Jacob Sundstrom

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EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO | PHD IN DIGITAL SIGNAL PROCESSING
Specialization in audio processing. Within the Department of Music.
Expected June 2021 | San Diego, California
Cum. GPA: 3.95

UNIVERSITY OF CALIFORNIA, SAN DIEGO: EXTENSION | DIGITAL SIGNAL PROCESSING CERTIFICATE
Courses in DSP in communications
Expected March 2021 | San Diego, California

UNIVERSITY OF WASHINGTON, SEATTLE | MM IN MUSIC COMPOSITION
December 2015 | Seattle, Washington
Cum. GPA: 3.7

UNIVERSITY OF CALIFORNIA, SAN DIEGO | BA IN MUSIC COMPOSITION, MINOR IN PHILOSOPHY
June 2012 | San Diego, California
Cum. GPA: 3.83
Honors with High Distinction

INDUSTRY EXPERIENCE

THRACKLE | DATA SCIENTIST/CRYPTOECONOMIC RESEARCHER
January 2022 - present | San Diego, California / Berkeley, California
- Economy optimization, statistical model validation, and industry research. Reading. And lots of thinking.

AIXDSP | AUDIO DSP ENGINEER
February 2021 - January 2022 | San Diego, California / Portland, Oregon
- Plugin development in C/C++ using the JUCE framework.
- Audio DSP research and development.
- Developed a proprietary pitch tracking algorithm for plugin use.

DEPARTMENT OF MUSIC, UCSD | GRADUATE STUDENT RESEARCHER
September 2016 - present | San Diego, California
- Oversee the optimization, design, and implementation of robust real-time audio DSP algorithms for use in performative settings.
- Design and implementation of cutting-edge audio spatialization strategies in multi-speaker arrays.
- Algorithms in use include spectral modeling, statistical analysis, and frequency-domain processing.

DSP CONSULTANT | FREELANCE
August 2016 - present | San Diego, California
- Primarily provide audio DSP guidance to clients worldwide. Clients include Pultizer Prize winner Roger Reynolds and Alvin Lucier.
- Projects include spectral transformations of sound, code refactoring of large projects, design of real-time DSP systems, sound spatialization, algorithm design, and EEG analysis.

DXARATS, UW | GRADUATE RESEARCHER
March 2015 - June 2015 | Seattle, Washington
- Researcher in the Art + Brain Lab in The Center for Digital Arts and Experimental Media.
- Oversaw and designed paradigms for EEG analysis in real and non-real time for novice users.

SEESCAN, INC. | SOUND DESIGN ENGINEER
July 2012 - September 2013 | San Diego, California
- Led research and development of audio displays for ARM chipped devices. Implementation in C++ embedded systems.
- Research and development in conjunction with design engineers to develop acoustic chambers for use with piezoelectric film speakers in a new generation of Ridgid SeeScan SR series locators. Additionally aided in the development of amplifiers for piezoelectric film speakers.
- Audio interface on Ridgid SeeSnake devices. Shipped late-2013.

TEACHING EXPERIENCE

DEPARTMENT OF MUSIC, UCSD | Associate Instructor
April - August 2020 | San Diego, California
- Music 172: Computer Music II. Advanced audio signal processing.
- Music 80: Tuning and Temperament. Survey in the tunings and temperaments of Western music. Developed the entire course.

JACOBS SCHOOL OF ENGINEERING, UCSD | Cluster Assistant
July 2019 | San Diego, California
- Aided, organized, and taught promising high school students in digital signal processing and music technology in the California State Summer School for Mathematics and Science (COSMOS).

DEPARTMENT OF MUSIC, UCSD | Graduate Student Researcher
September 2018 - June 2019 | San Diego, California
- Developed materials with Tom Erbe for graduate level courses in embedded DSP.

SCHOOL OF MUSIC, UW | Instructor
2014-2015 | Seattle, Washington
- Music 116: Fundamentals of Music Theory. Winter 2015. Organized and taught a large consortium (220) of non-music major undergraduates in a seminar-style course.
- Music 202/205: 1st Year Ear-Training. Spring 2014/2015. Organized assignments and quizzes for small groups of students for ear training. Included sight singing and dictation.

SCHOOL OF MUSIC, UW | Teaching Assistant
2013-2014 | Seattle, Washington
- Music 201/204: 1st Year Ear-training. Winter/Spring 2014/2015. Led small groups of students through ear training exercises including sight singing and dictation.
- DXARTS 460: Introduction to Digital Sound Synthesis. Fall 2014. Organized listening sessions for students and aided in teaching fundamentals of electronic music.

LEADERSHIP EXPERIENCE

SPACE4ART | Board of Directors, Member
May 2021 - ongoing | San Diego, California
- Artist lead of the Events & Engagement Committee.
- Provide guidance and feedback for organization direction, long-term strategy, and artist-driven community engagement.

OPEN SOURCE CONTRIBUTIONS

PYPERIOD | Author (Python)
- Sethares and Staley's Periodicity Transforms in Python including four algorithms for finding periodicities in time-domain signals.

DBAP | Author (C++)
- Implementation and improvement of distance-based amplitude panning algorithm for sound spatialization.

BOIDS | Author (SuperCollider)
- Implementation of Craig Reynolds' Boids flocking algorithm for SuperCollider. 2- and 3-dimensional speed-optimized versions in addition to a generalized N-dimensional version.

STYLE FUSION USING NEURAL NETWORKS | Author (Python)
- Successful development of a style-fusion LSTM recurrent neural network algorithm. Includes parameterizations for custom "degrees of fusion" between the various sylistic constraints.

SUPERCOLLIDER EXTENSIONS | Author (SuperCollider)
- Classes, methods, and class extensions for SuperCollider including offline FFT processing, spatialization processes, etc.

THEMES FOR ATOM | Contributor
- Customizations of Atom One Light and Atom One Dark to properly highlight SuperCollider syntax.

TECHNICAL SKILLS

DEVELOPMENT: SuperCollider • Python • MATLAB/Octave • C/C++ • LaTeX
SCM: Git
TARGETS: Linux • OSX • Windows

OTHER RELEVANT EXPERIENCE

SOUTHWESTERN COLLEGE | Guest Lecture
May 20, 2020 | San Diego, California
- Music 104: guest lecture on the history of electronic music.

SCHOOL OF MUSIC, UW | Guest Lecture
December 1, 2014 | Seattle, Washington
- Music 303: guest lecture on the history of electronic music.

LIBRARY OF CONGRESS | Archive Intern
March-June 2012 | Washington, D.C.
- Organized and cataloged the personal library of harpsichordist Wanda Landowska into the library archive.

EXHIBITIONS AND CONCERTS

INSTALLATION AND VISUAL
- *New American Fare* | April 14, 2019 | Space4Art, San Diego, California
- *Erasure* and *thoughts on Rorschach* | November 30, 2018 - January 6, 2019 | San Diego Art Institute, San Diego, California
- *Erasure* | August 8-10, 2018 | ICMC | Daegu Art Factory, Daegu, South Korea
- *once in a while i don't believe you ii* | April 13-14, 2018 | Conrad Prebys Music Center | La Jolla, California
- *Erasure* | February 2, 2018 | Calit2 | San Diego, California
- *thoughts on Rorschach* | November 16-18, 2017 | Piksel17 | Bergen, Norway
- *under the horizon* | with Maya Vanderschuit | April 9, 2017 | Birch Aquarium, La Jolla, California
- *once in a while i don't believe you* | February 11, 2017 | Conrad Prebys Music Center | La Jolla, California
- *thoughts on Rorschach #1* | March 12, 2016 | CoCA UN[contained] at Equinox Studios, Seattle, Washington
- *thoughts on Rorschach #1* | March 3, 2016 | Center on Contemporary Art (CoCA) Gallery, Seattle, Washington
- *alone in the machine* | February 10-18, 2016 | Common Area Maintenence, Seattle, Washington

MUSIC (as composer)
- *Meditation I, II, and III* | September, 2020 | WHYR: Syntheclectico Radio
- *on red on green* | February 16, 2019 | Casa de Lago, Mexico City, Mexico
- *descent #2* | November 27, 2018 | San Francisco Conservatory of Music, San Francisco, California | Lukas Janata, piano
- *the piece formerly known as Boring Formless Nonsense* | March 10, 2017 | Louisiana State University | Kevin Baldwin, baritone saxophone
- *descent #2* | February 17, 2017 | Good Shepard Center, Seattle, Washington | Brooks Tran, piano
- *on red on green* | November 29, 2016 | University Art Gallery, La Jolla, California
- *alone in the machine* | February 10, 2016 | Common Area Maintenence, Seattle, Washington
- *the piece formerly known as Boring Formless Nonsense* | November 11, 2015 | Good Shepard Center, Seattle, Washington | Kevin Baldwin, baritone saxophone
- *the piece formerly known as Boring Formless Nonsense* | May 23, 2015 | Good Shepard Center, Seattle, Washington | Kevin Baldwin, baritone saxophone
- *descent #7* | April 17, 2015 | Radiophrenia, Glasgow, Scotland
- *no comment from the Grey Room* | January 29, 2015 | Jones Playhouse, Seattle, Washington | Inverted Space
- *come on now* | December 17, 2014 | University of Washington | Seattle Chamber Players
- *untitled telematic improv* | December 19, 2014 | New York University, NYC | with Diarmid Flatley
- *come on now* | October 14, 2014 | University of Washington | Inverted Space
- *no comment from the Grey Room* | June 2, 2012 | National Gallery of Art, Washington, D.C. | JACK Quartet
- *the psychic Displacement of a Brownsuit in a Colorworld* | March 11, 2012 | Conrad Prebys Music Center, La Jolla, California | Tyler Eaton, contrabass
- $\infty - \infty = $ *any number you like* | June 6, 2011 | Conrad Prebys Music Center, La Jolla, California
- *Percussion Solo: One* | December 8, 2010 | La Jolla, California | Ayaka Ozaki, percussion
- *untitled improv* | December 2, 2010 | La Jolla, California | with Diarmid Flatley
- *517" for Quartet* | June 2, 2010 | La Jolla, California

MUSIC (AS PERFORMER)

- *Placeless Landscape - Sophia Daud* | February 20, 2020 | CalArts, Valencia, California | with Diarmid Flatley and Sharon Chang
- *Dream Mirror - Roger Reynolds*, computer | February 16, 2019 | Casa de Lago, Mexico City, Mexico | Pablo Cano Gomez, guitar
- *Transfigured Wind - Roger Reynolds*, sound projection | March 7, 2018 | CPMC, La Jolla, California | Palimpsest
- *Toward Another World: Lament - Roger Reynolds*, computer | January 30, 2018 | CPMC, La Jolla, California | Anthony Burr, clarinet
- *Toward Another World: Lament - Roger Reynolds*, computer | August 1, 2017 | Society for Perception and Music Cognition, La Jolla, California | Anthony Burr, clarinet
- *Kontakte - Karlheinz Stockhausen*, sound projection | May 4, 2017 | CPMC, La Jolla, California | James Beauton, percission. Kyle Adam Blair, piano
- *A Pierre. Dell'Azzurro Silenzio, Inquietum - Luigi Nono* | April 6, 2017 | CPMC, La Jolla, California | Madison Greenstone, contrabass clarinet. Michael Matsuno, contrabass flute
- *Dr. Gyrus and the Electric Sulci*, electric guitar | June 6, 2015 | Oakland, California
- *Don Perlimplin - Bruno Madera*, sound | May 29, 2015 | Meany Studio Theater, Seattle, Washington
- *Harry Partch Ensemble*, voice & Kithara II | May 26, 2015 | Meany Studio Theater, Seattle, Washington
- *Stimmung - Karlheinz Stockhausen*, sound projection | May 14, 2015 | Good Shepard Center, Seattle, Washington
- *Harry Partch Ensemble*, voice & Kithara II | May 11, 2015 | Meany Studio Theater, Seattle, Washington
- *Kreuzpiel - Karlheinz Stockhausen*, sound projection | May 14, 2015 | Jones Playhouse, Seattle, Washington
- *Critical Band - James Tenney*, electric guitar | November 6, 2014 | Jones Playhouse, Seattle, Washington

PUBLICATIONS

PEER-REVIEWED

- Sundstrom J. *Speaker Placement Agnosticism: Improving on the Distance-based Amplitude Panning Algorithm.* Immersive and 3D Audio International Conference, Bologna, Italy. September 2021. DOI: 10.1109/I3DA48870.2021.9610897
- Deuel T.A., Pampin J., Sundstrom J., and Darvas F. *The encephalophone : A novel musical bio feedback device using conscious control of electroencephalogram (eeg).* Frontiers in Human Neuroscience, 2017.
- Deuel T.A., Pampin J., Sundstrom J., and Darvas F. *The encephalophone : A novel musical bio feedback device using conscious control of electroencephalogram (eeg).* Presentation Number 540.16: Society for Neuroscience Annual Meeting, Chicago, Illinois. October 20, 2015.

UNPUBLISHED

- Sundstrom J. *The Short-Time Periodicity Transform and its Applications to Audio Synthesis.* Unpublished.

SERVICE

JURIES

- Installation and Sound Art, International Computer Music Conference 2021
- Installation and Sound Art, International Computer Music Conference 2020
- Installation and Sound Art, International Computer Music Conference 2019

COMMITTEES

- Academic Integrity Review Board, UCSD 2020-2021
- Graduate Student Area Representative: Computer Music, 2017-2021

HONORS, AWARDS, AND RESIDENCIES

- SYMADES Grant for the Media Arts Design Engineering Showcase at the University of California, Santa Barbara, 2021.
- Space4Art, Resident Artist, 2020-ongoing.
- Artistic Residency, 2018. Qualcomm Institute's Initiative for Digital Exploration of Arts and Sciences
- Full funding and stipend, 2016. University of California, San Diego, Department of Music
- Interview in *Not Random Art*, June 2016
- Alcor Endowed Scholarship, 2015. University of Washington, School of Music
- Gerald and Betty Kechley Endowed Scholarship, 2015. University of Washington, School of Music
- Artist Grant, 2015. Megapolis Audio Festival
- Travel Grant, 2015. University of Washington, School of Music
- Demar and Greta Irvine Endowed Scholarship, 2013. University of Washington, School of Music
- Full funding and stipend, 2013. University of Washington, School of Music

- Stewart Prize, 2012. University of California, San Diego, Deparment of Music
- President's Washington Scholarship, 2012. University of California
- Provosts' Honors, Fall '09, Winter '10, Fall '11, Winter '12. University of California, San Diego
- Eagle Scout, 2006. Boy Scouts of America