REVISED: May 11th

Sounding Data: Critical and Creative Approaches to Sonification
Course Syllabus

Course # STS 190, Spring 2017
Location: Wellman 233
Time: 12:10 – 1:30 Tuesday and Thursday
Instructor: Owen Marshall
omarshall@ucdavis.edu
Office Hours: Thursdays 2-4PM, SS 260

Course Description:

From the "chirp" of colliding black holes to the melodies of folded proteins, sonic representations of scientific data seem to play an ever more important role in the production and circulation of knowledge. However, researchers have long used their ears to experience and understand the world around them.

This course is a critical survey of historical and contemporary practices of sonification - or turning data into sound - and auditory display. It is also a practical introduction to a variety of techniques for sounding-out and listening-in on data. By incorporating perspectives from the emerging fields of data sonification and sound studies, as well as approaches from sound art and experimental music, we will develop a deeper understanding of how and why data is made audible.

The kinds of questions this class will explore include: How practices of sonification have developed and changed over time? What can we learn from listening? How best to take into account the ways data are made to seemingly "speak" through practices of auditory rendering?

The course is a mixture of lectures, discussions, and other activities. Students are expected to complete assigned reading prior to class each week. Course work will include written reflections on readings/listenings and the rhetorical presentation of information as sound, as well as opportunities to design and experiment with various strategies for sounding data.

Assignments and Grading

Grades will be calculated based on the following percentages:

34% *Participation:*
- *20% Attendance & Discussion*
- *7% Transcoding Exercise (2-3 pp)*
- *7% Auditory Icon/Earcon Exercise (2-3 pp)*

33% Midterm project: Report on a Sonification (5-10 pp)
33% Final project: Original Sonification and Justification (5-10 pp)

Schedule:

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Week 1

April 4 — Introductions & going over the syllabus
Viewing: "No Ideas But In Things" (20 min excerpt)

April 6 — Taxonomies of Sonification
Reading: (Worrall 2013)

Week 2

April 11 — Download Audacity and go through the tutorials
http://www.audacityteam.org

April 13 — Critical Histories of Sonification
(Supper 2013; Volmar 2013)

Week 3

April 18 — Visit from Russel Zochowski, UC Davis Student Disability Services.
Demonstration of JAWS sonification system. (Reading TBA)

April 20 — *Transcoding Exercise Presentations*

Week 4

April 25 — Parameter Mapping
(Knouf 2013; Polli 2016)

April 27 — Sounds of Science
(Klein 2016; Mody 2005; Roosth 2009)

Week 5

May 2 — *Auditory Icon/Earcon Exercise Presentations*

May 4 — Visit from Alexandra Lippman, the Sound Ethnography Project
(Lippman 2016)

Week 6

May 9 — *Midterm Paper Presentations*

May 11 — Hardware-based sonification: Contact mics, Midisprout, etc.
(Collins 2004, chapters 3 and 7)

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Week 7

May 16 Visit from Alex Berrian, Lake Tahoe Sonification Project.
Share data sets for final project

May 18 Sound and Language
(Porcello 2004; Shayan, Osturk, and Sicoli 2011)

Week 8

May 23 *Share sonification methods for final project*

May 25 Machine Listening
(Bijsterveld 2006)

Week 9

May 30 *Share draft sonifications*

June 1 Workshopping Final Projects in-progress

Week 10

June 6 *Final Project sonification presentations Part 1*

** We're invited to share our work live on KDVS from 8-9AM on Wednesday, June 7th **

June 9 *Final Project sonification presentations Part 2*

June 13*:* *Final Project Papers Due via email*

Recommended Readings/Listenings for Midterm Project:
Rilke – Primal Sound (1919)
http://kaganof.com/kagablog/2008/12/19/"primal-sound"-by-rainer-maria-rilke/
Sonified Spores
http://www.yannseznec.com/works/spores/
Polli – Sonic Antarctica
https://www.youtube.com/watch?v=sflQe6ih3tg
Miyazaki - Algorythmics
http://computationalculture.net/article/algorhythmics-understanding-micro-temporality-in-computational-cultures
Neuro-molecular activity that sounds like Steve Reich
https://www.youtube.com/watch?v=Ot2v4KDvfFE
Data Bending With Audacity

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http://www.hellocatfood.com/databending-using-audacity/
Mark Ballora TEDx Talk
https://www.youtube.com/watch?v=aQJfQXGbWQ4
What's The Sound of Personhood?
http://nautil.us/issue/6/secret-codes/whats-the-sound-of-personhood
Helmreich – Gravity's Reverb
https://culanth.org/articles/849-gravity-s-reverb-listening-to-space-time-or
Kepler Sonifications & the Sonic Choir
https://kepler.nasa.gov/multimedia/Audio/sonifications/
http://www.stellarchoir.com/movie.php
Willie Ruff on the Harmony of the Spheres
https://www.youtube.com/watch?v=ArXrDAlGlYU
Stephen Vitiello – World Trade Center recordings
http://www.wnyc.org/story/155908-the-sounds-of-the-world-trade-center/
Karl Heinz Jeron - Fresh Music for Rotten Vegetables
http://jeron.org/fresh-music-for-rotten-vegetables/
Slime Mold Piano Duet
http://thecreatorsproject.vice.com/blog/scientists-are-making-music-with-slime-mold-and-whale-songs
Using the sun to make music
https://www.youtube.com/watch?v=kcqiLvHiACQ
Wanda Dia Merced – How A Blind Astronomer Found a Way to Hear the Stars
https://www.ted.com/talks/wanda_diaz_merced_how_a_blind_astronomer_found_a_way_to_hear_the_stars?language=en
What's it like to hear color?
http://www.npr.org/2014/03/07/283441986/what-s-it-like-to-hear-color
Listening to Data From the Large Hadron Collider
https://www.youtube.com/watch?v=iQiPytKHEwY
Heidi Appel – Predator Vibrations Trigger Plant Chemical Defenses
https://www.youtube.com/watch?v=TKQ-CIX9afA

Statement on University Policies and Regulations:
The course instructor respects and upholds University policies and regulations pertaining to the observation of religious holidays; assistance available to the physically handicapped, visually and/or hearing impaired students; plagiarism; sexual harassment; and racial or ethnic discrimination. All students are advised to become familiar with the respective University regulations and are encouraged to bring any questions or concerns to the attention of the instructor. You will be expected to understand and comply by the UC Davis code of Academic integrity

Statement for Students with Disabilities:
In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except in unusual circumstances, so that arrangements can be

made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

Statement on Academic Integrity:
All of the work you submit in this course must have been written for this course and not another and must originate with you in form and content with all the contributory sources fully and specifically acknowledged.

Bibliography:

Bijsterveld, K.T. 2006. "Listening to Machines: Industrial Noise, Hearing Loss and the Cultural Meaning of Sound." *Interdisciplinary Science Reviews* 31 (4): 323–37.

Collins, Nicolas. 2004. "Circuit Sniffing." In *Hardware Hacking*. http://www.nicolascollins.com/texts/originalhackingmanual.pdf.

Gadye, Levi. 2014. "Love Songs from a Spider." *Berkeley Science Review*. http://berkeleysciencereview.com/love-songs-spider.

Grimshaw, Mark. 2011. "Sound and Player Immersion in Digital Games." In *The Oxford Handbook of Sound Studies*, edited by Trevor J. Pinch and Karin Bijsterveld. Oxford, UK: Oxford University Press.

Klein, Joanna. 2016. "Studying the Building Blocks of Life in Stereo Sound." *New York Times*, October 21. http://www.nytimes.com/2016/10/22/science/proteins-music.html?_r=0.

Knouf, Nick. 2013. "The Noises of Finance." *Sounding Out!* https://soundstudiesblog.com/2013/04/22/the-noises-of-finance/.

Lippman, Alexandra. 2016. Resonance (Chapter draft)

Lutkowski, Bujacz. 2014. "No Making Information Flows in Hybrid Space Tangible: An Analog RF Power Detector for Sonification of Wireless Network Traffic." In *The 20thInternational Conference on Auditory Display (ICAD)*. New York, N.Y. https://smartech.gatech.edu/bitstream/handle/1853/52035/Lutkowski_Bujacz_Ożóg - MAKING INFORMATION FLOWS IN HYBRID.pdf?sequence=1&isAllowed=y.

Mody, Cyrus C M. 2005. "The Sounds of Science : Listening to Laboratory Practice" 30 (2): 175–98. doi:10.1177/0162243903261951.

Polli, Andrea. 2016. "Soundwalking, Sonification, and Activism." In *Routledge Companion to Sounding Art*, edited by Barry Truax. Routledge.

Pollock, Dennis. 2016. "Grapes: Can Audio Playback Interrupt GWSS Mating?" *Western Farm Press*.

Porcello, Thomas. 2004. "Speaking of Sound: Language and the Professionalization of Sound-Recording Engineers." *Social Studies of Science* 34 (5): 733–58. doi:10.1177/0306312704047328.

Roosth, Sophia. 2009. "Screaming Yeast: Sonocytlogy, Cytoplasmic Milieus, and Cellular Subjectivities." *Critical Inquiry* 35 (2): 332–50.

Shayan, Shakila, Ozge Osturk, and Mark A Sicoli. 2011. "The Thickness of Pitch: Crossmodal Metaphors in Farsi, Turkish, and Zapotec." *Senses and Society* 6 (11): 96–105.

Supper, Alexandra. 2013. "Sublime Frequencies: The Construction of Sublime Listening

Experiences in the Sonification of Scientific Data." *Social Studies of Science* 44 (1): 34–58. doi:10.1177/0306312713496875.

Volmar, Axel. 2013. "Listening to the Cold War: The Nuclear Test Ban Negotiations, Seismology, and Psychoacoustics, 1958–1963." *Technology & Culture* 28: 80–102.

Worrall, David. 2013. "An Introduction to Data Sonification." In *Sonic Interaction Design*. Cambridge, Mass: MIT.