Zhuoyan (Terry) Tao

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Education

Carnegie Mellon University, School of Computer Science — Aug 2026 – Dec 2027
M.S. in Intelligent Information Systems, Language Technologies Institute — *Pittsburgh, PA*

University of Southern California — Aug 2022 – May 2026
B.S. in Computer Science & Mathematics, GPA: **3.93/4.0** | *Trustee Full-Tuition Merit Scholarship* — *Los Angeles, CA*

Publications

Z. Tao et al. "Spoken Language Diarization in Multilingual Code-Switching Conversations." *IEEE Signal Processing Letters*, under review. **[First Author]**

Z. Tao et al. "ANCHOR: Autoregressive Non-intrusive Chunk-Ordered Refinement for Joint Multi-Resolution Speech Quality Modeling." *Interspeech 2026*, under review. **[First Author]**

J. Han, J. Shi, **Z. Tao** et al. "CartoonSing: Unifying Human and Nonhuman Timbres in Singing Generation." *ICML 2026*, under review.

Research Experience

CMU WavLab | Speech & Audio ML Research — Jun 2025 – Present
Advisor: Prof. Shinji Watanabe — *Remote*

- Built HuBERT- and prosody-based speech-to-speech translation systems preserving pragmatic intent (stance, emotion, dialog function) across English–Spanish pairs for the Interspeech 2026 S2ST Challenge
- Proposed ANCHOR, extending ARECHO (NeurIPS 2025 Spotlight) for incremental speech quality prediction: introduced resolution-aware decoding with dual-resolution tokens in a single Transformer decoder, achieving **48% PLCMOS error reduction** on 2 s prefixes across 580k+ training instances
- Merged multiple PRs into **ESPnet (16k+ stars)**: **≈50× speedup** for speaker-embedding extraction, new TTS training recipes, and a Tacotron-1 CBHG module fix affecting synthesis quality

USC SAIL Lab | Multilingual Speech Processing Research — Aug 2023 – Present
Advisor: Prof. Shrikanth Narayanan — *Los Angeles, CA*

- Led spoken language diarization research for Hindi, English, and Malayalam in multilingual code-switching conversations; fine-tuned Whisper and MMS with LoRA on synthetic and real data
- Designed a synthetic multilingual data generation pipeline (rule-based + LLM-assisted) producing realistic code-switch patterns for language change-point detection and weak supervision of turn-level labels
- Benchmarked TTS and LID systems across languages, identifying systematic diarization bias in code-switching segments; first-author paper under review at IEEE Signal Processing Letters

USC Interaction Lab | Multimodal ML for Healthcare — Apr 2023 – Sep 2023
Advisor: Prof. Maja Matarić — *Los Angeles, CA*

- Built multimodal classifiers in PyTorch fusing audio, visual, and behavioral signals for early Alzheimer's detection
- Developed cross-platform data collection apps (iOS, Windows UWP) with Tobii Pro eye-tracking SDK for synchronized gaze, audio, and ink-stroke capture

Industry Experience

Apple Inc. – Satellite Connectivity Group (SCG) — Summer 2026
Software Engineering Intern — *Austin, TX*

- Developing C++ and Python production systems for satellite connectivity spanning orbital mechanics simulation, wave propagation modeling, and large-scale network infrastructure
- Engineering on Apple's satellite platform powering Emergency SOS and messaging services deployed across iPhone hardware

Projects

Unity 2D Platformer | *VP & Executive Producer, Open Alpha Game Design Club* — Jan 2023 – Apr 2024

- Directed a Unity 2D platformer with a 10-member audio team (Ableton Live & Wwise); shipped on Steam with **85% positive reviews**
- Designed and taught a semester-long Unity & SFX curriculum for 40 students; recruited and mentored incoming cohorts

Technical Skills

ML & Speech: PyTorch, Hugging Face Transformers, ESPnet, Kaldi, TensorFlow, librosa, LoRA/PEFT, TTS, ASR, diarization
Languages: Python, C++, C, Java, C#, Bash, SQL
Infrastructure: CUDA, Docker, Linux, SLURM, Git, AWS, GCP, GitHub Actions (CI/CD)
Tools: NumPy, SciPy, pandas, scikit-learn, Weights & Biases, FFmpeg

Teaching

Supplemental Instruction Leader, USC MATH 229 (Multivariable Calculus) — Aug 2023 – May 2026

- Led 3–4 weekly sessions for 98 students; review sessions reached ∼300 attendees, the highest attendance in program history