# Chitralekha Gupta, Senior Research Fellow


**Contact Information**

COM2-01-07, Augmented Human Lab,
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**Research Interests**

My research interests lie at the intersection of deep learning, human-computer interaction, and audio, particularly in singing quality and lyrics analysis, controllability of audio generative models, explainability of AI, and audio-based assistive technologies.

**Work Experience**

**Senior Research Fellow** Mar 2023 - Present
Augmented Human Lab, School of Computing, NUS

**Research Fellow**
Augmented Human Lab, School of Computing, NUS (PI: *Suranga Nanayakkara*) 2022-2023
Communications and New Media, Faculty of Arts, NUS (PI: *Lonce Wyse*) 2021-2022
Human Language Technology lab, Electrical and Comp Engg., NUS (PI: *Haizhou Li*) 2019-2021

**Co-Founder of MuSigPro Pte. Ltd.** Aug 2019 – Present
A music technology start-up that commercializes two AI-based music technologies developed during my PhD and post-doc - a singing quality assessment algorithm, and an audio-to-lyrics time aligner.

**Research Engineer at Airbus Defense and Space, Bangalore** March 2013 - July 2014

**Software Developer at Dell R&D, Bangalore** Aug 2011 - Feb 2013

**Education**

**Ph.D. at Dept. of Computer Science,** 2015 - 2019
**National University of Singapore (NUS)**
*Thesis:* Comprehensive evaluation of singing quality; *Advisors:* Haizhou Li and Ye Wang

**Master of Technology at Dept. of Electrical Engg.** 2008 - 2011
**Indian Institute of Technology Bombay (IIT-Bombay)**
*Thesis:* Objective assessment of ornaments in Indian singing; *Advisor:* Preeti Rao

**Bachelor of Engineering in Electronics Engg.** 2004 - 2008
**M.S. University, Baroda, India**

**Selected Projects**

Through my experience as a research fellow and a senior research fellow, I have worked on a diverse range of projects related to audio and deep learning. A selected few of them are below:

- **Music Analysis:**
  **(a) Singing Quality Evaluation:** I have worked on signal processing-based and machine learning-based explainable modeling of singing quality, based on pitch, rhythm, ornaments, as well as pronunciation.
  *12 papers published across ISMIR, Interspeech, APSIPA, IEEE/ACM TASLP* 2017 - 2022
  **(b) Alignment and Recognition of Lyrics in Music:** I have worked on kaldi-based modular ASR models for the task of lyrics-to-audio alignment and lyrics recognition. I have also co-authored works on espnet-based end-to-end ASR models lyrics recognition.
  *9 papers published across ICASSP, Interspeech, SMC, IEEE/ACM TASLP* 2019 - 2022
- **Controllability of Sound Synthesis using Generative Models:** I have worked on exploring supervised and unsupervised methods of inducing control over certain attributes of synthesized audio by manipulating the latent space of Generative Adversarial Networks.
  *6 papers published across ICASSP, ISMIR, ACM IUI, Springer, IEEE/ACM TASLP* 2021 - Present
- **Assistive Augmentation Technologies:**
  I have worked with people with visual impairments to build an assistive tool that creates awareness of distant scenes through sonification, i.e. converting scene information into relevant sounds through generative models. *Published in ACM IMWUT* 2023 - Present

## Selected Publications

- **Chitralekha Gupta**, Shreyas Sridhar, Denys Mattheis, Christophe Jouffrais, and Suranga Nanayakkara, *SonicVista: Towards Creating Awareness of Distant Scenes through Sonification*, *IMWUT*, 2024.
- Purnima Kamath, **Chitralekha Gupta**, Lonce Wyse, and Suranga Nanayakkara, *Example-Based Framework for Perceptually Guided Audio Texture Generation*, *IEEE/ACM TASLP*, 2024.
- Elliot Wen, **Chitralekha Gupta**, Prasanth Sasikumar, Mark Billinghurst, James Wilmott, Emily Skow, Arindam Dey, and Suranga Nanayakkara, *VR.net: A Real-world Dataset for Virtual Reality Motion Sickness Research*, *IEEE VR*, 2024 - **Best Paper Award**.
- **Chitralekha Gupta**, Purnima Kamath, Yize Wei, Zhuoyao Li, Suranga Nanayakkara, and Lonce Wyse, *Towards Controllable Audio Texture Morphing*, *ICASSP*, 2023.
- Xiaoxue Gao, **Chitralekha Gupta**, and Haizhou Li, *PoLyScriber: Integrated Training of Extractor and Lyrics Transcriber for Polyphonic Music*, *IEEE/ACM TASLP*, 2023.
- **Chitralekha Gupta**, Haizhou Li, and Masataka Goto, *Deep Learning Approaches in Topics of Singing Information Processing (Overview Paper)*, *IEEE/ACM TASLP*, 2022.
- **Chitralekha Gupta**, Yize Wei, Purnima Kamath, Zhuoyao Li, and Lonce Wyse, *Parameter Sensitivity of Deep-Feature based Evaluation Metrics for Audio Textures*, *ISMIR*, 2022.
- **Chitralekha Gupta**, Emre Yılmaz, and Haizhou Li, *Automatic Lyrics Alignment and Transcription in Polyphonic Music: Does Background Music Help?*, *ICASSP*, 2020.
- **Chitralekha Gupta**, Haizhou Li, and Ye Wang, *Automatic Leaderboard: Evaluation of Singing Quality without a Standard Reference*, *IEEE/ACM TASLP*, 2019.

## Selected Achievements and Awards

- **DCASE Challenge 2023:** Our generative model system for the Foley Sound Synthesis Task at this international challenge ranked 3rd amongst 26 submitted systems.
- **MIREX 2020 and 2019:** Our *"Automatic Lyrics-to-Audio Alignment and Lyrics Transcription"* system ranked 1st in the International Music Information Retrieval Evaluation eXchange platform for two consecutive years 2019 and 2020. (Press Release)
- **NUS Graduate Research Innovation Program (GRIP) Award**, July 2019, a start-up grant for MuSigPro Pte. Ltd.

## Patent (Pending)

**Chitralekha Gupta**, Haizhou Li, and Ye Wang, "System and Method for Assessing Quality of A Singing Voice"; **U.S. Patent Application No. 17/631,646** filed on 8 February 2022.

## Invited Talks

- Invited talk at Meta ARIA Summit, Redmond WA, USA 2024.
- Invited talk at Music Research Symposium, Singapore 2023.
- Women in MIR panelist at ISMIR 2022.

## Overseas/ Industry Collaborators

- CNRS, Toulouse, France (Dr. Christophe Jouffrais) 2023 - Present
- Meta Platforms Inc. (META) 2022 - Present
- AIST, Japan (Dr. Masataka Goto) 2021 - 2022

## Mentorship

- Mentored 2 PhD Students, and Co-supervised 2 Masters students.
- Served as a PhD Thesis Examiner of a student from Sorbonne University, Paris in 2023.

## Research Community Service

- *Reviewer*: IEEE Transactions on Multimedia, IEEE/ACM Transactions of Audio, Speech and Language Processing, ISMIR, ICASSP, Interspeech, ICME, APSIPA Transactions, Springer International Journal of Social Robotics, IEEE Access, Springer Multimedia Systems Journal.
- *Organizing Committee Member*: ISMIR 2017, ASRU 2019, SIGDIAL 2021, ICASSP 2022, ISMIR 2022, AH Workshop 2023.