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Xuehua Fu

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EDUCATION AND TRAINING

15/08/2020 – 30/06/2023 Stockholm, Sweden

MASTER OF SCIENCE IN COMPUTER SCIENCE KTH Royal Institute of Technology

- Visualization and Interactive Graphics
- Sound and Music Computing
- Music Acoustics
- Human-Computer Interaction
- Interactive Media Technology

Website https://www.kth.se | **Field of study** Computer Science | **Final grade** 4.625/5.0 | **Level in EQF** EQF level 7 |

Thesis Real-time Visual Feedback of Emotional Expression in Singing

Link https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-329761

01/09/2016 – 30/06/2020 Guangzhou, China

BACHELOR OF SCIENCE IN INFORMATION AND COMPUTING SCIENCE Sun Yat-Sen University

Website https://www.sysu.edu.cn/sysuen/ | **Field of study** Mathematics | **Final grade** 3.7/5.0 | **Level in EQF** EQF level 6 |

Thesis A Variation of the Waring's Problem: Sums of Odd Ascending Powers

WORK EXPERIENCE

14/07/2024 – CURRENT Shenzhen, China

UNIVERSITY RESEARCH ASSISTANT SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

- Leading one research project on Participatory Soundscape Studies, funded by Key Laboratory of Digital Music Intelligent Processing
- Founding member of the D# platform for art+tech integration; Co-leader of the 1st Art Residency Program
- Collaborating with Xi'an Jiaotong University-Liverpool on sound design for VR museums
- Assistant of an inter-university Accessibility Design Project in Yuanling Streets

Department School of Design | **Website** https://designschool.sustech.edu.cn/en

Link soundstudiesgroup.net

10/07/2019 – 25/08/2019 Hangzhou, China

SUMMER RESEARCH INTERN WESTLAKE UNIVERSITY

- Conducted literature review of deep learning algorithms for time series analysis
- Implemented baseline models using Support Vector Regression, Gauss Process Regression, and Multi-layer Perceptron Autoencoder with Python
- Proposed and implemented non-local attention and squeeze-and-excitation blocks to optimize Convolutional Neural Networks, compared with baseline models

Website https://en-soe.westlake.edu.cn/OurSchool/departmentcenter/departmentAI/

PROJECTS

20/07/2024 – CURRENT

Urban Sound Diary: Participatory Analysis of Urban Soundscapes

- Supervised by Prof. Marcel Zaes Sagesser, Sound Studies Group, Southern University of Science and Technology
- Leading the team on systematic research and technical development, coordinating with external collaborators (sociology researchers)
- Designed and contributed the most to the development of "Urban Sound Diary", consisting of a mobile app for recording and documenting urban sounds with multimodal information, and a browser-based interface for exploring and creatively composing sounds
- Hosted a Chinese CHI 2024 workshop and presented preliminary findings of the project
- Main contributor of academic paper writing. Abstract accepted by Urban Sound Symposium 2025 and Forum Acusticum Euronoise 2025.

Link soundstudiesgroup.net

30/04/2022 – 30/05/2023

Real-time Visual Feedback of Emotional Expression in Singing

- Master thesis project at KTH Royal Institute of Technology, supervised by Prof. Roberto Bresin, Sound and Music Computing Group
- Investigated cross-modal perception in singing by mapping vocal expression to dynamic intuitive computer graphics
- Built a real-time music processing and visualization software system using Unity and Pure Data
- Implemented a parametric mapping from vocal cues to graphical parameters derived from cross-modal correspondences
- Designed and conducted user experiments with 19 participants who were experienced singers

Link https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-329761

10/11/2021 – 01/02/2022

Vowel Singing Synthesis with Spectral Notches

- Individual project in Music Acoustics, supervised by Prof. Sten Ternström, TMH Division of Speech, Music and Hearing, KTH Royal Institute of Technology
- Investigated spectral notches (anti-resonances, the opposite of formant resonances) in singing voice synthesis
- Developed a source-filter synthesizer leveraging notch filters, implemented with the State-Variable Filter (SVF) in SuperCollider
- Designed and Implemented an intuitive graphical user interface compatible with MIDI input
- The method was integrated in the re-implementation of the KTH Music and Singing Synthesis Equipment (MUSSE)

Link https://sites.google.com/view/xuehuafu/works/synth?authuser=0

10/01/2024 – 07/10/2024

Biopoetic morphing: Reforming the forest-human communication

- Selected project from Student Festival Competition by NAVET Center of Art, Design, and Technology
- Project resulted in an immersive installation exhibited at Tekniska (Museum of Technology), Stockholm
- Project manager of an interdisciplinary team between Konstfack and KTH
- Conducted philosophical research to conceptualize the system's narrative, emphasizing a non-anthropocentric perspective
- Prototyped the interactive system with responsive soundscape, visuals, and touchable objects

Link https://www.kth.se/navet/articles/welcome-to-navet-student-festival-exhibition-at-tekniska-museet-1.1361540

CONFERENCES AND SEMINARS

28/04/2025 – 30/04/2025 Zürich, Switzerland

Urban Sound Symposium 2025 (Planned)

Distributed Listening to the City: A Mobile Phone-based Creative Recorder for Urban Sounds

Link https://urban-sound-symposium.org

22/11/2024 – 25/11/2024 Shenzhen, China

Chinese CHI 2024

Concurrent Workshop 5: Exploring Urban Soundscape - Interactive Data Visualization of Urban Sound Diary

Link https://chchi.icachi.org/24/workshops/

HONOURS AND AWARDS

10/02/2022

Scholarship Karl Engvers Foundation – KTH Royal Institute of Technology

Scholarship for international master thesis students at KTH (limited positions based on GPA ranking)

01/03/2020

The Hattrick Award for DD2380 Artificial Intelligence Course at KTH – KTH Royal Institute of Technology

Achieving grade A on all programming assignments

01/11/2019

Academic Excellence Scholarships – Sun Yat-Sen University

- Top 15% student in academic performance
- Awarded for the academic years of 2017, 2018, and 2019

01/10/2018

First Prize in the 10th Chinese Mathematics Competitions (CMC) of College Students – The Chinese Mathematical Society

DIGITAL SKILLS

Interaction design

Figma | Unity | Front-end development

Audio signal processing

Matlab/Simulik | Python

Voice analysis and synthesis

Matlab/Simulink | SuperCollider | Praat

Data analysis and visualization

Javascript (D3.js) | Python (numpy, pandas, matplotlib)

LANGUAGE SKILLS

Mother tongue(s): **CHINESE**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
SWEDISH	A2	A2	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

VOLUNTEERING

12/06/2023 – 17/06/2023 Stockholm, Sweden

Volunteer at Sound and Music Computing Conference 2023

01/07/2017 – 20/08/2017 Shaoguan, Guangdong, China

Volunteer Music Teacher at Aizizhen Middle School

Motivation Letter

Dear VoCS Admission Committee,

I am writing to express my keen interest in the PhD position in the Voice Communication Sciences (VoCS) project. With a Master's degree in Computer Science from KTH Royal Institute of Technology and a research background spanning human-computer interaction, auditory and multisensory perception, computer music, and interactive technologies, I am eager to contribute to VoCS's mission of advancing voice research. In particular, I am highly interested in the *Seeing Voices – Sensory Substitution for Vocal Communication* project, as well as two other VoCS projects that investigate voice science, multimodal perception, and the role of sound in human experience. My previous work in singing synthesis, voice visualization, soundscape research, and interactive systems has prepared me to contribute meaningfully to these research efforts.

My academic development has always been driven by a lasting interest in the intersection of human experience, computing, and technology. My particular interest in voice research stems both from my academic experience and my personal engagement with singing. While pursuing my bachelor's degree in Information and Computing Science at Sun Yat-Sen University, I developed a strong technical foundation in mathematics and computational modeling. In parallel, I developed a deep passion in choir singing, serving as the alto lead in my university's student chorus. This experience sparked my curiosity about the science of the voice and the power of ensemble singing in promoting social connection and communication, ultimately leading me to study music acoustics (in particular, voice acoustics) and interactive media technology during my master's at KTH.

To further explore the computational modeling of voice, I conducted an individual research project in singing synthesis under Prof. Sten Ternström' supervision, where I built a source-filter synthesizer with graphical interface in SuperCollider. Through this project, I contributed preliminary results about anti-resonances and programming methods for the reimplementation of the KTH Music and Singing Synthesis Equipment (MUSSE). This experience strengthened my understanding of acoustic modeling, audio signal processing, and voice perception, providing me with valuable insights into how vocal characteristics can be analyzed and synthesized computationally.

Building on this foundation, my master's thesis focused on cross-modal perception by mapping vocal expression to dynamic intuitive computer graphics. I developed an interactive system that transforms voice into real-time visual feedback and evaluated it by a user study, investigating how singers can use visual representations of their voice to enhance emotional expression and self-awareness. This work closely relates to the Seeing Voices project, as both investigate how auditory information can be transformed into visual representations to support human perception and communication. The use of scientific visual representations such as spectrogram and electroglottograph (EGG) was discussed as a future work for potential application in music education and distant learning. Through this experience, I gained valuable insights into designing perceptual experiments, developing interactive systems, and analyzing voice-based information in a multimodal context, all of which I am eager to apply in VoCS.

Following my master's, I expanded my research to in-situ sound studies as a research assistant at the Sound Studies Group, Southern University of Science and Technology. Co-leading a project on urban soundscape research with my supervisor Prof. Marcel Sagesser, I proposed a partipatory approach for soundscape analysis, leveraging ubiquitous mobile technology and human input. For this, I developed a mobile application for participatory sound collection and annotation, and a multimedia interactive display of the urban sound archive. Two rounds of user study were conducted to collect and analysis qualitative and quantitative data about people's experience and perception when exploring the sound environments using our mobile app and website. This project has led to several outcomes that were presented as a workshop at the Chinese CHI Conference 2024, and recently accepted by Urban Sound Symposiym 2025 and Forum Acusticum Euronoise 2025. This experience broadened my perspective on how sound functions as a medium for environmental perception and social communication. It also

strengthened my skills in audio processing, experimental design, and data analysis that are also essential in investigating voice perception and human communication.

The VoCS project presents an exceptional opportunity for voice research not only by the in-depth research topics, but also by its unique integration of cognitive neuroscience, acoustics, phonetics, and computing science through the doctoral training network to advance our understanding of voice communication. I am particularly intrigued by the *Seeing Voices* project (DC11)'s exploration of sensory substitution, as it aligns with my interest in how auditory information can be translated into other modalities to enhance perception and communication. Additionally, the project *DC18: Creating Voice Composites* aligns with my interest in designing user-led human-computer interactions, and the project *DC15: Perception of voice cues and vocal emotions with hearing aids* perfectly fits my expertise in analyzing vocal cues and emotions. I am also excited about the opportunity to collaborate with experts across multiple disciplines and to gain experience through VoCS's structured training, secondments, and hands-on research environment.

With my strong foundation in voice acoustics, auditory and multisensory perception, audio processing, interactive technology, and human-centered research, I am confident that I can make meaningful contributions to the VoCS project. I am eager to bring my computational, experimental, and interdisciplinary skills to this program while expanding my knowledge in bioacoustics, neuroscience, and psychology. I look forward to the possibility of joining VoCS and contributing to its mission of advancing voice communication sciences.

Thank you for your time and consideration. I would be delighted to discuss my application further.

Sincerely,

Xuehua

Contact of Referees

Reference 1:
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