

RUILIN (HENRY) XU

Ph.D., Computer Science

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EDUCATION

Columbia University <i>Ph.D., Computer Science</i> (Advisor: Shree K. Nayar)	New York, NY 2018–2024
Columbia University <i>M.S., Computer Science</i>	New York, NY 2015–2017
University of Illinois at Urbana-Champaign <i>B.S., Computer Science</i>	Champaign, IL 2010–2014

RESEARCH INTERESTS

- Deep learning, speech enhancement, audio–visual learning, and multimodal representation
- Cross-modal generation and real-time, low-latency human-AI interaction

INDUSTRY / RESEARCH EXPERIENCE (SELECTED)

Snap Research & Columbia University <i>Ph.D. Researcher (Joint Collaboration), Computational Imaging Team</i>	New York, NY 2021–2025
▪ DanceCraft — Real-time, music-reactive 3D dance improvisation; designed and built a hybrid pipeline (audio descriptors → graph-based motion selection → neural in-betweening) with Bitmoji personalization; curated an 8+ hour 3D dance dataset; deployed at Snap; showcased at Billie Eilish events (120M+ followers); <i>ACM MOCO '24</i>. ▪ Personalized Speech Dereverberation — One-time personalization (representative RIR + short moving read) with a two-stage model (Wiener deconvolution → neural refinement); integrated into Snap's internal audio enhancement pipeline (AR/VR & creative tools); outperformed classical and learned methods; <i>INTERSPEECH '23</i>.	
Columbia University (with SoftBank Group Corp.) <i>Ph.D. Researcher</i>	New York, NY 2019–2022
▪ Listen to the Silence — Generative denoising/inpainting of environmental speech; restored ambient context and continuity via a deep generative model with a signal-processing front end; validated by objective & perceptual tests; informed later multimodal/audio–visual alignment work; <i>NeurIPS 2020</i>. ▪ Follow-up: Real-time Denoising — Low-latency streaming extension for interactive use; <i>ICASSP '22</i>.	
Columbia University <i>Ph.D. Researcher</i>	New York, NY 2017–2019
▪ Trapping Light — Built a planar-mirror light trap and, given known trap geometry, designed calibration + inversion algorithm to reconstruct ray paths and recover accurate depth from a single scan. Simulations show >99.9% coverage (pyramid traps >99% across diverse objects); validated on a hardware prototype; <i>CVPR '18</i>.	

TECHNICAL SKILLS

Programming Languages	Python, JavaScript, MATLAB, C#, Java, C/C++, $\LaTeX$, Docker
ML/DL Tools & Libraries	PyTorch, TensorFlow, Keras, torchaudio, librosa, SciPy, scikit-learn, pandas, OpenCV

PUBLICATIONS & PATENTS (SELECTED)

- **Ruilin Xu**. *Harmonizing Audio and Human Interaction: Enhancement, Analysis, and Application of Audio Signals via Machine Learning Approaches*. Doctoral Dissertation, Columbia University, 2024.
- **Ruilin Xu**, Vu An Tran, Shree K. Nayar, Gurunandan Krishnan. *DanceCraft: A Music-Reactive Real-time Dance Improv System*. *ACM MOCO '24*.
- Changxi Zheng, **Ruilin Xu**, Rundi Wu, Carl Vondrick, Yuko Ishiwaka. *Neural-network-based approach for speech denoising*. US 11,894,012 (granted 2024; assignee: SoftBank Group Corp.).
- **Ruilin Xu**, Gurunandan Krishnan, Changxi Zheng, Shree K. Nayar. *Personalized Dereverberation of Speech*. *INTERSPEECH '23*.
- Jinxu Xiang, Yuyang Zhu, Rundi Wu, **Ruilin Xu**, Changxi Zheng. *Dynamic Sliding Window for Realtime Denoising Networks*. *ICASSP '22*.
- **Ruilin Xu**, Rundi Wu, Yuko Ishiwaka, Carl Vondrick, Changxi Zheng. *Listening to Sounds of Silence for Speech Denoising*. *NeurIPS 2020*.
- **Ruilin Xu**, Mohit Gupta and Shree K. Nayar. *Trapping Light for Time of Flight*. *CVPR '18*.

TEACHING EXPERIENCE

- Teaching Assistant — *First Principles in Computer Vision* (Instructor: Shree K. Nayar) 2016–2024