Jacob Sundstrom

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EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO | PhD in Music
Concentration in Computer Music and Digital Signal Processing
Expected June 2021 | San Diego, California
Cum. GPA: 3.95

UNIVERSITY OF CALIFORNIA, SAN DIEGO: EXTENSION | Certificate in Digital Signal Processing
Courses in DSP in communication
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

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.

SOFTWARE DEVELOPER | Freelance
August 2016 - present | San Diego, California

- **Roger Reynolds**: Redesign of *Four Real-Time Algorithms* (proprietary); optimization, redevelopment of spectral transformations of sound, code refactoring, redesign of UX, redesign real-time spatialization processing. Deployed in performances worldwide. ***Watershed***; Redesign of signal processing and spatialization. (C++, SuperCollider, Python)
- **Alvin Lucier**: Redesign of DSP, spatialization, and UX for ***Slices***. Has been used worldwide. (SuperCollider)

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.

OPEN SOURCE CONTRIBUTIONS

DBAP | Author (C++)

- Implementation and improvement of distance-based amplitude panning algorithm for sound spatialization.

PYPERIOD | Author (Python)

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

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

PUBLICATIONS

PEER-REVIEWED

- 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.

SERVICE

JURIES

- Installation and Sound Art, ICMC 2020
- Installation and Sound Art, ICMC 2019

COMMITTEES

- Academic Integrity Review Board, UCSD 2020-2021

HONORS, AWARDS, AND RESIDENCIES

- Space4Art, Resident Artist
- 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