MINGYUE TANG

+1(213) 245-4164 ◇ Champaign, IL, USA
mt55@illinois.edu ◇ mtang.fyi ◇ github/mtang724

RESEARCH INTERESTS

Wireless Sensing, Mobile Computing, Signal Processing and Internet of Things, Data Mining, Pervasive Computing, Machine Learning in Internet of Things, Healthcare Systems.

EDUCATION

Ph.D. in Computer Science, University of Illinois Urbana-Champaign 2023 - Expected 2027
GPA: 4.0/4.0, Advisor: Prof. Elahé Soltanaghai
Research Direction: Wireless sensing and IoT applications using machine learning-based methods
M.Eng. in Systems Engineering [Ph.D. Transfer Out], University of Virginia (UVa) 2021 - 2023
GPA: 3.9/4.0, Advisor: Prof. Mehdi Boukhechba, Cyber-Physical Systems NRT Program

SELECTED PUBLICATIONS

*indicates co-first authors. See the full list at my Google Scholar - shorturl.at/lN8fN

[1] **Tang, M.***, He, J.*, Okubo, R., Panchmia, D., Soltanaghai, E., Identifying and Positioning FMCW Radars Using Passive Low-power Tags, **MobiCom** 2025 (Accepted)
[2] Gao, J., **Tang, M.**, Wang, W., Routh, T., Campbell, B., Atlas: Ensuring Accuracy for Privacy-Preserving Federated IoT Applications, **ICCPS** 2025 (Accepted)
[3] **Tang, M.**, Teckchandani, P., He, J., Guo, H., Soltanaghai, E., BSENSE: In-vehicle Child Detection and Vital Sign Monitoring with a Single mmWave Radar and Synthetic Reflectors, **SenSys** 2024
[4] He, J., **Tang, M.**, Okubo, R., Panchmia, D., Soltanaghai, E., Extended-Range Two-way Radar Backscatter Communication with Low-Power IoT Tags, **MobiCom** 2024 (Poster)
[5] Wang, Y., **Tang, M.**, He, Y., Tang, T.Y., Interactive Design with Autistic Children Using LLM and IoT for Personalized Training: The Good, The Bad and The Challenging, **UbiComp Workshop Proposal** 2024
[6] Wang, Z., **Tang, M.**, Toner, E., Larrazábal, M., Boukhechba, M., Teachman, B., Barnes L., Personalized Learning for State Anxiety Detection: A Case Study using Digital Linguistic Biomarkers, **EMBC** 2023
[7] **Tang, M.**, Gao, J., Yang, C., Dong, G., Campbell, B., Zoellner, J., Bowman, B., Rahman, E., Boukhechba, M., Mobile Sensing based Fluid Intake Anomaly Detection for End Stage Kidney Patients via Self-Attention Sensor Relation Dual Autoencoder, **CHIL** 2023, Oral (13.3%)
[8] Gao, J.*, **Tang, M.***, Wang, T., Campbell, B., PFed-LDP: A Personalized Federated Differential Privacy framework for IoT sensing, **SenSys** 2022 (Poster)
[9] Yang, C.*, Song, H.*, **Tang, M.**, Danon, L. , Vigfusson, Y., Dynamic Network Anomaly Modeling of Cell-Phone Call Detail Records for Infectious Disease Surveillance, **KDD** 2022, **Best Paper Award for Health Day**
[10] **Tang, M.**, Dong, G., Zoellner, J., Bowman B., Rahman E., Boukhechba, M., Using Ubiquitous Mobile Sensing and Temporal Sensor-Relation Graph Neural Network to Predict Fluid Intake of End Stage Kidney Patients, **IPSN** 2022
[11] **Tang, M.***, Yang, C.*, Li, P.,Graph Auto-Encoder via Neighborhood Wasserstein Reconstruction, **ICLR** 2022
[12] Dong, G., **Tang, M.**, Wang, Z., Gao, J., Guo, S., Cai, L., ... & Boukhechba, M., Graph Neural Networks in IoT: A Survey. ACM Transactions on Sensor Networks (**TOSN**)

SELECTED RESEARCH PROJECTS

Spy Radar Detection. First radar detection system capable of detecting FMCW radar waveform without any prior knowledge of the radar's configuration by using a low-power passive tag. [MobiCom 2025]
- Designed delay lines structure to downconvert GHz-level radar operating frequency to kHz intermediate frequency, enabling low-power signal processing.
- Implemented a two-antenna design low-power backscatter tag that can joint estimation of radar chirp slope [MobiCom 2024] and add an additional antenna for the direction of incoming radar signals.
- Experimentally evaluated across various settings with both sub-10 GHz radars and commercial 24GHz mmWave radars via STM32 boards and oscilloscope.

In-Cabin Infant Vital Sign Monitoring. A novel design of a mmWave sensing platform for infant detection inside vehicles with synthetic reflectors for covering radar blind spots and NLoS areas [SenSys 2024].
- Developed a real-time Stepped Frequency Continuous Wave (SFCW) visualizer to visualize Vayyar 60GHz radar data with Beamforming and Range-Doppler.
- Proposed a novel signal processing + deep learning based joint learning framework for child presence and breathing rate detection tasks.
- Deployed a synthetic reflector to cover blind spots and conducted 400+ experiments with simulators and real babies inside the car, achieved average 97% detection rate and less than 6 BPM breathing error under any conditions.

Federated Learning on IoT data. Optimized the accuracy of collaborative training data from IoT edge devices while preserving privacy. [ICCPS 2025, SenSys 2022]
- Designed a dynamic layer importance determination method to select globally important layers for cloud training, while adding differential privacy to the system.
- Experimented with our proposed method on three distinct tasks like energy prediction, HAR, and achieved comparable performance to non-privacy-preserving methods.

SIMS - Social Interactions Monitoring Study. Monitoring social state anxiety with wearable sensors and webcams. [EMBC 2023]
- Designed and implemented a novel transfer-learning-like personalization method to identify the state of anxiety of a group of people with high anxiety.
- Experimented and improved the baseline functions (one-size-fits-all, generic ML models) by nearly 28%.

FluiSense. Using multi-modal mobile sensing for better fluid control for end stage kidney disease (ESKD) Patients.
- Conducted a 4-week study and collected time-series data with on-body physiological and behavioral sensors (e.g., PPG, IMU) from ESKD patients. [AHFE 2022]
- Proposed a novel graph neural network-based method to model the multi-modal relationship between sensors. Outperformed 5 selected benchmark models by around 8.7%. [IPSN 2022]
- Proposed a novel graph anomaly detection method to pick fluid overload samples from normal data, improved state-of-the-art baselines by 1.25%.

Graph Unsupervised Representation Learning. A new unsupervised way of graph learning, addressed existing limitations in graph autoencoder, graph structure learning, and infomax-based methods.
- Developed a novel unsupervised graph representation learning method based on autoencoder (AE) and optimal transportation (OT).
- Implemented and experimented with the proposed method on both structural synthetic and mixed real-world datasets [ICLR 2022], improved baselines on structural and mixed types of tasks (-2.98% to 18.48%), and competitive performance on proximity-oriented tasks (-3.21% to-0.32%).
- Implemented and experimented with the baseline monitoring methods of infectious disease via mobile phone records and graph mining. [KDD 2022]

WORK EXPERIENCE

Scientist I - Abbott Neuromodulation Jan 2023 - Jun 2023
Objective: Analysis of neurological data and assess outcome for the next generation of Neuromodulation devices.
Teaching Assistant - Data Science School - University of Virginia Jan 2021 - Dec. 2022
Objective: DS 5110: Big Data Systems || DS 5100: Programming for Data Science || DS 3002: Data Science Systems.
Data Engineer Intern - Data Strategy Team - Novartis, Inc. Jun 2020 - Aug 2020
Objective: Construct a comprehensive Biomedical Domain Knowledge Graph based on Wikidata and Ontologies.
AI Engineer Intern - Nanjing Tuobu Intelligent Inc. Jun 2018 - Aug 2018
Objective: Constructed a face recognition service based on Google FaceNet framework.

SERVICE & AWARDS

- **Reviewer**, for International Conference on Acoustics, Speech, and Signal Processing (ICASSP), ACM Transactions on Internet of Things (TIOT), Conference on Knowledge Discovery and Data Mining (KDD).
- **N2Women Fellowship**, at SenSys 2024, co-organized N2Women Event.
- **Best Overall Hack** (1/70), in Athenahacks 2019, One thumb input method for blind people. 2019
- **Best Senior Project**(1/48), **Outstanding Graduates**, Kean University (Wenzhou) CS department. 2018
- **Second Prize** (2/30), Wenzhou Crowd Innovation Hackathon. 2018