

Sound Studies and Sonic Arts

Summer Semester 2022

Phase Focus

Module Theory, Practice

Course Title Computational Listening | Seminar

Course Times and Location Wednesdays | 15:00 - 19:00 p.m. | LIE313

Instructor [Dr. Jasmine Guffond](#)

Email jasmineguffond@zoho.com

Office Hours Upon request after class

Course Description

This seminar investigates constructs of listening and how they apply to the contemporary context of computational listening. Also referred to as machine listening this auditory regime intersects with algorithmic surveillance, machine learning and computer music. As a sonic mode of communication executed by machines for machines, computational listening bypasses human audition. Its operational scale and logics thereby exceed human comprehension, presenting one of its political challenges: how do we critically interrogate computational listening cultures without solely resorting to modes of perception reliant on human sensory modalities? As an emergent field of knowledge-power, data extraction, capital accumulation, automation and control, we will explore the tensions between intangible machinic operations and their real affects through sound, listening, media, and surveillance studies as well as the practices of intelligent computer music and synthetic speech systems.

Over the course of the seminar this contemporary context will be explored from historical and current listening perspectives. We will examine listening constructs as culturally embedded practices and how a diagnostic mode of listening established in medical science relates to contemporary voice recognition technologies. Through a history of eavesdropping we will investigate how human sensory modes of surveillance have been largely superseded by non-sensory, post-aesthetic, extractive capacities of algorithmic surveillance most evident in ubiquitous smart assistants, permanently connected to the Web. This relates more broadly to the fundamental operation of algorithmic processes themselves, through which computational listening is enacted. We will explore how machine learning algorithms develop their own systems of categorizing, sorting and decision making across examples in computer music and speech synthesis and thereby investigate a correlative listening and knowledge production unlike human modes of comprehension and meaning making.

This course is structured according to seminars which include two compulsory readings. During each seminar one or more students will lead a discussion based on one of the assigned readings. Extra reading and listening options are offered as a means to pursue an aspect of the topic further and support the writing of a term paper. The final seminar will include 10' presentations from students related to their intended term paper or audio work with the goal of fostering discussion and feedback at an early stage of their projects. This course is for students interested in obtaining theory credits. In addition, there is the option to attain credit for an audio work alongside a complimentary text that exhibits an understanding and practical application of the theory read and

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discussed throughout the seminar. After this course you will have knowledge of critical frameworks for investigating the contemporary context of computational listening from historical and listening perspectives. Further reading and listening options provide the means for further research into particular aspects of computational listening cultures addressed by this seminar.

Requirements for Attending

Maximum of 12 students.

Students need to commit to reading at least one article per week, ideally two.

Exam / Credit Points

2CP assignment (graded: Theory): Regular attendance and 20' presentation in class;

Consecutive assignment leading to 4 CP (optional, graded: Theory, grading: mean of both grades): term paper (ca 8,000 words) due 1 Nov 2022.

OR

Consecutive assignment leading to 4 CP (optional, graded: Practice, grading: mean of both grades): audio work + 2000 words due 1 Nov 2022.

Passing the first assignment is mandatory for submitting the second assignment.

Schedule

1. Introduction / Diagnostic Listening

Sterne, Jonathan. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham: Duke University Press, 2003.

Further Reading / Listening:

Bijsterveld, Karin. *Sonic Skills: Listening for Knowledge in Science, Medicine and Engineering (1920s-Present)*. London: Palgrave Macmillan UK, 2019. <https://doi.org/10.1057/978-1-137-59829-5>.

Abu Hamdan, Lawrence. *What Now? 2015: The Politics of Listening - Keynote by Lawrence Abu Hamdan*, n.d. https://www.youtube.com/watch?v=kvpunh2ew6s&ab_channel=TheNewSchool.

Lachmund, Jens. "Making Sense of Sound: Auscultation and Lung Sound Codification in Nineteenth-Century French and German Medicine." *Science, Technology, & Human Values* 24, no. 4 (1999): 419–50.

Robinson, Dylan. *Hungry Listening: Resonant Theory for Indigenous Sound Studies*. Indigenous Americas. Minneapolis: University of Minnesota Press, 2020.

2. Algorithms

Miyazaki, Shintaro. "Algorhythmics: Understanding Micro-Temporality in Computational Cultures." *Computational Culture*, no. 2 (September 28, 2012): 1–20.

Mattern, Shannon. "Urban Auscultation; or, Perceiving the Action of the Heart." *Places Journal*, no. 2020 (April 28, 2020). <https://doi.org/10.22269/200428>.

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Further Reading:

Lefebvre, Henri. *Rhythmanalysis: Space, Time, and Everyday Life*. London ; New York: Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc, 2017.

Offenhuber, Dietmar, and Sam Auinger. "Politics of Sensing and Listening." In *Architecture and the Smart City*, edited by Sergio M. Figueiredo, Sukanya Krishnamurthy, and Torsten Schroeder, 1st ed., 186–97. New York : Routledge, 2020.: Routledge, 2019. <https://doi.org/10.4324/9780429324468>.

Schuller, Björn W., Dagmar M. Schuller, Kun Qian, Juan Liu, Huaiyuan Zheng, and Xiao Li. "COVID-19 and Computer Audition: An Overview on What Speech & Sound Analysis Could Contribute in the SARS-CoV-2 Corona Crisis." *Frontiers in Digital Health* 3 (March 29, 2021): 564906. <https://doi.org/10.3389/fdgth.2021.564906>.

<https://metalabharvard.github.io/projects/laughingroom/>

In Bb 2.0 (for 8 Echoes) – Binaral soundtrack <https://www.youtube.com/watch?v=zymfLZzLPXc>

3. Automated Listening

Andrejevic, Mark. "Automating Surveillance." *Surveillance & Society* 17, no. 1/2 (March 31, 2019): 7–13. <https://doi.org/10.24908/ss.v17i1/2.12930>.

Feldman, Jessica. "'The Problem of the Adjective' 1: Affective Computing of the Speaking Voice." *Transposition*, no. 6 (December 15, 2016). <https://doi.org/10.4000/transposition.1640>.

Further Reading:

Andrejevic, Mark. *Automated Media*. London; New York, NY: Routledge, 2020.

Burrell, Jenna. "How the Machine 'Thinks': Understanding Opacity in Machine Learning Algorithms." *Big Data & Society* 3, no. 1 (January 5, 2016): 205395171562251. <https://doi.org/10.1177/2053951715622512>.

Foucault, Michel. *Discipline and Punish: The Birth of the Prison*. 2nd Vintage Books ed. New York: Vintage Books, 1995.

Neville, Stephen. "Eavesmining: A Critical Audit of the Amazon Echo and Alexa Conditions of Use." *Surveillance & Society* 18, no. 3 (August 19, 2020): 343–56. <https://doi.org/10.24908/ss.v18i3.13426>.

Szendy, Peter. *All Ears: The Aesthetics of Espionage*. First edition. New York, NY: Fordham University Press, 2017.

Vallee, Mickey. "Biometrics, Affect, Autoaffection and the Phenomenological Voice." *Subjectivity* 11, no. 2 (July 2018): 161–76. <https://doi.org/10.1057/s41286-018-0044-3>.

4. Machine Listening

House, Brian. "Machine Listening." *A Peer-Reviewed Journal About* 6, no. 1 (April 1, 2017): 16–24. <https://doi.org/10.7146/aprja.v6i1.116008>.

Parker, James. "(Against) the Coming World of Listening Machines," 2020.

<https://machinelisting.exposed/topic/against-the-coming-world-of-listening-machines>.

Further Listening

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<https://noodsradio.com/shows/computational-listening-with-jasmine-guffond-21st-september-20>

Maier, Stefan. "WaveNet: On Machine and Machinic Listening." *Technosphere Magazine, HKW*, December 23, 2018. <https://technosphere-magazine.hkw.de/p/1-WaveNet-On-Machine-and-Machinic-Listening-a2mD8xYCxtsLqoaAnTGUbn>.

Li, Xiaochang, and Mara Mills. "Vocal Features: From Voice Identification to Speech Recognition by Machine." *Technology and Culture* 60, no. 2S (2019): S129–60. <https://doi.org/10.1353/tech.2019.0066>.

Crawford, Kate, and Vladan Joler. "Anatomy of an AI System. The Amazon Echo as an Anatomical Map of Human Labor, Data and Planetary Resources," 2018. <https://anatomyof.ai/>.

Parker, James E. K, Joel Stern, City Gallery Wellington, University of Melbourne, Law School, Liquid Architecture Sound Inc, and Public Office (Melbourne Vic.). *Eavesdropping: A Reader*. City Gallery, Wellington, 2019.

5. Improvising Machines

Lewis, George E. *Why Do We Want Our Computers to Improvise?* Public Lecture. Monash Arts, 2013. <https://vimeo.com/78692461>.

Friend, Juliana. "Programming Improvisation." *Society for Cultural Anthropology, Visual and New Media Review, Fieldsights* (blog), August 2019. <https://culanth.org/fieldsights/series/programming-improvisation>.

Ritwik, Banerji. "Liner Notes on Improvising with an Algorithm." *Society for Cultural Anthropology, Visual and New Media Review, Fieldsights* (blog), August 2019. <https://culanth.org/fieldsights/ritwik-banerjis-liner-notes-on-improvising-with-an-algorithm-1>.

Ritwik, Banerji. "Algorithm as Co-Ethnographer: An Interview with Ritwik Banerji." Interview by Juliana Friend, August 2019. <https://culanth.org/fieldsights/algorithm-as-co-ethnographer-an-interview-with-ritwik-banerji>.

Further Reading / Listening

Collins, Nick. "Automatic Composition of Electroacoustic Art Music Utilizing Machine Listening." *Computer Music Journal* 36, no. 3 (September 2012): 8–23. https://doi.org/10.1162/COMJ_a_00135.

Lewis, George E. "Why Do We Want Our Computers to Improvise?" In *The Oxford Handbook of Computer Music*, edited by R. T. Dean and Alex McLean, Vol. 1. Oxford Handbooks. Oxford ; New York: Oxford University Press, 2009.

Lewis, George E. *Rainbow Family Premiere*. Concert. Machine Listening. *Technosphere Magazine*, 1984. <https://www.youtube.com/watch?v=i4bS-0tsVEg>.

Lewis, George E. "Too Many Notes: Computers, Complexity and Culture in *Voyager*." *Leonardo Music Journal* 10 (December 2000): 33–39. <https://doi.org/10.1162/096112100570585>.

Sutela, Jenna. *Nimiia Vibié* (PAN, 2019), <https://jennasutela.bandcamp.com/>

Sutela, Jenna. "Nimiia Vibié Log." In *AUDiNT Unsound: Undead*, edited by Steve Goodman, Toby Heys, Eleni Ikoniadou, and AUDiNT (Research team), 229–33. Falmouth, United Kingdom: Urbanomic Media and MIT Press, 2019.

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6. Biased Listening

Lawrence, Halcyon M. "Siri Disciplines." In *Your Computer Is on Fire*, edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip, 179–98. Cambridge, Massachusetts; London England: The MIT Press, 2021.

Strengers, Yolande, and Jenny Kennedy. *The Smart Wife: Why Siri, Alexa, and Other Smart Home Devices Need a Feminist Reboot*. Cambridge, Massachusetts: The MIT Press, 2020.

<https://machinelisting.exposed/topic/interviews/#halcyon-lawrence>

Further Reading

Søndergaard, Marie Louise Juul, and Lone Koefoed Hansen. "Intimate Futures: Staying with the Trouble of Digital Personal Assistants through Design Fiction." In *Proceedings of the 2018 Designing Interactive Systems Conference*, 869–80. Hong Kong China: ACM, 2018. <https://doi.org/10.1145/3196709.3196766>.

Thompson, Marie. "Gendered Sound." In *The Routledge Companion to Sound Studies*, edited by Michael Bull, 1st ed., 108–17. Routledge, 2018. <https://doi.org/10.4324/9781315722191>.

7. Adversarial Listening and Class Presentations

Schönherr, Lea, Katharina Kohls, Steffen Zeiler, Thorsten Holz, and Dorothea Kolossa. "Adversarial Attacks Against ASR Systems via Psychoacoustic Hiding." San Diego, Calif, 2022. <https://adversarial-attacks.net/>.

Further Reading

Li, Juncheng B., Shuhui Qu, Xinjian Li, Joseph Szurley, J. Zico Kolter, and Florian Metze. "Adversarial Music: Real World Audio Adversary Against Wake-Word Detection System." *ArXiv:1911.00126 [Cs]*, December 5, 2019, 1–11.