Video 4: Sounding – Resonance

[00:00:00]

Stefan Helreich: As one of the symposium conveners, I would like to welcome you to this panel, Sounding Resonance. And I start by thanking CAST administrative organizers who've made this event so sensorially seamless. Thank you, director Leila Kinney, producers Liz Murphy and Meg Rotzel, and CAST postdoc David Mather. And thanks, too, to Heidi Erickson and Anya Ventura.

So what is sounding? We've decided, for this event, that it is resonance, precisely because resonance is, and is not, sound. Resonance reaches beyond the acoustic, auditory, and audible into the zone of vibration, the vibratory, which includes the sonic, but also the tactile and haptic, as well as that which oscillates just beyond the sensible, in the domain of what dubstep artist,Code Nine, calls "unsound."

Resonance, synchronous vibration, operates, too, in the register of the associative imagination, which turns out to be often at the very center of its imagined opposite, scientific rationality. There is, it happens, a minor key Western tradition that has hearing, listening, feeling, resonance as a path to reason. If the visual idiom of reflection posits that the mind is a mirror of the world, an entity detached, apart, objective, resonance suggests participation in the world, moving in sympathy, an empirically attuned embodiment.

Within that tradition, the human has been envisaged as an Aeolian harp. That instrument, named for the ancient Greek ruler of the winds, Aeolus, pictured on the left, the Aeolian harp resonates with the wind, animated by the world around it. It is an eerie, non-human agent, famously celebrated by Coleridge, Chopin, and many more.

The harp is what Victorians would have called a sensitive, an attuned being, one Victorians often imagined as essentially feminine. Whether Bruno Latour in his wondrous keynote, last night, was inviting us to ungender or transgender the sensitive, I leave to general discussion. Now, when Henry David Thoreau listened to wind traveling through telegraphy wires, through cables carrying significant signals, the Aeolian harp of the Romantics went electric, moved into the domain of what media scholar, Douglas Kahn, calls the electrosonic.

Strings and wires, resonance without and within, the electrosonic became the model for human hearing. For Herman Von Helmholtz, hearing became explicable through an analogy with the telegraph. The ear was a tuning fork interrupter, with attached resonators, producing and transducing sound.

Fast forward to information theory at mid-20th century at MIT, and the founder of cybernetics, Norbert Wiener, turns hearing into a capacity that

might be imitated and installed in cyborgs, loops of organism and machine. Such cyborgian sounds weave through modern music, as Christina Dunbar-Hester suggests, from the work of John Cage to Baby Baron, to Walter Wendy Carlos, to Brian Eno, to Afrika Bambaataa, to Jessica Rylan, to Janelle Monae.

Cyborg sounds find themselves instantiated, too, in such technologies as the cochlear implant. That cybernetic story reverberates into this panel, which opens with composer, Alvin Lucier, in conversation with music theorist, Brian Kane.

Alvin Lucier is a towering presence in modern music, known for revelatory compositions that investigate sound as resonance. Lucier has leveraged, into musical pieces, the sound of lightning whistling through the ionosphere. He has, as you'll hear tonight in *I am sitting in a room*, tested the resonant frequencies of enclosed spaces with a simple probe of his voice, recorded and recursively replayed, in order to test the sonic affordances of specific spaces.

In music for solo performer, he has amplified his brain waves, in order to activate percussion instruments, a practice of cyborg resonance that blurs boundaries between the intentional agentive human author and the inhuman electromagnetic materials of which fleshy bodies are made.

This piece is an audiodelic implosion of the insides and outsides of human experience, something like what Tabua Auerbach, yesterday, called for with color. Lucier will be joined by Brian Kane, from Yale, an amazing music theorist concerned with the phenomenology of listening and, in particular, with acousmatic sound, sound of uncertain origin, on which he has just published an arresting book, Sound Unseen.

[00:05:00]   And this book jacket suggests, and I talked about this with Brian a little bit last night, that we might have a fascinating conversation about closed eyes, extended hands, presence/absence, the gender of the listener, and more.

The Lucier/Kane conversation will be followed by a break, after which NYU media historian and disability studies scholar, Mara Mills, will trace the notion of modulation, moving between music, phonetics, and electronics. Mills will offer history, too, of oral education for the deaf. In her brilliant writings, she has suggested that built into many scientific models of sound relay are ableist, oddist, and oralist assumptions about what counts as proper embodiment.

In her forthcoming book, *On the Phone*, deafness and communication engineering, she argues that what many of us think of as human hearing is haunted by the way it has been modeled, with respect to deafness, as construed as a deficient other to hearing.

We'll hear next from computational neuroscientist, Josh McDermott, in Brain and Cognitive Science, here at MIT, who will lead us through his labs statistical modeling of how humans, many humans, navigate our resonating world, and how they filter out unwanted reverberation. And it will be intriguing to puzzle through what happens when resonance and distortion become, in aesthetic productions, such as *I am sitting in a room*, desired qualities, things not to be filtered out, but qualities to be attended to.

Harvard music theorist, Alex Rehding who studies how music theory itself has transformed across time, history, and media, will offer a commentary that will then shepherd us into collective discussion.

The force fields that are set up in this conversation will, I hope, prepare us for tonight's concert, which will be astonishing. Seeing, hearing Alvin Lucier performing his, "I am Sitting in a Room," MIT music professor and clarinetist, Evan Ziporyn, in performing Lucier's, *In Memoriam Jon Higgins*, and Arnold Dreyblatt, who studied with Alvin Lucier, as well as with Pauline Oliveros, performing his *Spin Ensemble*, a composition built upon recordings of a biomedical instrument, the magnetic resonance imaging scanner.

This concert is the first in this year's MIT's "Sounding" series about which you can learn more at the end of your program. Curated by Evan Ziporyn and sponsored by CAST, this series will feature minimalist, Terry Riley, early music ensemble, Boston Camerata, and the vocal ensemble, Roomful of Teeth.

So to loop back to our own room full of teeth and hands, I am keen to learn how this conversation on resonance will unfurl, what kind of life it will gather, sonic, electronic, electrosonic. There's so many possible dimensions, that I'm tempted to wonder if what we will be hearing today will be the sound of "I am Sitting in a Tesseract."

So if I can digress for just 30 seconds, to speak to my own interest in sound, that came to me when, a few years ago now, I joined a submarine dive in the Woods Hole Oceanographic Institutions three-person research submersible named, as it happens, Alvin. Sinking to the bottom of the sea, to see underwater volcanoes in the eastern Pacific Ocean, I thought-- what did I think? I'm sitting in a submarine. I thought that the sounds of the sonar pings around me, of the robotic cyborgian sub of the MP3 player of the pilot, all contributed to my sense of immersion in sound, in water, in the culture of oceanography.

But that immersion was hard won, the result of an assembly of technologies working well, working in sync, for we submariners, to feel immersed in sea sound, it had to be seamlessly transduced, translated from the watery surround into our interior sphere. There is no self-evident immersion, no self-evident presence, without work of signal transduction, which can glitch

at any time, drowning us in sound unwound. There is no life of sound without an apparatus of sensing.

Back in 1960, minimalist composer, La Monte Young proposed, according to Seth Kim-Cohen, sound as an organism, with its own reason for being. And in 1975, Michel Chion pronounced that sound "unscrolls itself, manifests itself within time, and is a living process, energy in action." But as queer electronic music critic Tara Rodgers has shown, such statements emerge from an audiotechnical tradition, dating back to Helmholtz, that has treated sounds as individuals, individuals whose lifetimes can be graphed, whose properties can be purified, as with a sine wave, and formally known through the form of the wave form, which is, rather than a simply preexisting thing in the world, also an artifact of the technological apparatuses designed to capture and represent it, as here on the 1943 Triumph Wobbulator. That's what it was called.

[00:10:01]   The waveform is, to borrow a term from Bruno Latour and Stephen Woolgar's *Laboratory Life*, an inscription, one resonating with its conditions of production. Resonance has a history, a language, an infrastructure, and here today, a panel. So please join me in welcoming Alvin Lucier in conversation with Brian Kane, to open.

Brian Kane: Well, welcome everybody. I guess before we begin conversing, I just to express how it's a great pleasure for me to get to talk to you about your music. I've been a tremendous fan of your work for many, many years. I've had many revelatory experiences, more than one, hearing pieces at various points in my former life as a composer. So I have the easy job. I have to ask you a few questions and let you talk.

So before getting into-- I mean, I would love to talk about some of these questions of resonance that Stefan opened with, but I figured one way to get into that would be to start laying out some of the context for the pieces that people are going to hear tonight, talk about some of your work, and then we can see where that leads us.

So I wanted to start off with, I guess the piece that's often considered the, kind of, beginning of your mature work, which is *Music for Solo Performer*. Can you give us a sense of how that piece came to be?

Alvin Lucier: Yes. I was teaching. I had just come home from Italy on a Fulbright. Actually, I hadn't just come home, I'd been home for several years. And I was at an impasse. You know, I was a composer, I had written a lot of music, tonal music, imitating Stravinsky, you might say. I'd been to Europe and saw all these wonderful festivals. I heard music of Boulez, Nono, Stockhausen. I had been to Darmstadt.

And it just struck me, it wasn't my music, you know? And I thought if I made pieces imitating these composers in this very hyper, complex, serial technique, I would be speaking a language and a dialect that wouldn't be my own work. So I didn't compose for several years. I didn't know what to do. I thought, "This is bad. I want to be a composer and I'm not composing."

I happened to meet a scientist who was working for the Air Force. This is 1964-1965. And he was employed by the Air Force to work on pilots who were having epileptic fits, when their planes would be-- the propellers spinning at a certain speed would lock into their, some sort of visual thing in their brains. They'd have epileptic fits. He was trying to figure that out.

He had a brain wave apparatus, a huge differential amplifier, a set of electrodes. And he came through and tried to interest composers in this. He would say, it would be wonderful if you could make a piece of music using my brain wave apparatus. Nobody was interested in that. They thought it was a joke. They thought it was a gimmick. Well, I had a blank mind. I didn't think it was a gimmick. It's wonderful to have a blank mind. You let anything enter, any idea.

[00:14:48]   So I borrowed his amplifier. I didn't know anything about electronics. I don't know much about physics or science. And I several weeks and months, trying to generate alpha, which is a low 10/12 cycle brain wave. And I would sit for hours at night in the studio, watching my loudspeaker. I had a loudspeaker, an ALH. In those days, stereo, home audio was just beginning to be a thing.

And I would try to generate alpha, try to figure out what was alpha and what was noise, watching the meters on the tape recorder. And I started to generate alpha. And it sounded like what I thought alpha-- and I was looking at the loudspeaker. The grillcloth I took off-- and I could see the cone of the speaker moving, it was actually moving, pulsing. Now, you're not supposed to do that to loudspeakers. You're not supposed to get the cone to do that. But I thought this speaker is a performer. It's moving. I'm not moving. It's moving.

So I thought I could make a piece using a set of loudspeakers. Actually, I didn't know what I was going to do at that moment.

I was at Brandeis and John Cage-- I worked with John Cage a little bit. And the director of the Rose Art Museum at Brandeis was a very-- the art department at Brandeis was much more in tune with what was going on than the music department. I shouldn't say that, should I?

Anyway, I said to the director, it would be nice to get John Cage. She said, wonderful idea. So I called John Cage up on the telephone. He answered.

You know, composers from Europe used to come up and say, how can I speak to John Cage? I'd say, why don't you call him on the telephone?

They'd say, what? You can't call Pierre Boulez on the telephone, Stockhausen. So Cage answered the phone, I said, well, it's Alvin. He said, yes, I know. We used to work a little bit together. I said, would you like to come to Brandeis and do a performance? He said, great. But you have to do a piece on the concert. I said, I don't have any pieces. He didn't say anything. And then I said, but I'm working with this brain wave amplifier-- but I can't really get it to work. He laughed. He said, it doesn't really matter.

He said, the intention is more important. Your success of a piece is not necessarily success. He said, you have to see if you get it to go. So I thought that was a wonderful thing to say. All my friends at Brandeis would say, well, this is sort of a stupid idea, Alvin. You should record your brain waves and make a tape piece, make it safe.

So I thought about it for a while and anxiety-- I had a lot of anxiety about it, because there were no models. What do I do? No structure. I'd learned how to make other kinds of work, but-- So when I saw the cone of the loudspeaker really bumping, bumping 10 cycles per second, I thought, it can play instruments, it can be a performer. I'd been a drummer. I'd been a percussionist. That's my only instrument, actually.

So I just had this idea to gather 16, that number was just a number I like, 16 percussion instruments, gongs, symbols, base drums, anything that loudspeaker, bursting at 10 cycles a second, could get to sound. Even the night before the concert, I didn't know what-- in those days, we were in such a state. You wouldn't know what you were going to do, actually, at a concert, until the concert time. You had your equipment. You had your configuration of stuff, but you didn't know what you were going to do. There was no way to predict that.

[00:19:48]   I couldn't have thought about structuring, putting a grid on it. It's a natural phenomenon. The brain waves just flow from your head. You can't change them. They sound the same, but they're actually bursting, stopping, starting, rising a little bit.

So many people said, why don't you just use an iron oscillator? Use an oscillator and you tune it at 10 cycles a second? What a stupid idea that is. Those ideas always, somehow, it's like you don't want the real thing, you want an imitation of the real thing. I thought, that's not interesting. What would be interesting is to sit in front of an audience, for Heaven's sakes, and try to get in a meditative state, which you need to do to let the alpha flow unblocked, and try to do that in front of an audience, see if that is possible.

So I did. And I did that piece at-- I had John Cage, I said, well, how long should I make this piece? Eight or 10 minutes? He said, no. You should make it 35 minutes. That was a long time in those days, to make a piece of music. So not knowing what was going to happen, I set up the equipment and that was that.

Brian Kane: So the scientist that you mentioned is Edmond Dewan?

Alvin Lucier: Edmond, yeah.

Brain Kane: Who, I think, is an important figure. It comes back in your compositional life again. So let me ask you this-- so in Doug Kahn's recent book, he talks a lot about your relationship with Edmond Dewan. And Ed Dewan's importance for giving you the equipment to allow you to do *Music for Solo Performer*.

But it seems to me, that there's also another component that I don't know-- I haven't seen this talked about in the interviews-- so in the early '60s, you encountered David Tudor's electronic music.

Alvin Lucier: Yes, I--

Brian Kane: And you mentioned in some of your writing-- you used the phrase many times, that David Tudor saved my life?

Alvin Lucier: Well, David Tudor and John Cage, they were just fabulous. I have to go back to MIT and the concert in the '60s. There was a big snow storm. They came around. They did a concert here on the stage. We all came. There weren't very many people in the audience. And I thought a number of things.

First of all, I thought, my colleagues-- I shouldn't say this, but I'm going to say it-- my colleagues at Brandeis were getting bitter their pieces weren't getting played. In those days, you'd write a symphony. You'd hope that some orchestra would play it. And if they played it once, that was enough.

I saw David Tudor had these tables on the [INAUDIBLE] of his electronic equipment. It was junk equipment, basically cheap Radio Shack amplifiers. He had these wonderful battery-operated amplifiers. They were so noisy, but they had enormous gain to them. And he would just plug these, one into this, and you wouldn't know what was plugged in to what.

[00:23:21]   But I thought these men would arrive in this snowstorm and work all day setting up this concert, and these tables with wires hanging down. And I remember David Tudor confessed to me once. He said, often I wouldn't know what was going to happen. I'd turn a knob on an amplifier. I didn't know-- because my setup was so, so many-- I remember John Cage was so tired that after he would say things like, David, can I plug this into this? And David would say, no John, this is an amplifier, and that's an amplifier. But it

was just inspiring. They didn't have access to the big synthesizers. They got their own stuff.

Brian Kane: So in a piece like *Music for Solo Performer*, was Tudor's model of homemade electronics, was that a-- that was an important component in, did that, itself, become a kind of model for allowing you to work with the brainwave technology?

Alvin Lucier: I would think so, yeah. Yeah.

Brian Kane: Because one of the things-- I'm very interested in Tudor. I think that Tudor's work has been a little bit underrepresented in the history of experimental music, and it's-- I mean, you've spoken very passionately about how important seeing him work, seeing this table full of electronics, was.

Alvin Lucier: I was on a panel with him once and he started talking about John Cage, John Cage, John Cage. I said right in the middle of the panel, I said, listen, why don't you talk about your own work? He was so shy, and he's a wonderful player. He was one of the best pianists you've ever heard in your life, a genius. People would give him scores and he would look at them and prepare them and play these pieces, in ways that no one else would ever play it, just wonderful.

John Cage's *Music of Changes*, for piano, a very complicated piece – he would write a part of it, give it to David Tudor, David would play it, and Cage would say, OK, then write another part. In fact, Cage used to say, David Tudor is music, is that piece, actually. He was just a noble, selfless player, wonderful.

Brian Kane: So let me follow, then, the line that, along Ed Dewan, and move to a piece like *I am sitting in a room*. Dewan, he's a mediator for this piece, in a way, right?

Alvin Lucier: Well, it's so funny, I mean, I'm sort of-- I don't know what to say about this somehow. I met him in the hallway one day, in passing. All he said to me was, he said, I was at MIT the other night and a man named Bose, Professor Bose, is developing a loud speaker system. And I think what he said was, and he recycles the sounds back through his loud speakers, to test whether they're accurate or not. That's all he said to me. He didn't give me any details about it, what sounds he used. I'm not even sure whether the sounds went back into the room or not. It was just the idea of that process of repetition.

[00:27:07]   In those days, repetition-- the Judson dance group people were very important. People don't talk about it, but I used to go to those concerts. And the dancers would do pieces that were accumulation forms. One thing

would happen, then another thing would add to it, and adding to it. But very simple forms, repetition with accumulation, rather than dramatic forms.

And I've lost my thought here--

Brian Kane: So did something about seeing the seeing Judsons deal with these processes of accumulation--

Alvin Lucier: So I thought this would be a wonderful process. I'd been in Milan before on my Fulbright. I tried to make pieces in the electronics, the studio phonological in Milan. And I just never got anywhere. I made all these sounds with these analog oscillators and white noise generators.

But I didn't have any ideas about form, what to do. The conventional form, you do this, than you do that, you have contrast, fast, slow, all the various things you might use making a piece of electronic music, just never worked for me. I never made anything that meant anything. But the idea of getting a process of repetition and keeping the same thing, but something is happening when you do that, appealed to me.

So I borrowed a couple of tape machines, went into my apartment one night. I had this horrible, sordid apartment in Middletown. It had a shag rug on the floor.

Well, I tell you this, because it has to do with the acoustics of the room. And I thought, well, let me see what's going to happen. I didn't know what was going to happen.

So I had a loudspeaker. I had a microphone. I put two tape recorders outside the room, so they wouldn't make an noise, unplugged the refrigerator, waited until 11 o'clock at night-- there was a nearby bar, and all the cars would leave at 11 o'clock at night, so it would be relatively quiet-- and I sat down and I wrote out a text, in real time almost. I didn't think about it.

It's wonderful when you're composing and you're really not thinking, you're on automatic pilot. Any composer will tell you that, when they're really working and things are working in your process, things just -- you don't know what you're doing actually. You really don't know. You're just doing it. Your left hand is in the dark, kind of. You know those paintings of those Greeks-- your left hand is, you partly, you know what I mean?

So I wrote a text out fast, pencil and paper. I thought, well, I could use musical instruments for this, too, but I thought that would be-- I thought speech is a wonderful sound source. It has a lot of noise in it, S's, K's.

[MAKES NOISE]

All those sounds. And I thought, well, what will I say? I didn't want anything aesthetic. I don't want to use a poem. It just didn't appeal to me. I wanted to tell people what I was doing. So as a dancer, I think it was Lucinda Childs, a dancer, I remember she did a piece where she's telling you what she's doing, while she is-- now I'm moving my left hand. I'm bringing it across my-- she's telling you what she's doing. And it's wonderful. It just demystifies things.

[00:32:01]   So I just said, what will I say? I'm sitting in a room here. It's a piece that will probably be played in another room that's different from the one you're in now. I'm recording the sound of my speaking voice. And I'm going to play it back into the room again and again, until the resonant frequencies of the room reinforce… so forth. I thought that was a good way to, didn't have any highfalutin poetry, prayers.

Brian Kane: The piece has become such an important piece for so many composers and sound artists. It's a piece that I see referred to again and again. And it gets reworked by different people. Recently at the MoMA, at this big sound art show, there's the Jacob Kierkegaard piece, where he's in Chernobyl, and he records the sounds of the rooms in Chernobyl and goes through a similar processes.

So the piece, I think, has become, in the imagination of a lot of composers and sound artists, it's become this very significant moment. It becomes a piece that really is one of the first places where you get to see, or hear, a piece of music truly explore the acoustics of a room, to make the sound of the room audible.

But one of the things that I think is interesting about the piece, and I can't ever tell how important it is to you, because the piece has been done again and again, is the question of the stutter, right?

Alvin Lucier: Oh.

Brian Kane: And one of the things-- I ask you this, because when I was researching this, I came across a piece that I didn't know of yours, that's a proscore that's reproduced in Reflections called, "The Only Talking Machine of Its Kind in the World."

Alvin Lucier: Oh, that wasn't a very good piece.

Brian Kane: But can I say what the -- I mean, what the piece is about?

Alvin Lucier: Sure, go ahead.

Brian Kane: I'm just curious about this. I've never seen anyone ask you about this, so I figure it's my chance to do it.

Alvin Lucier: Thanks a lot.

Brian Kane: So the piece is basically, it's a tape delay system, where it says, "so the only talking machine of its kind in the world, for any stutterer or stammerer or lisper or person with faulty or halting speech, regional dialect, or foreign accent, or other anxious speaker-- that's all of us by the way-- who believes in the healing power of sound." That's a piece that sets up a series of tape delays that then operate on the voice to, you say, to annihilate the peculiarities of your speech.

Alvin Lucier: I said that?

Brian Kane: Yeah.

Alvin Lucier: Well, I guess I had heard that some idea about stuttering had to do delay, your brain functioning in a way that you don't hear your speech exactly. It would come as a delay, which causes you to stutter. I'm not sure, I don't believe that, but that was an idea I had. The other one, if you repeat-- I thought that if, what did I think exactly? That if you were speaking and you heard your voice coming back at you at various other delays accumulating this overlay of your speech, you wouldn't stutter anymore, because you weren't communicating, it was just turning into sound. I think that happens sometimes.

I don't know. It was a faulty idea, I think. And I only did the piece once or twice.

Brian Kane: I was just curious about it, because for a lot of people who've been in the reception of *I am sitting in a room*, the question of how much of the piece has to do with issues of speech always comes up. There's certain interpretations that push the piece in the direction of being about room tone. There's other ones that push it in the direction of being simply about process. And there's other ones that try to hold onto this question of the relationship between speech and the sound of speech. So it was a question that-- it was interesting to see this other score that I didn't know about, that was sort of dealing with a similar issue.

Alvin Lucier: It's not a good piece. It's just tape delay, you know. That happened so often-- people just tape delay, overlapping, and getting richer and richer. It's OK, but it doesn't interest me anymore.

Brian Kane: Let me ask you about-- I want to set up the context for *In Memoriam Jon Higgins*, so people can understand what that piece is about. Do you want to describe the setup of that piece?

Alvin Lucier: Yeah. I know in the early '80s, you know, I'd done these installations and electronic pieces. Performers would come. They'd say, why don't you write

pieces for instruments, conventional instruments? And I thought that was a wonderful idea.

[00:37:09] One of the reasons I became a composer was I loved the idea of composers making works other people could perform. So this player said, would you make me a piece? I said, sure. So I thought-- you don't know how you get the ideas, they just happen. If you knew how-- and I thought the range of the instrument-- I didn't want any musical language somehow. *I am sitting in a room* uses English language, but the structure, there's no language there. I thought, what will I do as an instrument?

I thought, what's the range of a clarinet? I looked in the instrumentation books. I just thought, trying to be really accurate about this, I thought interference patterns are interesting, beating, audible beating. Everybody knows what that is. When you tune two pitches close together, so close that you don't hear them as an interval, they coincide, their waveforms coincide destructively-- so you hear pumps of sound. When an old piano is out of tune, you can hear that pumping sound as a single note, makes a twanging sound.

So I thought that's an interesting idea. It's acoustics again. Doesn't have anything to do with language, musical language. It's physics, tuning a clarinet with another instrument, close enough to create beating. That's a wonderful idea, that tuning creates rhythm. Tuning creates rhythm. That was a fascinating idea for me.

So I thought using a sine wave, electronic sine wave, is perfect for creating this audible beating phenomenon, because a sine wave doesn't have any overtones. It's just pure wave. So if you sing against a pure wave, you're in a position to make this phenomenon very vivid.

So I thought, now what do I do? Take the range of the instrument, going from low to high, I'll make a sweep upward. So that if the clarinet would play across the rising wave, the farther apart the tones are, the faster the beating. In unison, there's no beating. So I thought if I had a rising sine wave, clarinet plays across the wave, the beating starts fast, slows down as the wave reaches unison, reaches no beating, and speeds up on the other side.

[00:41:03] Well, that's a lovely, simple kind of a gesture you could have. Then I thought, what if you started before the wave and stopped when it reaches unison? Or you could start at unison and the beating would speed up. Or you could straddle the wave, those things. Then I said, how fast should this go? What speed? I had to figure that out. I thought a semitone, 30 seconds a semitone. I mean, that's very slow, isn't it? But the beating isn't slow.

So I asked the clarinetist to play his notes one minute long. He could start 30 seconds before and go 30 seconds. So the whole gesture of that piece is simply either playing across the wave, starting sooner, getting stopping when it reaches. And I just, that was it. I had friends who said, you know, Alvin, this is boring. You can't have just a sine wave sweeping up. You should use your hand. You should change the speed of the beat. I thought if I changed the speed, then what? I have to do it again.

It's a relationship. I'm not interested in relationships in this piece. Who cares about that? I'm interested in the phenomenon of the acoustical. Also each octave the beating speeds up, so built into the piece is this constant moving, changing of the speed of the beat. And God knows within an octave, what the mathematics is. I have no idea. All I know is that every octave the frequencies are doubled, the beating is doubled. So by the time the player gets to the high range, the beating is very fast and at the lower range is slow.

What I discovered -- you know, it's wonderful when you don't interfere with these processes, let them work themselves out. It's wonderful when you discover -- what I started to hear was, I don't dare say this at MIT, because I don't -- you say the wrong thing, but anyway-- as the wave rises, its wavelength is getting shorter and shorter, right?

And as it does so, I'm thinking that the reflections off the walls of the room are causing the wave to move across the room in a natural manner. Nothing in the electronics I've done, there's nothing. However, if you sit in the audience, you think it's getting loud and soft. But what's happening is the crest of sound, the notes and the antinotes, are passing your ears, and you're in the crest of loud sound, then you're in a trough of quiet sound.

So this panning, this natural panning of the sound, occurs. And that's wonderful. This room is somehow, for some reason, is fabulous for that phenomenon. When I came in, Evan was already playing the piece. I could almost hear-- I always get this wrong, note or antinote, where there's practically no sound at all. And then it gets louder and softer, depending where you are. It happens at a different geographical location. So it's moving across the room.

But if I had interfered with that rising wave, out of some idea of form and structure and preference, I would never have heard that phenomenon. So I have to not compose in a certain way.

Brian Kane: One of things that I really love about the sine tone piece -- I had a very, the experience that you talk about, about being able to hear the differences within each octave, I remember hearing a performance of the *Homage to James Tenney*. For two sine tones and base, where that experience was made so vivid and palpable.

[00:45:42]	And it was such an amazing, elegant demonstration of what I think of as the difference between-- well, difference between acoustics and something like psychoacoustics, or in French we have the acousmatique and L'acoustique, but I want to ask you this, the sweeping sine tone, the sine tone generator, this function generator that sweeps, is a classic piece of scientific technology. This is what you use to typically test the resonance of a circuit, right?
Alvin Lucier:	Right.
Brian Kane:	And in a way, you've applied this test of resonance to instruments, or to acoustical spaces? But one of the things you say, in an earlier interview-- I thought this is interesting. Somebody was asking about resonance-- and you said, on the one hand, I don't understand resonance exactly. On the other hand, I don't believe what scientists say, sometimes, when they make models of resonance. I was hoping you could say more about that.
Alvin Lucier:	I'm in the wrong place here.
Brian Kane:	So these sine tones are usually used to test the resonance of a circuit. But it seems to me that resonance may-- I can't tell how central the issue of resonance is to your music or if there are other features of sound that are more important?
Alvin Lucier:	You think of *Music for Solo Performer* is all about that, it's really not about brain waves. It really is not about-- I just used my alpha to generate this percussive, these wonderful bumps and bursts of sound, by putting loudspeakers, touching or almost touching, percussion instruments. You're using the alpha waves to resonate the instruments, actually to resonate them.
Alvin Lucier:	Now, a big tam tam, a gong, needs a certain amount of energy to get it to sound, tympany, easier. So that the instruments I chose, they'd have different degrees of effectiveness of resonance. So that piece is really more about resonance than it is about brain waves. Does that make sense?
Brian Kane:	Yeah, absolutely. A feature of many of the sine tone pieces that I think is fascinating is that they demand, or they teach, the listener how to pay attention to very small artifacts in sound. The person who can't figure out what's of interest in a piece like *In Memoriam Jon Higgins*, is going to be terribly bored, right? Until they're able to kind of attune to the features that you want to talk about.
	And this got me thinking a little bit about the claim that Professor Latour was making last night, that he says aesthetics is about making oneself sensitive. Is your music, is that the kind of aesthetic that your music is--

Alvin Lucier: I think so. I love to see, when I'm doing *I am sitting in a room*, for example, I love to see someone in the audience getting it. They're listening. Then all of a sudden you can see, oh, they figured out what's happening. Instead of conventional music, you take the audience from point A to point B, you design your pieces to climax at certain points. *I am sitting in a room*, there's no idea about that.

There's no idea about a climax, except at the point at which the speech is intelligible or unintelligible. You remember, you hear it, you don't hear it. Can you hear the word? No, I don't hear it. At that point, everyone does that at a different time. They hear-- so instead of building the climax into the music, I let the person decide where that point is. It's not a climax, but it's a point of understanding and not understanding.

[00:50:14]   *In Memoriam Jon Higgins*, it's a different-- you might not understand the phenomenon, but since it's so physical, it's in the space, the wave is moving by itself in the space. The player is sustaining it. His pitch is causing these physical bumps of sound that are happening in the space. They are not happening on the page. My work is not high-low on a page or fast or slow. It's the sound in the room, you know? Does that make sense?

So I love to see when people are sitting and you can tell when they have understood what's happening. Someone said when they hear my work, they've been paying attention, they're trying to figure out how they are hearing it. They refer to themselves, not to the work itself. The work is not an object. It's like, how am I hearing this thing? Referring to themselves. Does that makes sense?

Brian Kane: Yeah. I'm curious about where the objective and subjective lie in your music. Because there's some interpretations of it that are so focused on the way that it explores room tone or the way that it explores beating. And then there's other aspects about it that seem to force the listener to be attentive to their own processes of attention, right? And you also have other, and there's other strands in your work that are really engaged with questions of memory.

I think of pieces like *Hartford Memory Space*. The piece, is it "The Duke of York" for synthesizer? There's other aspects about memory in your music, given a piece like *Navigations For Strings*, in a way, is dealing with response to your own memory of hearing the navigation satellites.

But I guess the question I would like, that I want to ask, because we're running a little bit short on time, would be this. You mentioned numerous times this idea of musical language, and how your music doesn't really deal with musical language, and you've talked about how form can be a kind of thing that can lead a listener along. And your music doesn't have form in this particular way. So I wonder, in your recent book, Music 109, it's

subtitled, Notes on Experimental Music. And I guess my question for you is, what is experimental music? How you characterize--

Alvin Lucier: Oh, that's a tough question. That's, first of all, it's not a good term. But I can't think of anything else to say about it. If you say new music, it can be anybody. If you say contemporary music, Elliott Carter, something like that. Some of my pieces are really experiments. You don't know what's going to happen. Some composers hate that idea. Edgard Varese said, well, I do all my experiments and then I write my piece. And they don't like that. Bob Ashley hated that term.

I guess I use it as a default term, pieces that don't have any connection with the past somehow, I mean, Jim Tenney's work-- and no models. My pieces don't relate to any music that came avant garde, is the term for contemporary music that forges ahead, from taking from the past. When you do a piece like In Memoriam Jon Higgins, which has a constantly rising sine wave, the player plays across and there's no models for that. There's no music, I can think of, that does that. So experimental is, I guess, until I can think of a better term, you know.

Brian Kane: I'm curious, nowadays, about-- there's no relationship that's emerged, I guess, between contemporary music and sound art, if we use these terms to differentiate the things. And your work is always talked about in both streams, which I think is wonderful, because I actually don't know what the difference is between much of contemporary music and sound art. But I wonder, you also had mentioned things that, the most interesting things were happening in art schools in the 1970s and not in music schools, I agree. I hope my Yale colleagues aren't listening. But do you still feel that that's the case? Do you feel more connected to artists than composers?

Alvin Lucier: I don't know, sometimes. I don't know what to say about that. I think music, some music departments, are changing. There are wonderful little enclaves. Mills College is one. But basically schools are still -- I don't know what to say about that.

[00:55:23] I think there are certain places that are doing this, other places are not. Sound art it was a good term, because people would say, what is this music? And you'd say, well, if you don't like that term, let's make another term. Let's call it sound art. You don't have to call it music.

Brian Kane: One of my things I wonder about is whether sound art is experimental music. If experimental music is-- I mean, the way I understand this relationship to the past, I think, has a lot to do with this question of musical language. Somehow the musical past is conveyed through the retention of the kind of musical language, right? And I wonder if sound art is a way of trying to unwork that language?

Alvin Lucier: You know, I'm very conservative when I write for instruments. I don't use any extended techniques. I don't ask the players to play in any extended, different way. I don't even use *col legno* violins when I write for strings or for winds. I like just that beautiful, beautiful sound of the instrument. I don't want screw that up with any -- I don't use, your know what I'm saying. I'm very conservative in that sense. I love the sound of those instruments, pure, pure string, grainy sound of the string. Change the pitch and it's a different timbre, it's a different sound. I don't know why I said that.

Brian Kane: I guess-- we've got just a couple minutes left.

Alvin Lucier: I never feel as though I've explained anything well enough.

Brian Kane: I think you explain things beautifully. Your music -- all my revelatory experiences with your music have always been in live performance. I feel like there's always something very important about being in the room with it, to get a sense of how, to be immersed in these moving sound waves, right? And recordings can do some justice to it you can sort of recreate it, but it's hard.

I always see an important attachment between real space and your music. And so much of what's happening, nowadays, there's convolution reverbs, models of reverberation, music happening on the internet. It seems as if the real space is constantly being pushed aside in the name of virtual space. Do you feel like there's a place for the kind of inquiries you want to do in that world? Or are those of us interested in real space dinosaurs, in the kind of new world of artificial virtual spaces?

Alvin Lucier: Well I did do a piece using -- impulse response, where I -- does everyone know what that is? You make a sound, a sharp sound, in a room, tape record that somehow. There are programs which can recreate the acoustical space that you've made that sound in, which is an interesting idea. I've made a few pieces using that, but I don't know how much I like them so much. I don't want to not do something, because of the idea I might have about it. Because how do you know? Yeah.

[00:59:02]

Brian Kane: I think with that, we probably, maybe this is a good space to stop. I appreciate you letting me ask you all kinds of questions. It's wonderful to meet you and talk to you.

Alvin Lucier: I never feel -- I hope I explained some things adequately.

Brian Kane: Thank you so much.