophysiological Arousal in Young Children Who Stutter: An Interpretable AI Approach." *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 6, 3, Article 137 (September 2022), 32 pages. https://doi.org/10.1145/

[1] * Indicates equal contribution.

3550326.

[14] Benway, Nina R., Jonathan L. Preston, Asif Salekin, Yi Xiao, **Harshit Sharma**, and Tara McAllister. "Classifying Rhoticity of /r/ in Speech Sound Disorder Using Age- and Sex-Normalized Formants." arXiv preprint https://arxiv.org/abs/2305.16111 (2023). (Accepted INTERSPEECH 2023).

[15] Benway, Nina R., Jonathan Preston, Elaine Hitchcock, Asif Salekin, **Harshit Sharma**, and Tara McAllister. "PERCEPT-R: An Open-access American English Child/Clinical Speech Corpus Specialized for the Audio Classification of /r/ Sound." OSF Preprints. May 27. https://doi.org/10.31219/osf.io/8zdsg. (Accepted INTERSPEECH 2022).

[16] Agrawal, Arun Prakash, Ankur Choudhary, and **Harshit Sharma**. "An Empirical Study on the Issues of Traditional Defect Life Cycle in Agile Model." In *International Conference on Advances in Engineering Science Management & Technology (ICAESMT)-2019*, Uttaranchal University, Dehradun, India, 2019. Available at SSRN: https://ssrn.com/abstract=3402842.

VOLUNTEERING

- **Academic Program Senator**, Graduate Student Organization, Syracuse University 2022-2023
- **Reviewer ETRA 2021**, Workshop 2022
- **Reviewer ISWC 2021**, Posters and Demo Session 2022
- **Student Volunteer**, UBICOMP 2022 2022
- **Reviewer CHI 2024**, Case Studies 2023
- **Reviewer** ECIS 2023,2025
- **Program Committee Artifact Evaluation**, Sensys 2025 2024
- **Reviwer** IMWUT 2024,2025,2026
- **Reviewer** OzCHI 2025 2025
- **Reviewer** CHI 2026 2025
- **Reviewer** HRI 2026 2025

FELLOWSHIPS / GRANTS

- Fulton Fellowship Award: $\$71,500$ 2024-2025
- Lambda Research Grant Program $\$500$ (cloud credits) 2026-2027

AWARDS

- SUN Award, ASU 2025
- Siemens, MakeIT Real Hackathon: 1st Runner-up 2017

NEWS COVERAGE

- Our on-going work on combining Artificial Intelligence with mindfulness-based practices to provide intervention for people with opioid use disorder was highlighted by Syracuse University: Link
- Our work on Privacy against Real-Time Speech Emotion Detection via Acoustic Adversarial Evasion of Machine Learning was highlighted by Syracuse University: Link