

CAMILLE NOUFI

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I am a PhD candidate in the Center for Computer Research in Music and Acoustics (CCRMA) at Stanford University. I am fascinated by the human voice as a means of both functional and expressive communication.

My research utilizes audio signal processing, machine learning and human-computer-interaction to study the nuances of vocal production. My PhD is an opportunity to 1) study how current technologies interact with the voice as a biomarker 2) leverage the voice to augment expressive, humanistic, and inclusive technological interaction.

EXPERIENCE

PH.D CANDIDATE

SEPTEMBER 2018 – JUNE 2023

CCRMA, STANFORD UNIVERSITY

Music Engagement Research Initiative (MERI): Advised by Dr. Jonathan Berger

- **Synthesis of affective audio signals** derived from acoustic parameters of affective speech. Investigating both parametric synthesis and data-driven generative methods. *Funded by Wu Tai Neurosciences Institute Seed Grant.*
- Audio-based **analysis of techniques used in amateur vocal expression** via paralinguistic feature extraction and deep learning of acoustic representations.
- **User studies of vocal expression perception:** accuracy of perceived emotion in song versus speech, correlation of perceived expression in mobile karaoke singing.

Human-Computer Interaction for Music/Voice: Advised by Dr. Ge Wang

- **Gesture-responsive digital instrument design** for voice and movement.
- **Audio-visual and audio-haptic interfaces** to dissect and reinterpret vocalizations.

RESEARCH INTERN

JUNE 2020 – SEPTEMBER 2020

AUDIO TEAM @ FACEBOOK REALITY LABS, FACEBOOK

Real-time Speech Directivity in AR/VR: Advised by Peter Dodds and Dejan Markovic

RESEARCH INTERN / TECHNICAL ASSISTANT

SUMMER 2017 / JANUARY 2018 – AUGUST 2019

MIT LINCOLN LABORATORY

Bioengineering Systems and Technologies: Advised by Dr. Thomas F. Quatieri

- Designed and executed a **longitudinal assessment of audio-based vocal biomarkers to track changes in speech production** following severe pediatric traumatic brain injury.

Human Language Technology: Advised by Dr. Michael Brandstein

- Designed and developed an end-to-end semi-supervised deep learning model leveraging Google's 'AudioSet' for **generalized query-by-example sound event detection.**

Advanced Sensors and Techniques: Advised by Dr. Robert Morrison

- Developed a novel radar signal processing algorithm **to create high-resolution 2D satellite images via 1D radar data.**

RESEARCH ASSISTANT

SEPTEMBER 2016 – MAY 2017

SIGNAL PROCESSING GROUP, UNIVERSITY OF COLORADO

Researched feature extraction and machine learning **techniques to classify modulation schemes and frequency bands of digital communication signals.** Implemented a CNN-based classification model learning complex-plane signal representations. *(Advisor: Dr. Youjian Liu)*

SOFTWARE DEVELOPMENT INTERN

SUMMER 2016

TAIT TOWERS

Designed and implemented a **new SQL database and interactive web application for integrators and project managers** to create and manage custom hardware/software activation licenses. Database and application launched to company server at completion. (*Advisor: Jim Love*)

EDUCATION

STANFORD UNIVERSITY: CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS

JUNE 2023

PH.D – COMPUTER-BASED MUSIC THEORY & ACOUSTICS

Advisor: Dr. Jonathan Berger

Research Topics: Signal processing, machine learning, and psychoacoustic techniques for paralinguistics in speech and singing voice analysis. Vocal perception and production. Voice-centered human-computer interaction.

UNIVERSITY OF COLORADO, BOULDER

MAY 2017

B.S – ELECTRICAL & COMPUTER ENGINEERING

Advisors: Dr. Francois Meyer, Dr. Youjian Liu

GPA: 3.77 – *cum laude*

Research Topics: Signal Processing and digital communications
College of Engineering & Applied Sciences Dean's List: 2014 – 2017
Eta Kappa Nu (HKN) Honor Society

B.A – MUSIC, VOCAL PERFORMANCE

MAY 2015

College of Music Dean's List: 2013-2014

Mile 21 A Cappella (Director, Sound Engineer)

THE INSTITUTE FOR AMERICAN UNIVERSITIES (IAU) – AIX EN PROVENCE, FRANCE

SUMMER 2015

SKILLS

LANGUAGES/Frameworks

- Python, C, C++, C#, HTML, Chuck, Faust
- PyTorch, TensorFlow, scikit-learn, OpenGL
- Familiar with: Java, JavaScript, assembly, CSS, Julia

TOOLS/Software

- MATLAB, Mathematica, R
- Adobe Photoshop, Unity, Audacity, Logic, Ableton, Finale/MuseScore

MUSIC

- Classical and Jazz Voice (12 years), Piano (7 years), Guitar (3 years), Directing, Composition

HONORS & AWARDS

- 'Student Travel Award' for Authorship on Accepted Paper at INTERSPEECH 2019, Graz, Austria. (*International Speech and Communication Association*)
- 'Travel Award' for First Female Author on Accepted Late-Breaking Demo Paper at ISMIR 2017, Suzhou,
- 'Most Outstanding Graduate' Award. (*Dr. Francois Meyer, Electrical and Computer Engineering Chair, University of Colorado*)
- 'Research Experiences for Undergraduates' funding recipient, 2016. (*National Science Foundation*)

TEACHING ASSISTANTSHIPS

2019-2020 (Stanford University):

- Ear Training I (Music 24A)
- Creating Electronic Sounds (Music 101)
- Research Seminar in Computer-Generated Music (Music 220C)

ACADEMIC SERVICE

- NIME2020 (International Conference on New Interfaces for Musical Expression) Peer-Reviewer
- ISMIR 2020 (International Society of Music Information Retrieval) Peer-Reviewer
- ISMIR 'WiMIR' Planning Committee

PUBLICATIONS* AND PRESENTATIONS^ (CHRONOLOGICAL)

*Noufi, Camille and Prateek Verma. (2020). **“Unsupervised Representation Learning for Context of Vocal Music”** *Proceedings of the 21st International Society for Music Information Retrieval Conference, Montreal, Canada, October 2020.* (Under Review).

*Shaffer, Kris, Esther Vasiete, Brandon Jaquez, Aaron Davis, Diego Escalante, Calvin Hicks, Joshua McCann, Camille Noufi, and Paul Salminen. (2019). **“A Cluster Analysis of Harmony in the McGill Billboard Dataset.”** *Empirical Musicology Review* (In Press).

*Noufi, Camille, Adam C. Lammert, Daryush D. Mehta, James R. Williamson, Gregory Ciccarelli, Douglas Sturim, Jordan Green, Thomas F. Campbell, and Thomas F. Quatieri. (2019). **“Vocal biomarker assessment following pediatric traumatic brain injury: A retrospective cohort study.”** *Proc. INTERSPEECH 2019, Graz, Austria.* (Oral presentation).

*Noufi, Camille, Vidya Rangasayee, Sarah Ciresi, Jonathan Berger and Blair Kaneshiro. (2019). **“A Model-Driven Exploration of Accent Within the Amateur Singing Voice.”** *Machine Learning for Musical Discovery Workshop, International Conference on Machine Learning, June 2019.* (Oral Presentation).

^Noufi, Camille. **“Vocal biomarker assessment following pediatric traumatic brain injury.”** *Hearing Seminar (MUSIC 319), Center for Computer Research in Music and Acoustics, Stanford, CA. March 2019.* (Invited Talk).

*Noufi, Camille. (2017). **“Identification of Singing Style Techniques Through Spectral Analysis.”** *Extended Abstracts for the Late-Breaking Demo Session of the 18th International Society for Music Information Retrieval Conference, Suzhou, China, October 2017.* (Poster presentation).

^Noufi, Camille, Mason Darveaux, Andrew Lockwood, Paul Brunette, David Borski, Jim Love. (2017). **“RotoVision: A Rotational LED Hologram.”** *Electrical and Computer Engineering Capstone Exposition, University of Colorado, Boulder, Colorado.* (Poster Presentation and Demo).

^Noufi, Camille, Youjian Liu. (2017). **“Collaborative Intelligent Radio: RF Environment Understanding.”** *NSF-REU Discovery Learning Apprenticeship Exposition, University of Colorado, Boulder, Colorado.* (Poster Presentation).