

# Wisam Reid

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## Computational Neuroscientist & Computer Music Engineer

### EDUCATION

**HARVARD MEDICAL SCHOOL** DIVISION OF MEDICAL SCIENCES  
PhD Student, Harvard-MIT Program in Speech and Hearing Bioscience and Technology  
Expected June 2023 | Cambridge, MA

**STANFORD UNIVERSITY** MA IN MUSIC, SCIENCE, & TECHNOLOGY  
Emphasis: Auditory Neuroscience & Biophysics  
Graduated June 2017 | Stanford, CA

**UC BERKELEY** | BS IN ELECTRICAL ENGINEERING & COMPUTER SCIENCE  
Emphasis: Signal Processing & System Design  
Minor: Music  
Graduated May 2015 | Berkeley, CA

### RESEARCH

**STANFORD SCHOOL OF MEDICINE** | MOLECULAR AND CELLULAR PHYSIOLOGY  
PRINCIPAL INVESTIGATOR: **Anthony Ricci**  
October 2016 – Present | Stanford, CA

#### COCHLEAR MODELING:

Wisam is being advised by Anthony Ricci on research related to cochlear modeling. Wisam is working on modeling the evoked electrical responses of outer and inner hair cells on the Organ of Corti by the opening and closing of mechanically sensitive ion channels. It is Wisam's goal to contribute to a deepened understanding of the receptor cells of the inner ear and how the direct mechanical connections between the hair bundle and ion channels, contribute to hearing and hearing loss.

**CCRMA** | STANFORD UNIVERSITY'S CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS  
PRINCIPAL INVESTIGATOR: **Takako Fujioka**  
September 2015 – Present | Stanford, CA

#### AUDITORY NUEROSCIENCE:

Wisam has been working with Takako Fujioka on research combining electroencephalography (EEG), behavioral, and psychoacoustic data. Research topics include 2-person EEG (hyperscanning) paradigms, exploring how coordinated actions and social interactions during musical ensemble are processed in the two brains, recording and analysis techniques specifically for oscillation and correlation across brain areas and between subjects, and paradigms for recording evoked response potentials (ERP), and associated data analysis methods.

#### PSYCHOACOUSTICS:

Wisam is being advised by Takako Fujioka on a project aimed to determine the behavior of the change response in auditory evoked potentials to interaural phase differences (IPD) between dichotic signals, using a non-varying shift in temporal envelope of AM tones with varying carrier frequencies. This work includes the design of appropriate auditory stimulus as well as combining EEG with behavioral data analysis. In addition, Wisam is also working on building software tools using motion sensor data for the psychoacoustic assessment of the spatial fidelity of spatial audio sound systems.

## **COMPUTATIONAL NEUROSCIENCE** | STANFORD COMPUTER SCIENCE

ADVISOR: **Tom Dean**

January 2016 – Present | Stanford, CA

### **BIOLOGICAL NEURAL NETWORK THEORY:**

Wisam is being advised by Tom Dean on research involving computational neuroscience, modeling sensory transduction, functional connectomics, characterization of neural circuits, and biologically-informed neural network design. Recent projects have included the use of oscillatory neural networks (ONNs) to build models of behavior and neural activity in *c. elegans*.

## **CMMAS** | THE MEXICAN CENTER FOR MUSIC AND SONIC ARTS

VISITING RESEARCH SCHOLAR: **Neural Dynamics and Computational Modeling**

August 2016 - September 2016 | Morelia, Michoacán México

Wisam Reid, Iran Roman, and Cynthia Moncada accepted a research residency at The Mexican Center for Music and Sonic Arts (CMMAS) from August 22 to September 25, 2016. The group developed computational models of neural dynamics that occur in the primary auditory and motor cortices. Wisam explored the use of several artificial neural network architectures including: Recurrent Neural Networks (RNNs), Convolutional Neural Networks (CNNs) and Gradient Frequency Neural Networks (GrFNNs).

## **CCRMA** | STANFORD UNIVERSITY'S CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS

ADVISOR: **Malcolm Slaney**

September 2016 – Present | Stanford, CA

### **NEURAL MODELING:**

Wisam is being advised by Malcolm Slaney on research involving building functional models of neural dynamics using oscillatory neural networks, granger causality analysis, and dynamic causal modeling.

## **GROOVE ENHANCEMENT MACHINE (GEM)** | RESEARCH ASSISTANT STANFORD UNIVERSITY

PRINCIPLE INVESTIGATORS: **Jonathan Berger & Petr Janata**

June 2016 – June 2017 | Stanford, CA

### **COGNITIVE NEUROSCIENCE:**

The GEM project is funded through the National Academies Keck Futures Initiative for Art and Science, Engineering and Medicine Grant. The goal of the project is to build a prototype of the “Groove Enhancement Machine” (GEM), and to test its efficacy in a psychological experiment aimed at assessing socioemotional functioning. The desire to develop an adaptive device for facilitating musical interactions arose from considerations that joint music-making can have a positive emotional impact on the participating individuals and has been shown to increase cooperation among strangers who have synchronized during a music-making experience.

## **CCRMA** | STANFORD UNIVERSITY'S CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS

ADVISOR: **Julius Orion Smith III**

February 2016 – April 2016 | Stanford, CA

### **DIGITAL FILTER DESIGN:**

Wisam is being advised by Julius Orion Smith III on research involving the generalization of computable and realizable digitization schemes for state variable filters. The goal of this research is to derive new methods for topology preserving filter digitalization, enabling the matching of multiple frequency domain features while minimizing frequency warping artifacts.

## **CCRMA** | STANFORD UNIVERSITY'S CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS

PRINCIPAL INVESTIGATOR: **Fernando Lopez-Lezcano**

June 2015 – June 2017 | Stanford, CA

### **SOUND FIELD CAPTURE:**

Wisam has been working with Fernando Lopez-Lezcano on 3D printable B-Format microphone arrays. This research involves microphone measurement, calibration, and finding optimal microphone arrangements in order to optimize the spatial resolution and frequency response of the recorded A-format microphone signals.

**SPATIAL AUDIO (3D SOUND):**

Wisam is being advised by Fernando Lopez-Lezcano on projects involving the design and implementation of spatial audio authoring and composition tools, designing end-to-end network audio solutions for large scale 3D multimedia / sound systems, and algorithms for portable ambisonic sound field representation.

**CNMAT | UC BERKELEY'S CENTER FOR NEW MUSIC AND AUDIO TECHNOLOGIES**

PRINCIPAL INVESTIGATOR: **David Wessel**

May 2012 – May 2015 | Berkeley, CA

**MACHINE LEARNING:**

As a member of David Wessel's Machine Learning and Music Research Group, Wisam was focused on framing up many challenges in spatial audio as machine learning problems. This included using neural network autoencoders to learn the features of the decoding process for ambisonic audio systems.

**SPATIAL AUDIO (3D SOUND):**

Wisam's research under David Wessel included designing portable hardware for real-time authoring and rendering of spatial audio, researching new models for sound field representation, and collaborating with Rama Gottfried on developing authoring tools for spatial audio.

**MUSIC | UC BERKELEY: DEPARTMENT OF MUSIC**

ADVISOR: **Jeanne Bamberger**

May 2014 – May 2015 | Berkeley, CA

**MUSIC COGNITION:**

Wisam worked closely with Jeanne Bamberger researching the subtle ways in which spatial music is perceived. Under her direction, Wisam performed listening tests for spatial audio's effect on the perception of musical structure and developing coherent interplay between spatial compositions and the content they modulate.

**EECS | UC BERKELEY: DEPARTMENT OF ELECTRICAL ENGINEERING & COMPUTER SCIENCE**

ADVISOR: **Michael Lustig**

May 2014 – May 2015 | Berkeley, CA

**SIGNAL PROCESSING:**

Wisam is being advised by Michael Lustig on projects involving new methods for source separation of stereo music, state of the art algorithms for spatial transformations, computing wave fronts in three dimensional space, and designing multi-channel audio decoders.

**CNMAT | UC BERKELEY: CENTER FOR NEW MUSIC AND AUDIO TECHNOLOGIES**

ADVISOR: **Adrian Freed**

May 2012 – May 2015 | Berkeley, CA

**INSTRUMENT DESIGN:**

Wisam has been combining David Wessel's approaches to instrument design with user interface and user experience design techniques. Under Adrian Freed's direction, Wisam designed and built a full-scale spatialized laser harp. This instrument was installed along with a three dimensional projection mapping in a 30 foot dome at Lucidity Festival in April of last year.

**CNMAT | UC BERKELEY: CENTER FOR NEW MUSIC AND AUDIO TECHNOLOGIES**

ADVISOR: **Edmund Campion**

May 2014 – May 2015 | Berkeley, CA

**COMPOSITION:**

Wisam is working on music composition research that seeks to fuse the process of composing graphics with spatial audio. This research involves: sound modeling, mesh computation, collision modeling, synthesizing sounds from rigid-body simulations, modal analysis, and three dimensional control space.

## PATENTS

### **STRING THEORY LABS, INC.** | INTERFACE SYSTEM AND METHODS FOR AUTHORING AND PLAYBACK OF SPATIAL AUDIO

Filing Date: December 10th, 2014

United States Patent Application: 14565427

Inventors: Wisam Reid, Rishi Sharma, Eddie Groshev

The present invention relates generally to systems for the authoring and playback of spatial audio. More particularly, this invention relates to the interaction between a user interface and a spatial engine to create a three-dimensional audio experience.

## PRESENTATIONS

### **ARO 2018** | POSTER PRESENTATION: THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY

Filing Date: October 29th, 2016

"Relating the Cohesiveness of Auditory Hair Bundles in Mammals to their Function" (Accepted)

Author(s): Wisam Reid, Anthony J. Ricci, Dáibhid Ó Maoiléidigh

### **ICMPC15** | POSTER PRESENTATION: INTERNATIONAL CONFERENCE ON MUSIC PERCEPTION AND COGNITION

Presentation Date(s): July 23-28, 2018

"The Effects of Musical Role Asymmetries in Piano Duet Performance on Neural Alpha-band Oscillation and Behavioral Synchronization." (Accepted)

Author(s): Washburn, Auriel Lassyn; Roman, Iran; Huberth, Madeline; Gang, Nick; Dauer, Tysen; Reid, Wisam; Nanou, Chryssie; Wright, Matthew;

### **OHNS RESEARCH DAY** | POSTER PRESENTATION: STANFORD DEPARTMENT OF OTOLARYNGOLOGY

Filing Date: October 29th, 2016

"Building A Hair Bundle."

Author(s): Wisam Reid, Anthony J. Ricci, Dáibhid Ó Maoiléidigh

### **CNS 2017** | POSTER PRESENTATION: COGNITIVE NEUROSCIENCE SOCIETY

Presentation Date: March 25th, 2017

"A dual EEG study during piano performance: the effect of the partner's animacy and melodic content on alpha-band oscillations."

Author(s): Irán Román, Madeline Huberth, Nick Gang, Tysen Dauer, Wisam Reid, Chryssie Nanou, Matthew Wright, Takako Fujioka.

### **CNS 2017** | POSTER PRESENTATION: COGNITIVE NEUROSCIENCE SOCIETY

Presentation Date: March 26th, 2017

"Involvement or irrelevance: Representation of the self vs. other in joint piano performance recorded by dual-EEG."

Author(s): Huberth, Madeline; Dauer, Tysen; Roman, Iran; Nanou, Chryssie; Ried, Wisam; Gang, Nick; Wright, Matthew; Fujioka, Takako

### **ANDREW NG'S MACHINE LEARNING POSTER SESSION** | STANFORD UNIVERSITY

Presentation Date: December 8th, 2015

"Blind Audio Source Separation Pipeline and Algorithm Evaluation." 14th Annual CS 229 Machine Learning poster session. (Best Project Award)

Author(s): Wisam Reid, Kai-Chieh Huang, Doron Roberts-Kedes

## HONORS, AWARDS, & APPOINTMENTS

### **BEST PAPER AWARD (RUNNER-UP)** | CS DEPARTMENT: STANFORD UNIVERSITY

DEEP LEARNING IN GENOMICS AND BIOMEDICINE: **Anshul Kundaje**

Project Title: An oscillatory neural network model of motor dynamics during continuous periodic movement

Projects were selected for excellence not only in terms of the writing, deep learning model development, training and evaluation but also in using interpretation methods to gain biological insights captured by the models and predictive patterns in inputs.

### **STANFORD UNIVERSITY'S ACADEMIC COUNCIL COMMITTEE ON ACADEMIC COMPUTING AND INFORMATION SYSTEMS** | STUDENT REPRESENTATIVE

CHAIRMAN: **Michael Cherry**

2016 - 2017 Academic Year | Stanford, CA

The Committee on Academic Computing and Information Systems, subject to the Charter and Rules of the Senate, formulates policies concerning the computing and information systems of Stanford University to meet the academic and administrative needs of the faculty, students and academic staff. In addition, the committee reviews the work of the appropriate University administrative officers whose duty it is to implement the policies adopted by the Senate.

### **WARREN DERE DESIGN AWARD** | EECS DEPARTMENT: UNIVERSITY OF CALIFORNIA, BERKELEY

NOMINATOR: **Anant Sahai**

May 2015 | Stanford, CA

This award is presented to graduating seniors in EECS whose accomplishments in engineering design are judged to be most outstanding. This memorial award honors Professor Dere, who later went on to work at IBM, and was known by his colleagues as being outstanding in engineering systems design. Evidence might include accomplishments during a co-op or internship assignment or on a summer job, or achievements on a project for an upper division design course.

### **BEST-IN-CATEGORY: AUDIO AND MUSIC** | CS DEPARTMENT: STANFORD UNIVERSITY

MACHINE LEARNING RESEARCH: **Andrew Ng**

Project Topic: Blind Audio Source Separation Pipeline and Algorithm Evaluation

Winner of the Best-in-Category Machine Learning Project. The winners were selected through a multiple round judging process which took into account both the poster content and final report quality.

## ENTREPRENEURSHIP

### **STRING THEORY LABS INC** | FOUNDER + CHIEF CREATIVE OFFICER

February 2014 – Present | Oakland, CA

- String Theory Labs Inc, is a spatial audio, virtual reality, and interactive media technologies startup.
- String Theory Labs provides services including music venue / studio design and content creation. String Theory Labs uses advanced AVB networking technologies to synchronize audio, video, and lighting data creating integrated, interactive, and immersive end-to-end solutions for 3D multimedia / sound systems.
- Nonprovisional Patent Filing: 14565427  
INTERFACE SYSTEM AND METHODS FOR AUTHORIZING AND PLAYBACK OF SPATIAL AUDIO -  
The present invention relates generally to systems for the authoring and playback of spatial audio. More particularly, this invention relates to the interaction between a user interface and spatial engine to create a three-dimensional audio experience.

### **STRING THEORY LLC** | FOUNDER + ARTIST + ENGINEER

May 2012 – Present | Stanford, CA

- String Theory offers services including art exhibition and curation, live visual and audio performances including non-invasive venue integration of immersive 3D audio technologies (developed by String Theory Labs), 3D projection video, LED lighting networks, dancers and more.
- String Theory also provides songwriting, recording, production and post-production services for music collaboration, video, films, augmented and virtual reality experiences in stereo and multichannel formats.
- TradeMark (US Class 100, 101, and 107): Art exhibitions; Entertainment services in the nature of live visual and audio performances by musical bands, DJs, Video jockeys and dancers; Multimedia entertainment services in the nature of recording, production and post-production services in the fields of music, video, and films

## TEACHING

### **DEEP LEARNING FOR MUSIC INFORMATION RETRIEVAL**

| INSTRUCTOR: STANFORD UNIVERSITY

INSTRUCTORS: **Iran Roman & Wisam Reid**

August 2017 | Stanford, CA

Wisam is co-instructing this course with Iran Roman, at Stanford's Center for Computer Research in Music and Acoustics (CCRMA). The availability of large-scale databases has facilitated recent advances in Deep Learning across fields like computer vision, genomics, and natural language processing. These techniques are also applied in the field of Music Information Retrieval. In this course, students will master the theory behind tools at the intersection of machine learning, Digital Signal Processing, Music Information Retrieval, and Computational Neuroscience. First, students will write software completely from scratch, and then they will optimize their implementations with TensorFlow.

**ACOUSTICS** | GRADUATE STUDENT INSTRUCTOR: STANFORD UNIVERSITY

INSTRUCTOR: **Thomas Rossing**

January 2017 – Present | Stanford, CA

Wisam will be assisting Professor Thomas Rossing in teaching acoustics (Music 150) during the 2017 Winter quarter. Music 150 teaches topics including, the physics of vibrating systems, waves, and wave motion. Time-frequency-domain analysis of sound. Room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music.

### **MOBILE EEG AND COMPUTATIONAL TOOLS FOR AUDITORY RESEARCH |**

INSTRUCTOR: STANFORD UNIVERSITY

INSTRUCTORS: **Iran Roman & Wisam Reid**

August 2016 | Stanford, CA

Wisam, Iran Roman and Cynthia Moncada taught this neuroscience workshop. Participants will record brain activity using a custom and mobile electro-encephalogram (EEG) to study topics including: the fundamental patterns of cortical brain activity unfolding over time, specific relationships between cortical activity and the acoustic stimuli that trigger it, experiments that we can bring outside the lab to investigate the brain in realistic scenarios, Machine Learning and Statistical tools to clean, analyze, and visualize EEG data, and artificial neural networks as tools for modeling of brain activity. Topics to be covered include: Anatomy and physiology of the peripheral and central auditory systems. The history and functionality of modern EEG systems. Analysis of electrophysiological data using Matlab and Python libraries. Neuroscience literature on cognition of music and speech. Modeling of brain activity using Neuroscience-Inspired Artificial Neural Networks.

**MUSIC, MIND, & HUMAN BEHAVIOR** | GRADUATE STUDENT INSTRUCTOR: STANFORD UNIVERSITY

INSTRUCTOR: **Jonathan Berger**

March 2016 – Present | Stanford, CA

Wisam is assisting Professor Jonathan Berger in teaching Music 1A at Stanford University. Music 1A is an introductory exploration of the question of why music is a pervasive and fundamental aspect of human existence. The class will introduce aspects of music perception and cognition as well as anthropological and cultural considerations.

**ACOUSTICS** | GRADUATE STUDENT INSTRUCTOR: STANFORD UNIVERSITY

INSTRUCTOR: **Thomas Rossing**

March 2015 – May 2015 | Stanford, CA

Wisam assisted Professor Thomas Rossing in teaching acoustics (Music 150) during the 2016 Winter quarter. Music 150 teaches topics including, the physics of vibrating systems, waves, and wave motion. Time-frequency-domain analysis, room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music.

## **STANFORD YOUTH ORCHESTRA** | INSTRUCTOR

PROGRAM DIRECTOR: **Jindong Cai**

July 2015 | Stanford, CA

The Stanford Youth Orchestra brings the finest young musicians from around the world to participate in a three-week intensive orchestral and academic program in Summer 2015 on the beautiful campus of Stanford University. Bringing together world-renowned faculty instructors, the Stanford Youth Orchestra will provide participants with exceptional orchestral training in the state-of-the-art Bing Concert Hall, and within Stanford's peerless intellectual and interdisciplinary environment.

## **PHYSICS & MUSIC** | TEACHING ASSISTANT: UNIVERSITY OF CALIFORNIA, BERKELEY

INSTRUCTOR: **Nobel Laureate, Saul Perlmutter**

March 2016 – Present | Berkeley, CA

Wisam served as a TA in Physics C21 during the Spring 2015 semester. C21 is a course designed by Nobel Laureate, Saul Perlmutter covering the physical principles encountered in the study of music. The applicable laws of mechanics, fundamentals of sound, harmonic content, principles of sound production in musical instruments, musical scales, acoustics, and fourier analysis.

## PHILANTHROPY

### **VOW OF POVERTY** | WATCHTOWER BIBLE & TRACT SOCIETY

Location: Brooklyn, NY

January 2003 - February 2006

After graduating from high school Wisam took a legal 3 year vow of poverty in order to serve as a full-time minister without distraction.

### **HURRICANE DISASTER RELIEF** | WATCHTOWER BIBLE & TRACT SOCIETY

Locations: Louisiana, Mississippi, and Florida

January 2006 - March 2006

Wisam volunteered full-time to help communities in Louisiana, Mississippi, and Florida rebuild after hurricane Katrina.

### **RESTORE VOLUNTEER** | SAN DIEGO HABITAT FOR HUMANITY

August 2011 - August 2012 | San Diego, CA

Habitat for Humanity ReStores are nonprofit home improvement stores and donation centers that sell new and gently used furniture, home accessories, building materials, and appliances to the public at a fraction of the retail price. Habitat for Humanity ReStores are proudly owned and operated by local Habitat for Humanity affiliates, and proceeds are used to build homes, community, and hope locally and around the world.

### **STRING THEORY MUSIC PROCEEDS FOR CHARITY** | THE BERKELEY FOOD AND HOUSING PROJECT

December 2014 - Present | Berkeley, CA

All proceeds from String Theory's "Homeless" single are being donated to The Berkeley Food and Housing Project, a local Berkeley, CA homeless charity.

Link: <https://string-theory.bandcamp.com>

### **WOMEN IN COMPUTER MUSIC SCHOLARSHIP** | SUMMER WORKSHOP OPPORTUNITY TO STUDY AUDITORY NEUROSCIENCE

August 2016 | Stanford, CA

Wisam taught a workshop on "Mobile EEG and Computational Tools for Auditory Research." In order to encourage diversity, Wisam and his co-instructor offered scholarships to encourage women to apply.

## AFFILIATIONS

### **STANFORD OTOLARYNGOLOGY-HEAD & NECK SURGERY** | STANFORD MEDICAL SCHOOL

Stanford Otolaryngology-Head & Neck Surgery (OHNS) strives for excellence in all of its core missions: clinical care, education, and research. The central theme of Stanford OHNS basic and translational research is to seek a better understanding of diseases in the field and inventing new therapies in order to overcome hearing loss through regenerative means.

### **FIRST GENERATION MENTORING PROGRAM** | STANFORD MEDICAL SCHOOL

This program is sponsored by the Office of Medical Student Affairs, the Office of Graduate Education and the Stanford Medicine Alumni Association, helping first generation college students find support and mentorship.

### **THE CENTER FOR MIND, BRAIN, & COMPUTATION** | STANFORD UNIVERSITY

MBC is dedicated to understanding how mental functions such as perceiving, understanding, thinking, feeling, and decision-making arise from neural processes in the brain. The purview of the center includes the processes and mechanisms that underlie the development of these abilities as well as disorders and diseases that affect them. MBC fosters the integration of theoretical, computational and experimental approaches to these issues, in hopes of increasing understanding and fostering improved methods for enhancement of human potential and life satisfaction.

### **CCRMA** | STANFORD UNIVERSITY

The Stanford Center for Computer Research in Music and Acoustics (CCRMA) is a multi-disciplinary facility where composers and researchers work together using computer-based technology both as an artistic medium and as a research tool.

### **THE MULTIMEDIA ORCHESTRA** | UNIVERSITY OF CALIFORNIA, BERKELEY

The goal of The Multimedia Orchestra (MMO) is to bring artists, performers, programmers, makers, engineers and curious people together to explore the creative potential of interdisciplinary collaboration. MMO connects its community of makers and learners to awesome events, powerful tools, and enthusiastic mentors.

### **CNMAT** | UNIVERSITY OF CALIFORNIA, BERKELEY

The UC Berkeley Center for New Music and Audio Technologies (CNMAT) houses a dynamic group of educational, performance and research programs focused on the creative interaction between music and technology. CNMAT's research program is highly interdisciplinary, linking all of UC Berkeley's disciplines dedicated to the study or creative use of sound (such as music, architecture, mathematics, statistics, mechanical engineering, computer science, electrical engineering, psychology, physics, space sciences, the Center for New Media, and the Department of Theater, Dance, and Performance Studies).

## ART EXHIBITIONS & PERFORMANCES

### **SENTIENCE** | MULTIMEDIA ART EXHIBITION AND CONCERT

Location: Publicworks

August 2015 | San Francisco, CA

Motivated as both an artistic expression and a technical demonstration, Wisam's company String Theory Labs integrated live music, graphics, lighting, and interactive multimedia art to infuse Publicworks (a San Francisco night club) with a Sentience of its own. For one night, the club and its guests were merged together as a growing organism, an artistic celebration of the symbiotic relationship between biology and technology. Giving our 500+ attendees an opportunity to see, hear, and feel technology intertwined with the most graceful aspects of humanity: creativity, imagination, and art.

### **THE INAUGURAL ALLOSPHERE CONCERT** | UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Collaborators: John Chowning, Matt Wright, Ge Wang

February 2016 | Santa Barbara, CA

The AlloSphere is a Large-scale Immersive Laboratory, a 30-foot diameter sphere built inside a 3-story near-to-anechoic (echo free) cube, allows for synthesis, manipulation, exploration and analysis of large-scale data sets in an environment that can simulate virtually real sensorial perception. It is a physical place designed to facilitate creativity and incubate ideas via collaboration. Researchers find a multitude of interactive interfaces for research into: scientific visualization, numerical simulations, data mining, visual/aural abstract data representations, knowledge discovery, systems integration, human perception, and many other areas of inquiry.

Wisam was commissioned to create a multichannel remix of John Chowning's seminal 4 channel work "Turenas" to be paired with a 3D visualization by Ge Wang for the debut concert held at the Allosphere. To take advantage of the AlloSphere's 54.1 channel sound system, Wisam used a Ambisonic surround sound technique to bring the original four channels into the full space. His central concept was the "virtual speaker stack": three virtual sound sources arranged above, at, and below ear level in a vertical line. Creating one such virtual stack for each of Turenas' original 4 channels, bringing the sound out of the ground plane to envelop you much more richly also from above and below.

### **LUCIDITY FESTIVAL** | MUSICAL PERFORMANCE AND ART INSTALLATION

April 2014 | Santa Barbara, CA

Wisam's band String Theory performed their original violin, cello, double bass, piano, and electronic compositions live on the main stage at Lucidity Festival. Wisam also designed and built a 10' x 7' circular 16 channel spatialized laser harp, functioning as a step sequencer and modular synthesizer in collaboration with Eugene Lynch. By intercepting any combination of lasers, unique musical sequences were generated and spatialized through a circular array of speakers using our 3D sound technology. Sixteen knobs arranged around the instrument were then used to apply audio filters and effects to the generated sequence. This instrument was installed along with a three dimensional projection mapping in a 30 foot geodesic dome and was accompanied by an art gallery curated with multimedia and live painting.

## WORKSHOPS & TRAINING

### **THE NEURAL COMPUTATION AND PSYCHOLOGY WORKSHOP (NCPW) |**

CONTEMPORARY NEURAL NETWORK MODELS

Program Coordinator: James McClelland

August 2016 | Philadelphia, PA

The NCPW series is a well established and lively forum that brings together researchers from such diverse disciplines as artificial intelligence, cognitive science, computer science, neurobiology, philosophy and psychology to discuss their work on connectionist modelling in psychology. NCPW covers Contemporary Neural Network Models, bringing the latest developments in Deep Neural Networks, Deep Reinforcement Learning Networks, and Recurrent Neural Networks with Long-Short-Term Memory Units into contact with contemporary cognitive science and cognitive neuroscience research.

### **FAUST PROGRAMMING CLINIC | CCRMA: CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS**

July 2015 | Stanford, CA

Audio Plug-ins Designed with Faust

### **MAX/MSP PROGRAMMING CLINIC | CNMAT: CENTER FOR NEW MEDIA AND AUDIO TECHNOLOGIES**

July 2014 | Berkeley, CA

Max/ MSP Workshop

## CERTIFICATIONS

### **AMATEUR RADIO LICENSE | FEDERAL COMMUNICATIONS COMMISSION**

March 2014 - March 2024

License # 0023360746, Call Sign: KK6KJJ

### **CERTIFIED TECHNOLOGY SPECIALIST | INFOCOMM INTERNATIONAL LICENSE**

January 2016 - Present

Audio Architect – Design (CTS-D)

# RELEVANT COURSEWORK

## STANFORD

### COGNITION & PSYCHOPHYSICS:

- Music Perception and Cognition II: Musical Gesture  
Instructor: Takako Fujioka
- Psychophysics and Music Cognition  
Instructor: Takako Fujioka
- Computational Models of Sound Perception  
Instructor: Malcolm Slaney

### NEUROSCIENCE & BIOLOGY:

- Computational Models of the Neocortex  
Instructor: Thomas Dean
- Computational Biology in Four Dimensions  
Instructor: Ron Dror
- Theoretical Neuroscience  
Instructor: Surya Ganguli
- Cognitive Neuroscience - Vision  
Instructor: Justin Gardner
- Understanding Techniques in Neuroscience  
Instructor: William Newsome
- Auditory EEG Research III:  
Coordinated Actions and Hyperscanning  
Instructor: Takako Fujioka
- Basics in Auditory and Music Neuroscience  
Instructor: Takako Fujioka
- Graduate Research in Neuroscience  
Instructor: Anthony Ricci

### COMPUTER SCIENCE:

- Deep Learning in Genomics & Biomedicine  
Instructor: James Zou
- Machine Learning  
Instructor: Andrew Ng

### ELECTRICAL ENGINEERING & SIGNAL PROCESSING:

- Analysis & Control of Nonlinear Systems  
Instructor: Stephen Rock
- Linear Dynamical Systems  
Instructor: Stephen P. Boyd
- Audio Spectrum Processing Part I: Spectrum Analysis  
Instructor: Julius Smith
- Audio Spectrum Processing Part II: Digital Filters  
Instructor: Julius Smith
- Signal Processing Techniques for Digital Audio Effects  
Instructor: Jonathan Abel
- Perceptual Audio Coding  
Instructor: Marina Bosi
- Advanced Acoustics  
Instructor: Thomas Rossing

### MUSIC:

- Sound & Space  
Instructor: Fernando Lopez-Lezcano
- Fundamentals in Computer Generated Sound  
Instructor: Chris Chafe
- Careers in Media Technology  
Instructor: Jay Leboeuf
- Graduate Research in Music Technology  
Instructor: Fernando Lopez-Lezcano
- Research Seminar in Computer Generated Music  
Instructor: Chris Chafe, Julius Smith
- Physical Interaction Design for Music  
Instructor: Sasha Leitman

## UC BERKELEY

### ELECTRICAL ENGINEERING & SIGNAL PROCESSING:

- Microelectronic Circuits  
Instructor: Michel Maharbiz
- Digital Signal Processing  
Instructor: Michael Lustig
- Signals & Systems  
Instructor: Murat Arcak
- Structure and Interpretation of Systems and Signals  
Instructor: Babak Ayazifar

### COMPUTER SCIENCE:

- Artificial Intelligence  
Instructor: Pieter Abbeel
- Discrete Mathematics & Probability Theory  
Instructor: Anant Sahai
- Foundations of Computer Graphics  
Instructor: James O'Brien
- User Interface Design & Development  
Instructor: Eric Paulos
- Computer Architecture: Machine Structures  
Instructor: Randy Katz
- Data Structures and Programming Methodology  
Instructor: Michael J. Clancy
- The Structure and Interpretation of Computer Programs  
Instructor: Amir Kamil

### MUSIC:

- Music Cognition: The Mind Behind The Musical Ear  
Instructor: Jeanne Bamberger
- Computer Programming for Music Applications  
Instructor: David Wessel
- Musical Applications of Computers  
Instructor: Rama Gottfried
- Advanced Projects in Computer Music  
Instructor: Edmund Campion
- Voice Class  
Instructor: Candace Johnson
- African Drumming  
Instructor: C K Ladzekpo
- Musicianship  
Instructor: Jen Wang

### MISC:

- Linear Algebra & Differential Equations  
Instructor: Francisco Alberto Grünbaum
- Human Biological Variation  
Instructor: Christopher Schmitt
- Physics & Music  
Instructor: Terry Buehler

# PROGRAMMING LANGUAGES

## **PROFICIENT**

- Mathematica
- Matlab
- $\LaTeX$
- C++
- Java
- Python
- HTML
- CSS
- MAX / MSP

## **EXPERIENCED**

- C
- JavaScript
- CoffeeScript
- Android
- XML
- FAUST
- Pure Data
- Shell / BASH

## **FAMILIAR**

- iOS
- Ruby
- CUDA
- Processing
- Obj-C
- Assembly