

Alvin Lucier - Queen's University, GPHY 368 talk

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Laura Cameron – And the question is a really nice segue to introducing Professor Lucier.

Alvin Lucier – Shall I just start?

LC – Welcome, yeah, welcome.

AL – I don't know where to start exactly. My so-called experiments are always aimed at performance. I'm a musician to begin with. I give concerts and sound installation, so I really don't pursue experimentation for the sake of that. It's always I get an idea and I try to make it into a piece of music that can be performed. So all these experiments in sound and (???) and so forth, I just never pursued that. I made one piece after another.

The first piece I pursued in that regard is my brainwave piece. I came home from Europe as a student and didn't have any ideas. Didn't have any compositional ideas. I heard a lot of European music at that time. Although I admired it a lot it didn't resonate with me at all. I knew it was someone else's music, not my own.

And so I was looking for something that I could call my own instead of imitating European models of music. And I met a scientist actually. Now I'm not a scientist in any way. I never did very well in school in physics, certain things I just didn't understand, and I still don't them. But that's held me in good stead because I look at things from a different perspective.

For example when *I Am Sitting in a Room* scientists will say, 'Oh I can do that, I know that. That's just room acoustics.' I can't to this day tell you exactly why the frequencies that come from my speech in that room are the way they are. But I have a feeling about them and that's held me in good stead as a composer and not a scientist, if you understand what I mean.

And I met this scientist and he was prowling around the music department where I was teaching. And he had a brainwave amplifier and he was doing experiments with alpha waves as it related to aircraft pilots who were flying propeller airplanes. When they would land the propellers were spinning slowly, at such slow speeds that for some pilots who were prone to epilepsy the visual sunlight going through the propellers would lock onto a brainwave that would cause mild epileptic fits, and these pilots were blacking out. And the air force asked him to try to figure that out, and he did. And in doing so he had this enormous amplifier, about this big.

Now alpha alpha biofeedback amplifiers, this was a huge amp... And he said, 'You know I've been trying to interest the other composers in the department here to do something with brainwaves and they think it's silly.' I said, 'Well, I don't have any ideas at this

moment, but I don't think it's silly. I think it's interesting.' And I borrowed it, his amplifier, and I spent many hours trying to produce alpha.

We know that alpha is one of the brainwaves that can be unblocked by non-visualization. If you get into a meditative state where you're not thinking about anything, if that's possible, it's not really possible but you can try to (???) your alpha waves... Now you have to realize they're electrical energy signals that are in all our brains. I remember Pauline Oliveros used to say, 'Ah, your piece proves that we all have little electronic studios in our heads.' We have these waves bumping along, we don't know they're there but they're there. Now do we know they're there? I don't think so. She claimed that monks who in Asia who chant at very low frequencies... she says they're trying to sing the frequency of their alpha waves. She thinks it's that. I'm not quite sure it is but anyway.

So I made this piece where I could sit with electrodes on my scalp. I didn't know too much about it. I tried different things, sticking them here, sticking them there. I read a little bit about it. And when I was getting alpha I could see the cones of the loudspeakers... first the meters on the tape recorder would bump and alpha waves go about ten cycles a second. Now that's below audibility as far as musical tone is concerned, but certainly you hear the individual bumps and pulses.

I'm sort of rambling a little bit, but that's the way it is. You'll have to deal with it.

And I knew I was getting alpha and I saw the cones of the loudspeakers bumping and going in and out visibly. Usually, loudspeakers you're not supposed to exercise them in that way. So to make a piece of music I thought, well what do I do? I mean I'm a composer first of all so those experiments weren't the end of my interest. I wanted to make a performance piece. I thought, what do I do? All my friends said, all my colleagues said, 'Oh you should record these signals and go in a studio and splice them up and make a tape piece.'

I thought about that. That's a safe way to go, isn't it? You can record them under ideal conditions and you have miles of tape, you can splicing... in the old days you spliced tape together and made different things. And I thought to myself, but that isn't interesting performance. It's okay, you can make a tape piece and go into a concert. I can put it on CD, I could play it for you now and it would be okay, but I thought, what's much more interesting is a human being sitting in front of audience, generating alpha in real time. So that's dangerous, because sometimes it doesn't happen. Sitting in front of an audience, you don't get in that state of mind that releases the alpha waves, but I thought what a beautiful performance situation that is. I mean, everyday in medical buildings people are having EEGs, you know electroencephalograms, so it's a touching human experience.

Then what do I do? Do I just have the alpha coming out of loudspeakers? What do I want to do to vary it? I thought, well you don't have to vary it because it's varied by itself. The alpha waves are ten cycles a second, like (makes noise). That low sound. But they rise and fall a little bit. They stop. They burst. They get louder. They do a number of

interesting things. And it's nature. It's like if you watch a river, you don't need to dam it up to make it interesting. It's interesting the way it flows. So I thought of the brainwaves as flowing natural signals coming out of my brain.

And then I thought, what do I do for a performance, and I was an old percussion player. I was always playing snare drum in bands and stuff like that. So I thought, well I saw those cones of those loudspeakers doing work. They are actually doing physical work. I thought they could play the drums. So my piece, instead of coming up or deconstructing in any way the alpha rhythm, which I thought was natural and beautiful, I simply orchestrated it through sixteen or so channels or loudspeakers. Each speaker pushed up against drums, cymbals, gongs, bass drums, things of that kind. So that was the way I, what's the word? Orchestrated, composed that piece.

Even the night before the first performance I got very anxious. I thought, what am I doing? I'm a composer. I went to school. I know about forms and structures and so forth. And here I am, I'm just sitting there in front of an audience, just letting my alpha waves flow out. So, that piece was very important... I'm trying to think why I talked about this piece, where I was going with that argument.

Yes, it reveals something that's in our heads all the time, but we don't know it's there. We're not aware of our alpha waves I don't think. On the other hand we may be in some way. So I would have to say that the rest of my life, it was a long time ago. That was 1965, if you can believe it. The rest of my life has been, in composition, has been making pieces that reveal unheard sounds.

This gentleman talked about subconscious and sounds around us that we don't really hear but we (???) relate to somehow. My work is even at a lower level than that. It's sounds that exist that we don't hear.

One of them is room resonances. Now of course we do hear room resonances. My voice in this space is different than it is in another space. When I used to teach at Brandys University, I remember I always used to stand in the same place in the room when I talked because it was under a resonant, some sort of acoustical situation that my voice sounded stronger and gave me more confidence. So you do, you are aware of room resonances, but not completely.

Wouldn't you love to hear what this room sounds like, for example? I mean, every sound has a sound wave, a palpable physical sound wave. The low note A on the piano has a ten-foot wavelength. Actually, the sounds go out into space, pushing air molecules in groups of ten feet. If you tune a sine wave, if I had a sine wave oscillator here... a sine wave is a wave that's pure, without any overtones. I could tune a sine wave here so that you could see, you could hear, you could feel where the nodes and antinodes of that wave are in this room.

I made a piece for dancers, where I would tune a sine wave that would come out of a pair of loud speakers, and if the room is dry enough, if there's not a lot of reverberation, you

could actually walk in the valleys of quiet sound and the crests of loud sound. Okay? The higher the frequency the smaller the, the shorter the wavelength.

So sound for me became palpable and physical and I didn't think of notes on the page as being high or low or going from left to right on a page of music. And I didn't even think of them as high or low. I thought of them as fast vibrations and slower vibrations, and where they physically can be placed in space.

Now the word geography comes up, I've been trying to think where I used the word sound geography. I'm trying to think where I used it in a title of a piece or something but I can't remember.

But I did make this piece where dancers would start behind a pair of loudspeakers, and walk, and then try to find troughs of quiet sound and walk in them. By listening to loudness here, and loudness here and walking in those troughs. They happen to appear in space in hyperbolic curves. That's just the way it is. If you tuned one sine wave coming out of a pair of loudspeakers, it takes longer for this speaker to get to a point than this speaker. You can see this wave is going out, that wave is going this way and out too, so that you have hyperbolic geometric lines going out like this between the two speakers. And I call out those sound geographies, actually sound waves are making physical, palpable, sculptural manifestations in space. I'm talking about a bunch of things at the same time, but they're all the same thing in a certain way. So my works involve, often, revealing sounds that are there but you're not aware of them or you're maybe partially aware of them.

After I did *I Am Sitting in a Room*, which I have here and I'm going to play parts of it, I made a piece called *Vespers*. And *Vespers* was a piece involving echoes in a room. I mean real echoes. I don't mean imitation echoes. I mean real physical echoes. I found devices called *Soundals* (sp?). You know when you're on a case and you're interested in a phenomenon, you miraculously to... people come forward and give you materials that you need.

I had a dream one night that uh, I was in another, on another planet, this is a science fiction dream, we all have them one way or another. And I'm up in this other environment, talking about environments, which was, I don't know if it was physical or psychological or philosophical, and I had some sort of musical sound producing object. I should have brought my *Soundals* (sp?), but I didn't, that's all. And I'm playing the environment. I have these devices that send pulse waves out into this space that bounce off the walls and ceilings and floors of this space, returning as echoes. And you can see that when the wave returns to you, you can tell how far away something is. Sound goes eleven hundred feet a second, something like that, so if an echo comes back to you in one second, for example, you know that the object off of which it reflects is five hundred, six hundred feet away. It takes times for the pulse wave to go out and return.

I read a book on bats. A popular book by a scientist from Harvard, called *Echoes of Bats and Men*, and he describes how bats use echolocation to survive. They don't see very

well at night, in fact they don't see at all I don't think. And they send out pulse trains of sharp, short sounds. Sounds need to be short so that you can hear the echo that comes back. If the sound is long you don't hear the echo. And these bats send out these enormously high frequency, fast pulse trains and they, uh, between each pulse a bat can send out around 50 000 pulses per second. Even more than that. As they send out each pulse their ears open and close. Imagine opening and closing your ears 50 000 times a second. Because the sound they send out is so loud they have to close their ears. The echo that comes is weaker so they open their big ears.

So these bats can survive by sound. I thought that was a wonderful idea because in those days we...the idea of what a piece of music is, was up for grabs. Is music entertainment? Is it song form? Is it harmony, melody and rhythm? Is it gotta be played by musical instruments? What else could happen? And in...I'm talking about the 1960s now. It was this great opening up of possibilities, that anything could be a piece of music. You could even think about a piece of music and that would be enough. There was a genre of work called conceptual music. All you needed to do was to give an idea, and that would be a piece of music. So there were, there was a genre of prose scores, which a composer would tell you what a piece of music might be and that was enough to make it into a piece of music. Some of the prose scores were impossible, you couldn't execute them. Some were descriptions of making music, making pieces. So, I thought, gee it would be great to have some instruments that would play what the bat's pulse waves are...oh that's impossible.

One night I was in a bar in Arlington, Massachusetts at night and I happened to be talking about this. You know when you're interested in something your antennae are open, and you, everything that you perceive relates to your idea if you're passionate about it. You want to do a piece about such and such, so you go around and you're thinking about that all the time. So something from the environment may come to you and excite you about that and give you an idea. So I was in a bar talking to a guy and I said, 'Um, I read this book by this Harvard professor about bat's echolocation. It's wonderful how bats and whales and dolphins use sound waves to orient themselves to survive actually.' He said, 'Oh, I work for a company that's manufacturing these handheld pulse wave oscillators for blind people.' And I said, 'You do? Could you get me one?' He said, 'Yes, I'll loan you a prototype.' So he brought it the next day or sometime after that, and I had in my hands a battery operated pulse wave oscillator, which could send out beautiful sharp clicks whose speed I could vary. And, uh, it made gorgeous echoes, clear echoes from the walls and ceilings. Outdoors you could get echoes from objects of about a quarter of a mile away. And it was beautiful. I thought here's my piece. All I needed was the equipment and my piece materialized.

So I bought four of them and I thought, now what? I have these four devices, what do I do to make the piece of music out of them? And I was invited to Ann Arbor, Michigan by Robert Ashley, a composer, who had a festival called the *ONCE Festival*. And I said, 'I don't have a new piece. I don't know what to do.' I said, 'Well, I can do this piece with echoes.' And I didn't know quite how to orchestrate it. I didn't know what to do with it. So I flew out there, and I still didn't know the night before the concert. I didn't know

what the piece was going to be. But I went into the space, it was a large ballroom, and I had four *Soundals* (sp?), I had four players. They weren't musicians at all, they were just, they were actors or filmmakers or whatever. And even ten minutes before the concert I wasn't quite sure what I was going to do.

So I took each one of them physically and I placed them in the room. So-and-so in the back of the room. So-and-so over here. And I blindfolded them. And I said to them, 'Listen, your task is not to play these instruments like musical instruments, but to use the echoes to tell you where you are and where to go.' So I built into the score a task idea. Instead of orchestrating the piece saying player number one plays for one minute at this speed, player number three does this. I said, 'Your task is to move through the audience,' there were aisles, 'and get to a central point without seeing.' So I put obstacles in the space. There was stacked chairs. You know how they stack chairs up? I rolled those and I had big plants that I put in so that there'd be obstacles for these players to avoid, if they could, by hearing the echoes that come back to them.

If you're aiming at this wall here the echo comes back very fast and you know there's a wall there. If you're aiming at that wall the echoes are not so fast because it's farther away. One of the beauties of this piece was time and space were directly related. The time it took for the echo to go out from the performer, back to the performer depended on the space. How far away the player was to the wall. So it's not an idea of like slowing down and speeding up because you think it sounds good. It's slowing down and speeding up to measure your relationship to the walls and the ceiling in space.

So that for me was a wonderful, liberating idea because I didn't need to think about aesthetics. Fast, slow, slowing down, speeding up. The old idea of *accelerando*, *decelerando*. It was purely practical and physical, which idea I liked a lot.

Before the performance I had a pair of shoes on by accident that had leather, leather soles. So the audience is sitting there. I turn out the lights. I walk around the space, you can hear the echoes from my feet. A little bit. The audience wasn't aware of that so much. There were drapes on the windows. I opened them up so that there would be a more reverberant space. Drapes and dampenings, opening them up. Then I placed each player physically, I think I did, I took them by the hand to place them. Then I sat down and they played this piece and that was the piece. Afterward I wrote a score, a prose score describing the situation and what the players can do.

So that was a piece that directly had to do with space. I may have, if you give me a second here to see if I have it. I bring every CD I have except the one I need. Okay, I was going to play *I Am Sitting in a Room*, but since you already played part of it in the presentation I don't have to play it.

So instead of pursuing that idea completely, I'm a composer, you know I'm more of a composer than an explorer in a certain way. And I had to make pieces, you know, to survive. I made my brainwave piece, and I made *I Am Sitting in a Room*, and this echolocation piece was called *Vespers*. V-E-S-P-E-R-S. It had to do with evening. It's an

evening church service, isn't it? Vespers. It's also the name of the common bat of North America, *vespertilionid*. So I gave it that kind of a quality.

This is a performance of *Vespers* that we did for a recording in a stone building, an art gallery, at Brandeis University. Limestone I think. And the players were instructed to orient themselves acoustically by monitoring their echoes. Let it go for a while, just to get an idea of the sound. You can hear the, you can hear the room.

*(plays piece)*

Okay. That's all right. You get an idea of what the sound is like.

Okay let's switch gears now. She mentioned space, didn't she? I go in the summer to Colorado, and I'll just tell you what I do. I made two antennas out of wood. Four feet long notched antennas. I went to a *Radio Shack* and bought number 18 hook-up wire and wound it five times around each antenna, making what's called a large loop antenna. And I bought a couple of little transformers, I didn't know terribly much about it, and plugged the antennas into the microphone inputs of a *Sony* cassette tape recorder. And I drove my antennas up to the top of a mountain in an effort to receive electromagnetic signals from the ionosphere.

Now, at night the ionosphere comes down several hundred miles close to the earth, and all the time in the ionosphere are electromagnetic storms and they produce signals in the audible range. They are not sound waves, they are radio waves, but they are in the audible range of human hearing. They are basically storms that create three or four different kinds of signals. Scientists call them *tweaks*, *bonks*, *swishes* and *whistlers*. Those are the scientific terms. A *tweek* is a short burst of electromagnetic energy. A *bonk* is a *tweek* that echoes off the earth and back...from the ionosphere to the earth and back, creating a resonant signal.

A *whistler* can only be picked up at certain places on earth. A *whistler* sounds like this,

*(whistles twice)*

In the Thomas Pynchon novel, *V.* I think, or *Gravity's Rainbow*, talks about a whistler station somewhere. South Africa. But you can pick them up anywhere slightly. What happens with a *whistler*, is it's a *tweek* or a *bonk* that gets caught on the magnetic flux lines that go from the North Pole to the South Pole. So the *whistler* travels down the whole length of the earth. So I thought it would be great to record these.

Well the big problem is that if you set up an antenna, like outside, you get sixty-cycle hum. You get all the signals from electricity in the city. So it's impossible. So I had to find a place on a mountaintop where there were no power lines. It's almost impossible to find those nowadays, because power is everywhere. So I kept driving up and I would set up my antenna and take a listen. I'd get a radio station. I'd drive up a few more miles, not

to get close to the ionosphere but to get away from power. Finally I got to the top and I simply set up my antennas ten or twelve feet apart.

I had called the ionospheric lab for the United States space whatever...department in Boulder, Colorado, and any American citizen you're supposed to get any information you want. So I called them up and said, 'I'm going to record *sferics*.' They said, 'Yes, we know what those are.' I said, 'How do I get stereo?' The man said, 'We don't know anything about stereo sir.' I said, 'Do I have to put an antenna in the Antarctic and put another one in South Africa to get stereo?' He said, 'I have no information about that.' Well I discovered simply you just put them ten, twelve feet apart and aim them in different directions. So I got beautiful stereo reception.

So I started recording at like eleven at night. At nighttime they start sparsely and they get stronger and stronger throughout the night, and then at dawn they sparsen out a little bit. So I sat up all night changing the cassettes, it was the best cassette recorder I could find at that time, and I recorded like eight hours of *sferics*. They're called *sferics*, S-F-E-R-I-C-S. And I made a recording, let's see if I can find it now.

*(plays recording briefly)*

Okay, I'm going to go back so you can hear the *whistler*. You can hear a slight *whistler*, about four seconds in. I was lucky to get it. Try to hear it.

*(plays recording)*

Okay, they segued into a different piece, but those are *sferics*.

I did an installation of these with six pair of antennas in El Morro, New Mexico. And it was wonderful because cassette recorders were battery operated, I didn't have to plug it in. And you could see lightning in the distance and it would be simultaneously with a *sferic*. During the First World War the allies were monitoring enemy lines by, um, having...having antennas and radio receivers, and at night they heard these sounds and they wondered what they were, and they were *sferics*.

I also did in El Morro the installation, there were huge barbed wire fences that stretched for miles. So I hooked the wire of my antenna to the barbed wire fence and came into my tape recorder and I used the barbed wire fence as a large antenna. There's an idea that rivers can be antennas also. I thought of doing an experiment where I would use a river as an antenna but I never did it.

I made this piece. This is an eight-minute version. Every minute I splice. There was no way to splice this piece because it was so rich and dense in its material. Did you hear high frequencies in there that were periodic? Those are manmade. There used to be something now called the *Omega Navigational System* which was a set of ten or eleven points on earth, including some ships at sea, that would send out signals for aircraft pilots, called *Omni*, the *Omni signal*. Aircraft pilots used to navigate by hearing the *Omni*,



by seeing the *Omni signal* in their cockpit and knowing where they were. I don't think they need to do that anymore.

You know nobody passes a law that says you can do this. All of a sudden there's this ten twelve thousand cycle signals that are just in our environment that no one agreed to. Nobody voted on it, and it just happens to be there. The U.S. Navy does terrible things with low frequency sound waves under the ocean. They didn't have to consult us and say is it okay to do that, so it's causing great disturbances with animal life in the ocean.

But anyway, these high frequency periodic signals, there's no way I could splice them out. Because if you splice them out you splice out the high frequency material, so I just allowed them to stay there.

I walked around for years singing and whistling those frequencies. You know how a tune gets in your head? You can't get it out? I'd go around whistling...

(whistles)

...similar to those signals. Was everyone able to hear those? I can't hear them anymore. When you get older your high frequencies go, your perception of high frequencies aren't as good as...but anyways I sang these signals. I'd go around and it was driving me crazy. So one year I got a commission from a quartet, a string quartet. The *Arditti String Quartet*. This is music now. This isn't sound art. And they said, 'Would you write a piece for the *Arditti String Quartet*?' And I thought, oh gosh, but right away I thought, ah-ha. I'll take my condensation of those signals...

(whistles)

...and I notated them as the notes A, A flat, B flat and G, if you know what those are. And I made a piece where the string quartet would repeat those pitches over and over again, each time changing the frequency microscopically, lowering and raising, until at the end of the piece there's a single pitch between the four notes. And at the end they would go quieter and quieter so that the pitch would disappear into the air conditioning in the room or something. It was my idea of expelling those frequencies that were haunting my brain for so many years.

In doing so, if two pitches are tuned closely, really closely, almost the same pitch, you can hear interference patterns. Audible beating. Which is when the two sound waves coincide. If you have one frequency going a hundred cycles a second and another one going a hundred and one cycles a second, every second they're going to come into phase and you'll hear a bump. It's an audible beat. It's a rhythm. So I've worked with that for many years that idea, by tuning an instrument with an oscillator or two or three instruments together, creating interference patterns. The farther apart they are the faster the beating, the closer they are the slower the beating. At unison there's no beating. So I made this piece with the four stringed instruments, starting on those pitches.

(sings)

And I had to check because there's been many pieces written using people's initials. Like Bach, B-A-C-H. There's many composers have made pieces with B-A-C-H, H is a B flat in German, so I had to check. I don't want to steal that idea. I want my own idea. So I took the *sferics*...this is kind of far-fetched, okay, but I'm a composer, I can do this. I took those pitches and I had the players play them over and over again. Microscopically impossible to (???), they're impossible for the players to hear, but I still wrote it that way so that they would try to do it. Irvine Arditti, the direc...I said, 'Irvine, this piece is impossible to play.' He said, 'Oh we can do the impossible. It's the very difficult we can't do.' That's supposed to be a joke.

So anyway, let me play the beginning of this piece. This is called *Navigations for Strings*. I took the *Omni signals*, compressed them into four pitches and made a piece for a string quartet.

(plays music)

I'm going to stop it. Get the idea?

Okay, anyone want to ask me anything? I meandered around today, I'm sorry it's been so disorganized, but that's the way I am. I did a piece with brainwaves, uncovered sounds that you've never heard before that are there in your heads all the time. Did a piece with echolocation, hearing the signature of a room through the reverberation. *I Am Sitting in a Room*, which articulates the resonant frequencies of a room. And *sferics*, which is sounds from space echoing off the earth. And then a string quartet, which is a conventional musical form, which uses those signals in an indirect way.

There must be some questions, yes?

Unknown Student – I've heard of some people recording the northern lights. Would that work in the same way?

AL – I did an experiment in Alaska for a Japanese television program about the millennium. Theoretically northern lights are supposed to influence *sferics*, and we went up to Alaska and went up on a mountaintop with my antennas and waited for the clouds to clear and the northern lights appeared. But I couldn't hear much influence at all.

Is it time to go?

LC – It is, but...

(applause)