Wisam Reid

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Computational Neuroscientist
& Music Technologist

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
PhD Advisor: Anne Takesian

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

CURRENT RESEARCH PROJECTS

MIT | The McGovern Institute for Brain Research
Principal Investigator: Mark Harnett
June 2018 – Present | Cambridge, MA

COMPUTATIONAL NEUROSCIENCE:
Wisam is working with Mark Harnett, a member of MIT's Department of Brain and Cognitive Sciences. He is studying the biophysical features of individual neurons and the way dendrites (neuronal tree-like structures) endow neural circuits with powerful processing capabilities.

HARVARD MEDICAL SCHOOL | Mass Eye & Ear Infirmary
Principal Investigator: Anne Takesian
September 2018 – Present | Boston, MA

AUDITORY NEUROSCIENCE:
Wisam is working with Anne Takesian, on experimentally exploring the structure of neural circuits and testing theoretical predictions for plasticity in the auditory cortex of mice using optical measurement and stimulation technologies.

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 and Daibhid Ó Maoiléidigh 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.

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 audio engine to create a three-dimensional audio experience.

PUBLICATIONS
FRONTIERS IN NEUROSCIENCE | 2019

Washburn, Auriel, Irán Román, Madeline Huberth, Nick Gang, Tysen Dauer, Wisam Reid, Chryssie Nanou, Matthew Wright, and Takako Fujioka. "Musical Role Asymmetries in Piano Duet Performance Influence Alpha-Band Neural Oscillation and Behavioral Synchronization." Frontiers in neuroscience 13 (2019): 1088.

SOCIAL NEUROSCIENCE | 2019

Huberth, Madeline, Tysen Dauer, Chryssie Nanou, Irán Román, Nick Gang, Wisam Reid, Matthew Wright, and Takako Fujioka. "Performance monitoring of self and other in a turn-taking piano duet: A dual-EEG study." Social Neuroscience 14, no. 4 (2019): 449-461.

MANUSCRIPT IN PROGRESS | 2020
Authors: Wisam Reid, Daibhid Ó Maoiléidigh, and Anthony Ricci

Tentative Title: "Relating the Cohesiveness of Auditory Hair Bundles in Mammals to their Function"

INVITED TALKS
AES NEW YORK 2021 | AI IN AUDIO
Event Date: May 27th, 2021 | Virtual Session

Moderators: Heather Rafter & Bobby Lombardi
Panelists: Wisam Reid, Sehmon Burnam, & Alexander Wankhammer

Description: A panel of leading experts in Artificial Intelligence (AI) discuss its impact in audio engineering applications.

AES NEW YORK 2019 | SHOW ME THE MONEY: FUNDING YOUR AUDIO DREAM
Event Date: October 17th, 2019 | New York City, NY

Moderator: Heather D. Rafter
Panelists: Wisam Reid, Phil Dudderidge, Mark Ethier, Ethan Jacks, & Piper Payne

Description: This panel of industry insiders will share their tips on funding your audio passion, whether you're a student, start up, or an established company wishing to expand. We'll take you through every scenario: from scholarships and grants, to crowd funding via Kickstarter and other campaigns, and onto raising money through friends and family rounds and more. We'll demystify venture capital, debt financing, investment banking, and private equity, and we'll also explore growth through merger and acquisition or IPO. Whether you're a student, solo audio developer, new or well-established company, this program will guide you through the financing path that best meets your needs.

HEARING SEMINAR 2018 | CCRMA STANFORD UNIVERSITY
INVITED BY: MALCOLM SLANEY
Presentation Date: March 9th, 2018

Talk Title: "Hearing Sound with Auditory Hair Bundles"

POSTER PRESENTATIONS

SFN 2021 | Poster Presentation: Society for Neuroscience
Presentation Date: November 8-11, 2021

Title: "Function of cortical NDNF interneurons in sound frequency discrimination"
Author(s): Maryse Thomas, Carolyn Sweeney, Kasey Smith, Wisam Reid, Anne Takesian

ARO 2018 | Poster Presentation: The Association For Research In Otolaryngology
Presentation Date: March 13th, 2018

Title: "Relating the Cohesiveness of Auditory Hair Bundles in Mammals to their Function"
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

Title: "The Effects of Musical Role Asymmetries in Piano Duet Performance on Neural Alpha-band Oscillation and Behavioral Synchronization."
Author(s): Washburn, Auriel Lassyn; Roman, Iran; Huberth, Madeline; Gang, Nick; Dauer, Tysen; Reid, Wisam; Nanou, Chryssie; Wright, Matthew;

THE MUSIC ENGAGEMENT RESEARCH INITIATIVE | Poster Presentation: Stanford Department Of Music
Presentation Date: May 11–12, 2018

Title: "Performance monitoring of self and other in a turn-taking piano duet: A dual-EEG study."
Author(s): Huberth, Madeline, Dauer, Tysen, Nanou, Chryssie, Román, Irán, Gang, Nick, Reid, Wisam, Wright, Matthew, Fujioka, Takako

OHNS RESEARCH DAY | Poster Presentation: Stanford Department Of Otolaryngology
Filing Date: October 29th, 2017

Title: "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

Title: "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

Title: "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

Title: "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

PHD FELLOWSHIP | Howard Brain Sciences Foundation
Appointment Date: January 10, 2020

The Howard Brain Sciences Foundation (HBSFs) is dedicated to achieve an all-encompassing understanding of human cognition and neurological disorders. HBSF hopes to enable novel, multidisciplinary research approaches by establishing a community of researchers, gathered in the Howard Society of Fellows, from a wide variety of backgrounds.

BEST PAPER AWARD (RUNNER-UP) | CS Department: Stanford University
Awarded By: 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.

WARREN DERE DESIGN AWARD | EECS Department: University of California, Berkeley
Nominator: Anant Sahai

Date: May 2015 | Berkeley, 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 | Machine Learning Research
Awarded By: Andrew Ng

Project Title: "Blind Audio Source Separation Pipeline and Algorithm Evaluation"

Winner of the Best-in-Category Machine Learning Project at Stanford's 14th Annual CS 229 Machine Learning poster session. The winners were selected through a multiple round judging process which took into account both the poster content and final report quality.

LEADERSHIP

HARVARD ASSOCIATION FOR MEDITATION AND PSYCHEDELIC STUDIES (AMPS)
| Founder & President
Vice President: Daniel Low
Dates: 2018 - Present | Cambridge, MA

The Harvard GSAS AMPS focuses on reviewing academic studies surrounding meditation, psychedelics, breathwork, and related practices that may induce non-ordinary states of consciousness and enhance well-being from the perspective of science, medicine, spiritual tradition, and art. We invite speakers and organize events to further understand the potential of these practices for clinical therapies, personal growth, and social change. Since these topics can be approached from many different fields, we seek to build community within GSAS by co-organizing events with students and faculty from a diverse array of Harvard GSAS programs, including fields like medical sciences, neuroscience, psychology, social policy, and anthropology.

STANFORD'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.

TEACHING

INTRODUCTION TO SOUND, SPEECH, AND HEARING | Harvard-MIT Graduate Student Instructor
Instructors: Satrajit Ghosh, Sunil Puria, & Hideko Nakajima
September 2019 – December 2019 | Cambridge, MA

Wisam assisted in teaching Harvard-MIT's Introduction to Sound, Speech, and Hearing (SHBT 200) during the 2019 Fall semester. The goals of SHBT 200 are to introduce students to the acoustics, anatomy, physiology, and mechanics related to speech and hearing and to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of bioengineering. Particular attention will be paid to how humans generate and perceive speech. Topics include acoustic theory of speech production, basic digital speech processing, control mechanisms of speech production and basic elements of speech and voice perception. These fundamental topics were explored through applications and challenges involving acoustics, speech recognition, and speech disorders, which are especially relevant given the ubiquity of recording and playback devices such as smartphones and home assistants. On the hearing side, topics include acoustics and mechanics of the outer ear, middle ear, and cochlea, how pathologies affect their function, and methods for clinical diagnosis. Surgical treatments and medical devices such as hearing aids, bone conduction devices, and implants will also be covered.

DEEP LEARNING FOR MUSIC INFORMATION RETRIEVAL
| Instructor: Stanford University
Instructors: Iran Roman & Wisam Reid
August 2017 | Stanford, CA

Wisam co-instructed 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 mastered the theory behind tools at the intersection of machine learning, Digital Signal Processing, Music Information Retrieval, and Computational Neuroscience. Students wrote software completely from scratch, and then optimized their implementations with TensorFlow.

ACOUSTICS | Graduate Student Instructor: Stanford University
Instructor: Thomas Rossing
January 2017 – March 2017 | Stanford, CA

Wisam assisted 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 was 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 – May 2016 | Stanford, CA

Wisam assisted 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 introduces 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
Progam 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 2015 – June 2015 | 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.

RECENT COURSEWORK

HARVARD
CLINICAL SCIENCE:
- Anatomy of Speech and Hearing
  Cadaver Dissection
  Instructors: Barbara Fullerton, James Heaton,
     and James Kobler
- Clinical Aspects of Speech and Hearing
  Instructor: Konstantina Stankovic

NEUROSCIENCE & BIOLOGY:
- Biology of the Inner Ear
  Instructor: Charie Liberman
- Neural Computation
  Instructor: Cengiz Pehlevan
- The Discipline of Neuroscience
  Instructor: Lisa Goodrich

MIT
NEUROSCIENCE & ENGINEERING:
- Acoustics, Production and Perception of Speech
  Instructors: John Rosowski and Satrajit Ghosh
- Audition: Neural Mechanisms, Perception and Cognition
  Instructors: Daniel Polley,Bertrand Delgutte,
         Christian Brown and Joshua McDermott

RELEVANT COURSEWORK

STANFORD

COGNITION & PSYCHOPYHSICS:
- 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

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 AUTHORING 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

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.

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 Lucidty 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.

AFFILIATIONS

ASSOCIATION FOR MEDITATION AND PSYCHEDELIC STUDIES (AMPS)
Harvard GSAS
Founder & President

HARVARD MEDICAL SCHOOL (HMS)
Harvard University

DIVISION OF MEDICAL SCIENCES (DMS)
Harvard University

THE GRADUATE SCHOOL OF ARTS AND SCIENCES (GSAS)
Harvard University

MCGOVERN INSTITUTE FOR BRAIN RESEARCH
Massachusetts Institute of Technology (MIT)

NATIONAL INSTITUTES OF HEALTH (NIH)
Training Grant: Institutional National Research Service Award (T32)

MASSACHUSETTS GENERAL HOSPITAL (MGH)

MASSACHUSETTS EYE & EAR (MEE)

STANFORD OTOLARYNGOLOGY-HEAD & NECK SURGERY
Stanford Medical School

FIRST GENERATION MENTORING PROGRAM
Stanford Medical School

THE CENTER FOR MIND, BRAIN, & COMPUTATION (CMBC)
Stanford University

THE CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS (CCRMA)
Stanford University

ELECTRICAL ENGINEERING AND COMPUTER SCIENCES (EECS)
University of California, Berkeley

THE MULTIMEDIA ORCHESTRA
University of California, Berkeley

THE CENTER FOR NEW MUSIC AND AUDIO TECHNOLOGIES (CNMAT)
University of California, Berkeley

PAST RESEARCH PROJECTS

CCRMA | STANFORD UNIVERSITY'S CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS
PRINCIPAL INVESTIGATOR: Takako Fujioka
September 2015 – June 2017 | Stanford, CA

AUDITORY NUEROSCIENCE:
Wisam worked with Takako Fujioka on research combining electroencephalography (EEG), behavioral, and psychoacoustic data. Research topics included 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. (Paper Published)

PSYCHOACOUSTICS:
Wisam was 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 included the design of appropriate auditory stimulus as well as combining EEG with behavioral data analysis. In addition, Wisam also worked 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 – June 2017 | Stanford, CA

BIOLOGICAL NEURAL NETWORK THEORY:
Wisam was advised by Tom Dean on research involving computational neuroscience, modeling sensory transduction, functional connectomics, characterization of neural circuits, and biologically-informed neural network design. Projects 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 – June 2017 | Stanford, CA

NEURAL MODELING:
Wisam was 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:
GEM was 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 was 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 was 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 worked with Fernando Lopez-Lezcano on 3D printable B-Format microphone arrays. This research involved 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 was 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 was 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 was 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 2014.

CNMAT | UC Berkeley: Center for New Music and Audio Technologies
Advisor: Edmund Campion
May 2014 – May 2015 | Berkeley, CA

COMPOSITION:

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

WORKSHOPS & TRAINING

THE NEURAL COMPUTATION AND PSYCHOLOGY WORKSHOP (NCPW) |
Contemporary Neural Network Models
Program Coordinator: James McClelland
August 2016 | Philidephia, 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)

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