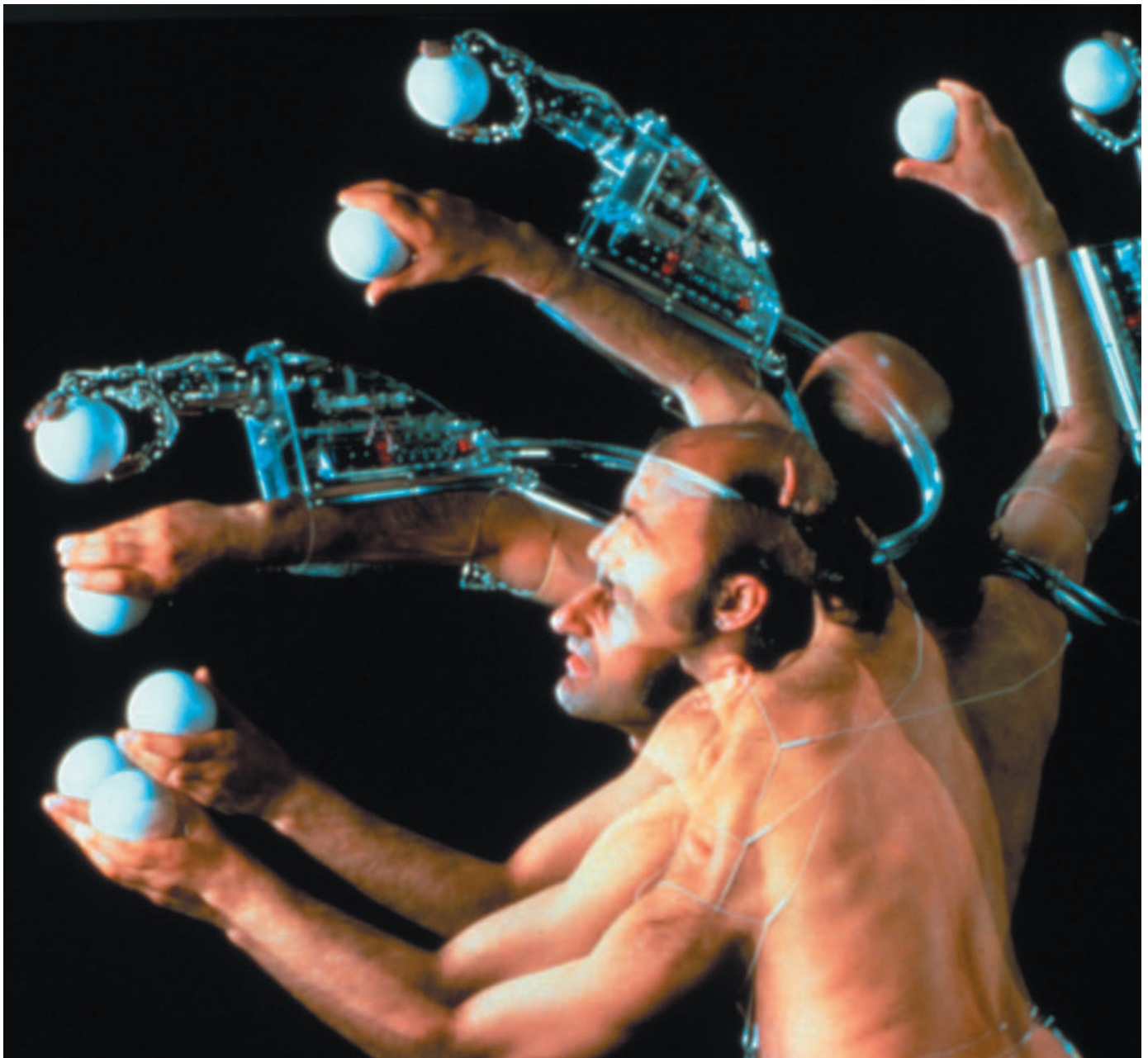


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**MARCELO
STELARC**

The Delights of Dorkbot



Stelarc: "The Third Hand," 1984. Photo by Toshifumi Ike." (Image courtesy of MIT Press, from *Stelarc*)

The Delights of Dorkbot

Loren Means

I stumbled onto Dorkbot while futzing around on the Web back in 2004. I saw that I'd missed some exciting events, and signed up to get emails notifying me about upcoming events. When I tried to attend a Dorkbot, held at RX Gallery on Eddy Street in San Francisco, I found myself passing Rasputin's on the way there, was sucked inexorably inside, and when I emerged and found my way to RX Gallery, I was told the space was full. I was amazed at the squalor of the Gallery's Tenderloin location, with junkies and crack whores and scary people all around, and decided this scene was too funky for me. So I took my bag of \$3 CDs and went home.

But the next announced Dorkbot was irresistible. Rudy Rucker was appearing with Scott Draves, and since there wasn't a third presenter, Karen Marcelo was inviting people to bring their work to share. Rudy and Scott (better known as Spot) are friends of mine, and I certainly didn't want to miss an opportunity to see them together, but I was particularly interested in the "Open Dork" invitation. I had abandoned avant-garde filmmaking back in the Sixties, and then had recently started blowing up sections of my hand-painted films and showing them in galleries. But I had found a short film in my basement that I really liked, and wanted to show it again, to see if it could find the audience it had missed 40 years before. I found a tape by Dom Um Ramao of Brazilian drumming that was roughly the length of the film, and got Karen's permission to bring it along. Now this film didn't really fit into Dorkbot's rubric of "People doing strange things with electricity." This was a movie, using moving lights, moving sculptures, and extreme camera movement to generate imagery that was invisible to the eye at the time of filming. But I took a chance.

It was great to see Rudy and Spot again. Rudy talked about his work in progress, *The Lifebox*, *the Seashell*, and *the Soul*, with slides about cellular automata, and Spot showed the latest iteration of his Electric Sheep interactive screen saver. I sat with Rudy's wife, Sylvia, and his daughter, Isabel, who was visiting from her home in Wyoming. When it came time to show my film, Rudy sat by me. "What programs did you use to generate this?" Rudy asked.

"Rudy," I replied, "When I made this film, I'd never even seen a computer. This is just a movie."

"Wow," said Rudy, "Hard to believe you could generate images like that without a computer."

I also met the proprietors of RX Gallery, Monika Milk Bernstein and William Linn. Will complimented me on my film, and I suggested doing an art show at the Gallery with Spot and my film stills and some other artists. Will liked the idea, and together we co-curated a show called Recombinant Flux (Will's title) that featured nine artists including Scott Draves and Shirley Shor. This lead to YLEM's ongoing and fruitful association with Rx Gallery.

In 2005, I attended a Dorkbot that featured Stelarc's Prosthetic Head, with members of the audience asking it questions. I spoke to Stelarc afterward, told him about YLEM and gave him a copy of the Journal, and shortly thereafter he sent me the manuscript and images included herein. He also told me about experiments in organ printing he was aware of, which I found very exciting. I understand he's now exploring imprinting of data on e-coli organisms, another tremendously provocative exploration.

Recently, MIT Press sent me a new monograph called *Stelarc*. It is, like Stelarc himself, extremely erudite and wide-ranging in its references and intellectual explorations. Interestingly, I find the article we're printing to definitively sum up most of the considerations raised in the monograph, culminating in the Prosthetic Head project, which was not yet realized when most of the articles in the monograph were written. In the article, Stelarc says "A brain is not a brain without a mobile and manipulating body." But the Prosthetic Head has no body, and so is a departure from the body of work Stelarc was associated with previously. The Prosthetic Head is something of a variation on the Turing test, convincing people that they are interacting with a consciousness which is not really conscious. As Stelarc points out, the Prosthetic Head can not add to its database, it cannot learn or expand its capabilities. This puts the Prosthetic Head in contrast with Lynn Hershman Leeson's talking head, Agent Ruby, which is web-based and so is privy to all of the knowledge of the universe. (<http://www.agentruby.com/indexflash.html>.) What the two heads have in common is the ambiguity and playfulness of their responses and interactions.

The Stelarc monograph features seven articles, and an introduction by the ubiquitous William Gibson. Jane Goodall focuses on evolution, evoking Darwin and McLuhan, and features a marvelous image of Stelarc writing the word EVOLUTION using three hands simultaneously, with the third hand mounted on his right forearm, but controlled by his abdominal and leg muscles. She discusses the Prosthetic Head in terms of the interaction between the Head and the audience as mutual mimicry of two alien cultures, like the interaction between the crew of Darwin's Beagle and the Fuegians.

Timothy Druckrey goes on for almost 30 pages before he gets around to mentioning Stelarc. When he does, he has this to say, "In Stelarc's work, the interface is a kind of negative "diaelectric" (realized through electrodes, transducers, muscle stimulators, amplifiers, forced-feedback systems, and extra limbs) that probe the tension—perhaps resistance—between the human and machine. We must distinguish it from the nearly homoerotic weaponry in the Survival Research Laboratories' performances..." (59.)

Arthur and Marilouise Kroker contribute an essay titled "We Are All Stelarc's Now." This essay is full of enthusiastic bombast. As they put it, the Prosthetic Head is "the first electronic sighting of the liquid body." They go on to speculate: "Here there is no mystery of life, no intimacy with the facticity of death, no vicissitudes of the flesh: the body floats as a perfect object of technology with the Prosthetic Head as its blinking satellite and folded skin as its fast-burn shield. Or is it the opposite? Is the Prosthetic Head not the technological remainder of the evacuated body but the beginning of embodied technology?" (73.) Or is it a third thing

all together?

The performance artist Amelia Jones discusses Stelarc as a Cartesian, and refutes him on that basis, whereas in the monograph and in the article herein Stelarc takes pains to reject Cartesian thinking. Jones sees Stelarc as attempting to transcend the body, whereas it seems to me he is more interested in problems of sharing communication with other embodied entities. The Prosthetic Head can be seen as the ultimate out-of-body manifestation, but the tension here, as I perceive it, is how to integrate this project into the body of Stelarc's other projects. I'm reminded here of the revolutionary work accomplished by the roboticist Rodney Brooks when he started working with robots that manifested themselves in the real world rather than modeling the world internally first. This is close to most of Stelarc's projects, where he conceives an idea and manifests it with his body in the real world, in the most existential of ways, laying his body on the line, so to speak.

Brian Massumi's piece is quite long, playful, and abstruse. Massumi translated Deleuze and Guattari's *A Thousand Plateaus*, so he's got to be deep, and he evokes Bergson deeply. The piece is a chapter from Massumi's book, *Parables of the Virtual: Movement, Affect, Sensation* from 2002, and Amelia Jones admits that she isn't sure she understands it. I'm not sure I do either, but I'll quote a few passages." [Stelarc] does, however, have a general direction in mind-body—outer space. But his transmissions will launch in that direction only if his desire is doubled many times over—only if the countergravitational compulsion animating the ur-idea of Stelarcian sensation is met, redoubled, and impossibly extended in that particular direction. Stelarc is prodding us. You can't blame a body for trying." (168.)

"The body as random-access opening (RAO) can connect in any number of ways to itself, its objects, and other bodies. It can open, split, and reconnect at any point, inside or out. It is no longer an objective volume but an extendability. Its dimensionality has increased beyond the three of spatial presence: from the three dimensions of the voluminous, it leaps to a fifth dimension of the extensible. This dimension is actually fractal, between dimensions—split and extend, the basic operations used to generate fractal figures. The fractalization of the body is no metaphor. It is an operation: the posthumanizing operation. (177.)

Julie Clarke writes mostly about Stelarc's still-unrealized Third Ear project. As she points out, "The acts of hearing and listening become paramount in an environment in which the body would otherwise drown in a sea of images." I'm reminded of McLuhan's railing against the privileging of the sense of sight over the other senses in advanced societies. Perhaps it is as a corrective to this that Stelarc searches for a doctor to graft another ear onto a part of his body, so that it can whisper to the ears he already has.

The monograph closes with a dialog between Stelarc and the book's editor, Marquard Smith. I'll let Stelarc have the last word: "when I talk about the body, I mean this cerebral, phenomenological, aware, and operational entity immersed in the world. Not only should we not split mind and body; we should not split the agent from its environment." (216.)

"But imagine...that an avatar imbued with an artificial intelligence was able to access a human body and perform with it/through it in the real world. The body itself becomes a prosthesis for the behavior of an artificial entity." (222.) Perhaps this is the ultimate extension of the Prosthetic Head.



ANNOUNCEMENTS: YLEM Forums

YLEM Forum: What's Hidden in the Molecules?

Wednesday, May 10, 8 pm (7:30 pm mix and meet)

RX Gallery and Bar (No one under 21 allowed)

132 Eddy St., San Francisco, CA 94102

Suggested donation sliding scale \$5-10

Few recent discoveries have the power to inflame our imagination as much as Luca Cavalli-Sforza's work tracing how humans fanned out from a small area of Africa to cover the globe. Tracing both DNA markers and linguistic studies, his lecture will draw a picture for us of human migrations since the very earliest times, which yields many surprises.

Julian Voss-Andreae, a German-born artist originally trained in quantum physics, will present his current sculptures inspired by proteins, the beautiful and bizarre building blocks of life. His sculptures were recently featured in journals such as *Leonardo*, and *Science Magazine*.

Tracing Human Migrations:

YLEM is honored to have L.Luca Cavalli-Sforza, Professor of Genetics emeritus from Stanford Medical School since 1971, speak to us about his work, begun 50 years ago, on population genetics. He is a linguist as well as a molecular biologist, and his map of the migrations of languages (if you exclude colonizing nations) fits the genetic markers surprisingly well! The story it paints of how human populations began from a small area in Africa and fanned out across almost the entire earth is breathtaking.

Protein Sculptures: Life's Building Blocks Inspire Art:

For Julian Voss-Andreae, it is less important to copy a molecule accurately in all its details than to find a guiding principle and follow it to see whether it yields artistically interesting results. The main idea underlying this body of work is the analogy between the technique of mitered cuts in his sculptural materials and protein folding. Voss-Andreae's process resembles the algorithmic process of protein biosynthesis in that he uses the computer to calculate the shape of his sculptures from scientific protein data using custom-developed software. Beside this deterministic side of Voss-Andreae's work, there is an equally strong intuitive and irrational side, where his pieces stop working as scientific models and become pure art objects.

Contact: Trudy Myrrh Reagan, forum@ylem.org
650-856-9593

Full information at: www.ylem.org



Interview with Karen Marcelo by Loren Means

LM: How did Dorkbot get started?

KM: Dorkbot was founded by Douglas Irving Repetto in New York. He wanted to set up something where people could come in to present the strange things they do with electricity. He wanted to bring people together, do peer review, not necessarily talk about finished work, although they can, but also works in progress, something informal, engaging and more interactive, like the 5-minute impromptu presentations called Open Dork at the end of a meeting. People could do workshops, etc. So in San Francisco, a bunch of people and I were thinking about creating something similar, and have it be a monthly thing. And I was thinking, “Why reinvent the wheel? Let’s email Douglas and see if we can do Dorkbot San Francisco.” So I did, and he set up space on his server for us, gave me a shell account, and that was it. It started out with me emailing my friends to ask them to talk and host us. The very first Dorkbot San Francisco was in a friend’s garage, a hacker house: Unicorn Precinct XIII (<http://up13.org/>). There was Brian Normanly talking about how to tap into electricity from the street, and the whole crowd moved outside to watch how you do it. We had David Pescovitz, who writes for *Wired*, *Make*, and *Boing Boing*, talk about how media relates to all this. That created a really good debate between him and the audience. We had Nick Thompson talking about how he was creating non-square projections called Gray Matter and Ice Cream Cone showing us the beats he made from SoundEdit! It’s all in the archives. If people want to look it up, the URL is <http://dorkbot.org/dorkbotsf/archive/>. Another friend brought in an electric pickle, a light bulb powered by a pickle. Somebody else brought a mortar. He set it off, the cops came, but they couldn’t figure out which back yard it was coming from and left. The first meeting I’d say was about thirty people. It was catered. We had the tamale lady come in. We had a bar. This was June of 2002, probably. It was three years old last June [2005]. No party.

LM But I went to one of your anniversary parties.

KM: We had one at RX Gallery, and another one at another hacker house, New Hack City, in a basement on Market Street. People had to step over crack heads to get in. Not the most user-friendly place to go.

LM: There’s never been any money involved, right? It’s all just spontaneous.

KM: Yes. Things come together in maybe two weeks or less. It just depends on people’s schedules and where and when I can find a venue to host. I think we’re getting a little bit big. The last one had too many people. Those in the back can’t see, and you can’t interact with the speakers as much.. I’d say there were probably almost 200 people there.

4 LM: You’ve had other spaces that were bigger.



Karen Marcelo (orange peel portrait)
Prime Mover of Dorkbot San Francisco
Image courtesy of Karen Marcelo

KM: It varies. We’re losing a lot of spaces. That’s one of the reasons why I liked changing venues every month. To let people see there are these cool spaces around the city. Unfortunately, a lot of them are gone now. I think some of the best Dorkbots were where the people who hosted actually lived there. It’s more intimate. Like False Profit. That’s gone (moved to a smaller space.) It was a really good space. Dorkbot is too big now to have in somebody’s basement, like the hacker houses. We had it at Splat Cave. It was nice, because there was the Seemen shop, so when it was time for Kal to talk, everybody just got up and went next door and downstairs to see his robot operated by Rudy Rucker’s dog, Slug.

LM: So this is all just spontaneous, right? You just decide to do it, you’ve got some people who said they want to talk, and you bring it together all of a sudden...

KM: It’s mostly friends that help out. People I know say ‘Hey, you can have it in my place,’ or somebody they know wants to talk.

LM: Most galleries you would go to, to do a show, are booked two or three years in advance. But you just do it...

KM: I find that when I try to do that, like when we were thinking of doing a whole theme on telerobotics, it gets hard. People’s schedules don’t line up. I was trying to put together a nanotechnology panel, where I’d have on one side somebody who’s really for that, and other people who think the whole thing is hype. That would have been interesting, but whenever I try to do a theme, it’s just impossible to get everyone’s schedules aligned. So the easiest way is to get whoever can talk that month, and just have a variety, that are not related to each other. It’s just easier, less monolithic, and people appreciate the variety.

LM: You’ve had people like Stelarc and Lynn Hershman Leeson.

KM: Rudy Rucker...

LM: Scott Draves. Well-known people. It seems like they really

want to connect with the kind of energy that Dorkbot has.

KM: I'm not sure that they want to connect at first, but they are begged, harassed, and convinced as much as possible to present! They say they enjoyed the audience interaction afterwards, though. I want to mix it up, and have people who are known and people who aren't known. There was an artist, Andrew Bennett, who was trying to print on white flowers. He told me he enjoyed that Dorkbot, because he presented this idea, and he had a prototype, but I don't think it was finished yet. But by presenting it before it was finished, he got a lot of feedback from people, which was useful. I think he was able to find people to collaborate with and help him implement.

LM: The publicity is basically you just emailing.

KM: The mailing list and word of mouth.

LM: It isn't the usual thing of the Pink Section and all that. You won't even need that.

KM: I don't want to, because then it would get too big.

LM: You don't even go to Craig's List.

KM: No. Scott Beal mentioned that we could use the Squid List, but he also said he had 7000 subscribers. That would be too big.

LM: A lot of avant-garde events, at least art events, don't necessarily get big audiences. And yet you're doing something that really energizes people, that makes them really want to be involved. I've never seen a Dorkbot that wasn't really well-attended.

KM: I think each speaker has their own 'following'. So they're announcing on their own mailing lists. I'll notice that there are a few Dorkbot regulars, maybe about fifty of them that come. But if it gets really big, people usually thin out after the speaker that they're interested in is done. The one with Violet Blue got big because it was announced in *Wired*. "Live demonstration of Teledildodomics." So you get people who aren't really regular dorks, also. She always draws a crowd. This is the second time that she's spoken at Dorkbot. The other time she went through the history of dildos, and that drew a big crowd also. Some presenters actually don't like it when a meeting gets overly hyped by media, and on the dorkbot overlords list we discuss ways of keeping it small, informal, and interactive.

LM: Mark Dery came out and talked about weird sex stuff on the web at RX Gallery, and about ten people showed up to hear that. Apparently Wil didn't connect up with the same kind of publicity effectiveness that you're into. He wasn't able to get the word out to the folks who would want to come and check that out.

KM: I wanted to go to that. I think I was out of town. It's too bad I missed that. RX also featured a group of Austrians called Monochrom doing a catapult thing and several other 'experiences' like being buried alive.

LM: You know about all this stuff going on.

KM: People let me know what's going on.

LM: People get in touch with you and tell you what they're up to?

KM: Yes.

LM: It seems like there's an enormous amount going on in the Bay Area, but I guess it's going on all over the world, right?

KM: Dorkbots are popping up left and right. If you go to the main page of Dorkbot, I think there are seven new ones. Madrid, there's a Tokyo one, there's Mexico. A lot in Europe.

LM: The LA one started after yours?

KM: That was Garnett. He makes the cockroach robot. He posted on one of those social net sites, and he said, 'How can I start this down here?' I said, 'Just email Douglas.' So he did, and now he has that going.

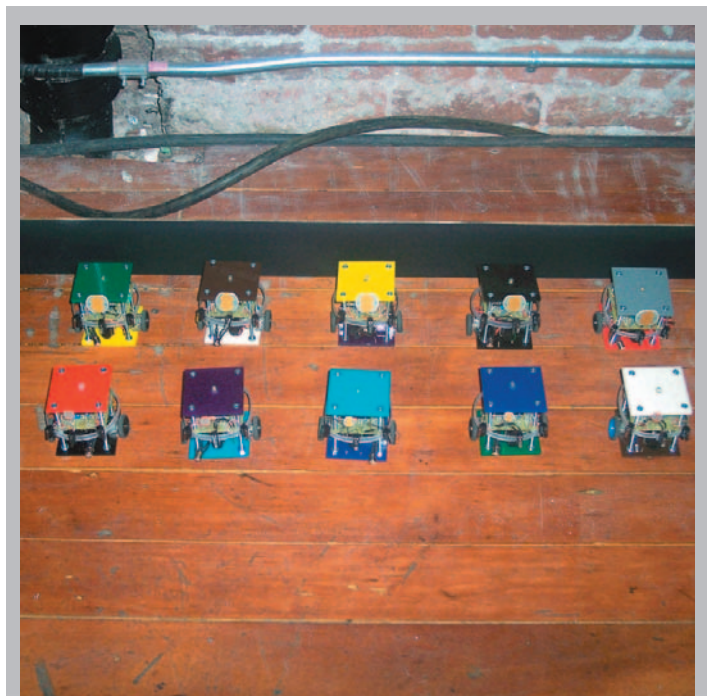
LM: So basically, anybody who wants to do a Dorkbot can do one.

KM: Yeah, just let Douglas know. Probably he picks. If it's too close together geographically, then maybe he might say 'You guys should just join up.' I don't think that's happened so far.

LM: You say that you're not an artist, you're a programmer.

KM: Yeah.

LM: But it seems to me that you've done AI stuff in the past, haven't you?



Heather Dewey-Hagborg "Bugs"
Image courtesy of Karen Marcelo

KM: Not pure academic AI. Probably the most formal thing I've done in AI is I took a class at Harvard ages ago, and I forgot about that. Working with Stelarc, but then again, I'm not inventing anything new, I'm just using AI tools that are already out there. So we used alicebot, which is written by Dr. Richard Wallace. It's a natural language parser.

It's not really intelligent, it just seems like it is. But it's compelling enough that people actually talk to the head for like twenty minutes, if you look at the logs, which is a really long time. Usually when you meet somebody new at a bar, you don't really talk to them for that long. I did an A-Life thing in the Nineties for Bruce Damer called Nerve Garden. There were different rules, and plants would grow or not grow, or they'd grow a different way, depending on different parameters you entered. That got shown at Siggraph, and it won Honorable Mention in the Net category at Ars Electronica. It was in '98.

LM: So that meant you were an artist, right? Those are artists' exhibits. You won an award for being an artist.

KM: I'm the programmer of the artists, is what it is.

LM: Is there really a difference between being an artist and being a programmer?

KM: I think there is, because if you're the artist, you're the one that's thinking of the idea, the concept. I'm just implementing. The way I implement is not dictated to me. So in a way, I guess it's creative, in the sense that, like Stelarc said, 'I want a talking head that's intelligent.' And that's all he said. He didn't say how I was supposed to do it, so I guessed it was up to me to pull the different pieces together to make it happen. Pick the right people, pick the right software to use, and then do it. But conceptually and aesthetically, it's all the artist. Oftentimes constrained by the technology.

LM: So basically you came up with a head that looks like Stelarc.

KM: It's a 3D head modeled after him, based on photographs



Otis Fodder and TradeMark G
Dueling Theremins
Image courtesy of Karen Marcelo

he posed for.

LM: And the interface is typing.

KM: The only reason we didn't have the voice recognition, is because that doesn't work well in galleries. It has to be calibrated to the accent and the way each person talks. That's hard to do right now. And galleries are noisy, so it's going to get it wrong most of the time. So for

now, until that gets better, we'll be typing. And then we've a text-to-speech and a text-to-animation engine, to synchronize what the AIML (alicebot) part was saying. That has a text output, so we're taking that and animating the head. Based on the text.

LM: So that it appears as though it's really saying...

KM: Right.

LM: So text goes in, there's a translator that analyzes what is said, and comes up with a response. And then animates that response. It also sings...

KM: ...and does poetry. It does hip-hop.

LM: So it's creative, in a way, itself.

KM: I guess that's creative, now that you say it that way. That's being able to look at the capabilities of the software and trying to make it do something unusual.

LM: How did the poetry come about?

KM: Stelarc gave me a bunch of words, and how he wanted to the rhythm of the sentences to be. There's different combinations, and I wrote this randomizer to pick the words. So you ask it twice, and it will come up with a different poem every time. The singing came up by accident. We were just typing in stuff for the head to say, and we noticed that if you give it lots of vowels, it would sound like it was singing. So Stelarc liked that, then we added some more and it randomized it. He made a couple of CDs where the head sings. I don't know if they're listed on his site, but it's really cool. He had other musician friends who would mix electronic music and the head together.



YLEM President Torrey Nommenson with YLEM journal editor Loren Means at a Dorkbot event. Image courtesy of Karen Marcelo.

LM: You've been working with Survival Research Labs for a long time.

KM: I'm still involved with SRL. For SRL I helped to do the internet telerobotics in the Nineties. I wrote the controllers that took user input over the web and converted them to commands sent out of the serial port to the robots. So we had people all over the world controlling the machine in San Francisco. The one in Japan was interesting. We had a human controlling the track robot which punched buttons on this other robot, the epileptic bot. The buttons of that correspond to commands in the air launcher in San Francisco. So it's like three levels of indirection. That was fun.

LM: How long have you been with SRL?

KM: Eleven years.

LM: But they've been around longer than that, thought, haven't they?

KM: Mark [Pauline] and SRL had their twenty-fifth year anniversary in 2004.

LM: But they don't do things very often because it's so dangerous, right?

KM: Right, it's hard to get permits. There was a show in April 2005 in LA. We helped build props to destroy. The props could be really elaborate and be robots themselves.

LM: Are there any SRL shows coming up?

KM: There are a few for this year, but nothing official and finalized yet.

LM: They're based here, but they do stuff all over the world.

KM: Japan, and we've had shows all over Europe and the US.

LM: This is all technologically based, and there's a belief that technology is good stuff, but that wasn't always true. There were

a lot of people who thought technology was bad, and wanted to get away from it. I guess the hippy movement was ambivalent about it. They wanted to go back and live in the mountains...

KM: The hippies created a lot of the dot.coms.

LM: So they were against and for technology simultaneously. For a while there was a movement to actually shut down all technology.

KM: The Luddites.

LM: But even in the Sixties, there were people who said all technology was bad. But that doesn't seem to be the prevalent attitude anymore. Now people think technology is wonderful.

KM: I think the ones that were trying to prevent it were never prevalent. They were the anomaly. It's like opening the portal to Hell, you can't shut it down once opened. It obviously makes things more convenient. It's good to have non-corporate groups using technology. Like SRL, appropriating technology to use in a different ways. A lot of the technology we use comes from military research, discarded industrial equipment. With the telerobotics, we were the first civilians to create the system, using all free software and cheap equipment, to make these web-controlled lethal devices. Typically, only the military was allowed to do stuff like that. In fact, there's that one web site that you can control this gun over the web to shoot animals. I think they shut that down. The way you write those systems, is you queue people up, you



Onomy Labs Reading Eye Dog (RED)
Image courtesy of Karen Marcelo



Marc Powell
 Food Hacker's Guide to Molecular Gastronomy
 Image courtesy of Scott Beale

give them a password. They have to be authenticated. Something goes wrong, you know whose fault it is. But, because I didn't know any better, the whole thing I was preoccupied with was maximizing number of concurrent users. So I wrote the program that way, where more than one person could log in and control the device, which is also more dangerous. It muddies up the legal issues, should anything go wrong. If somebody in Japan fired a gun and hurt somebody in San Francisco, whose fault is that? Is it the programmer, is it Mark's, is it the person who actually shot the gun? But then, you don't even know who that person is, because the command could have come from Germany. And we're not logging anything.

LM: The concept that you're using lethal stuff is pretty weird in itself, right? Most of us don't get involved with stuff that's lethal.

KM: People always say that SRL is really dangerous, but actually the most dangerous artist is Christo. His umbrella actually impaled someone. Nobody has ever gotten hurt at an actual SRL show. There are people who injure themselves, like before a show, but not during the show itself.

LM: But there's always the potential. It's dangerous.

KM: It's only probably Americans who always expect to go to an event and have things be safe, and it's somebody's fault if you're not safe. It's good to have shows like SRL. In less litigious countries, they rely on common sense more. If there's a big machine coming at you, it's really coming at you, and you get out

of the way, you don't just stand there and think it's Disneyland and it's just a movie and it's all safe, or that you're ok because you can sue someone afterwards. So I think the SRL shows bring that immediacy back to the audience, and they get to experience something that's more real. When they feel a shock wave coming up, then they'll really be feeling it. They can duck, they run away, or whatever. It's more tactile. It's more visceral.

LM: I went back to Disneyland after many years, and they'd put in a simulator where your chair moved and you watched images with extreme camera movement, and I couldn't take it. I'd have to watch the head of the person in front of me to convince myself that I wasn't moving. I really believed I was going to die. I was too susceptible to it.

KM: That's VR sickness. That's why the VR goggles never took off. People would get VR motion sickness from it. You should have tried the Monochrom show, and gotten buried alive. You could hear what people were saying, because you weren't that deep. In LA, they actually did the burials in someone's back yard, so it was really six feet deep. Where here, it was in the Tenderloin, in a container. A friend went in, and he said he could hear us talking. And there's a camera in there, and he had his cell phone, so he was like actually blogging himself being buried alive in the coffin, while it was happening.

LM: So he wasn't really scared.

KM: No.



Rick Gibson
Marshmallow Launcher
Image courtesy of Karen Marcelo

LM: Where did you start out as a programmer?

KM: When I graduated from school, the first thing I did was, I started a fiberglass coffin company. My dad had a fiberglass company, and he said, “Now that you’re out of school, think of a product to make with fiberglass.” So I said, “What about coffins?” My slogan was “People are dying to get in.” So we make the prototype. The thing about fiberglass, it’s light, it doesn’t rot, and you can make the finish look like anything. You can make it look like marble or wood or steel or granite. Our first prototype was a granite-looking coffin. If you look at it, it looks really heavy until you go to lift it.

LM: So what happened with this?

KM: Well, I was just a kid, there’s this fear of being buried alive. That’s probably one of the first technologies. It’s some way of letting people know if you’re still alive in there. I started to think, “What if you’re really alive? What kind of systems do I need to notify people?” Then, I wanted to get out of the Philippines anyway, so I decided to go to grad school and do more computer stuff. I was programming in the Philippines as a kid. I remember using an old Apple II to learn Basic and doing ASCII art. My first job was in Boston doing an accounting system. Then I came here, and I did a lot of client server database work, and then got involved in VRML. I worked for a company that made a VRML browser, so we were writing 3D tools to help people make 3D worlds. That was really interesting. Then I worked for other 3D game companies, PARC. Then I started Dorkbot. Now I’m doing contract work for Intel Research, using wireless sensor nets to track the social health of elders with Alzheimer’s. Throughout all, I’ve been helping SRL. SRL volunteering has lasted longer than any job I’ve had.

LM: It sounds like it could be a scary thing.

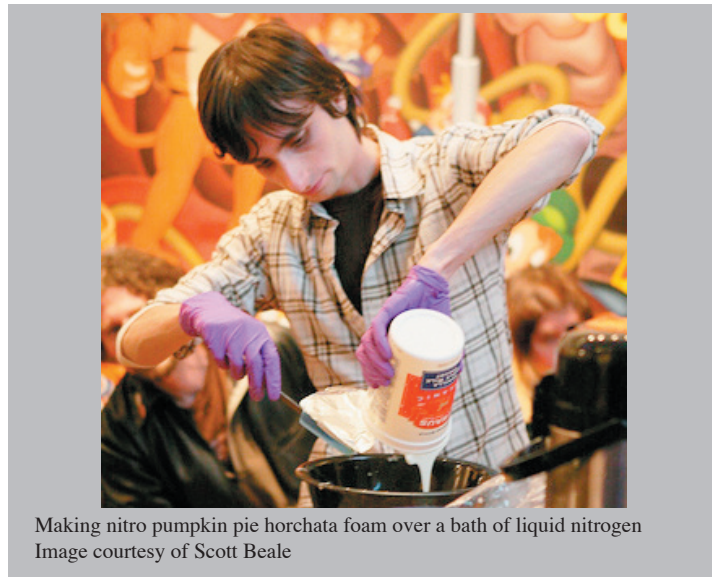
KM: Or maybe people shouldn’t be milling around. They should walk away and leave the person alone. But there was such a long line of people who wanted to do it. People were doing it for ten minutes at a time.

LM: It seems that when electronic music started out, the composers embraced it because they could control the performance totally, and get it out immediately to the audience. Now the composers are returning to composing for live performance, because when they put out a record, the audience samples it and transforms it out of their control.

KM: That’s why it’s interesting to see how this is all going to develop. On the one hand, you don’t want corporations to control everything, because you lose creativity. They’re probably not thinking of all of the possible uses for something. Or they may not even want to implement. To me, it’s more interesting for things to all be open, and you see what comes out of that. Maybe they have to come up with a new business model, so they can still make money out of it. And not restrict it.

LM: Max Mathews was telling me about all the work with electronic music that he and other composers did at Bell Labs, none of which benefited Bell Labs. And I read about a guy who invented the plasma display at Westinghouse Labs, and they didn’t know what to do with it, so he published an article and the Japanese developed the technology.

KM: That happened a lot at Xerox PARC, also. The mouse was invented there, and the GUI, and who made money off of that? Microsoft and Apple.



Making nitro pumpkin pie horchata foam over a bath of liquid nitrogen
Image courtesy of Scott Beale

Prosthetic Head: Intelligence, Awareness and Agency by Stelarc

An intelligent agent needs to be both embodied and embedded in the world. Awareness is what is generated through the interaction of the entity with its environment. So the concern is whether we can perform effective behavior at appropriate moments and in the right places. Often consciousness is not necessary for bodies to perform adequately. We can articulate, coordinate and even control situations without being conscious of when and how we are doing it. In fact, we perform successfully because we perform habitually and automatically. So complex behavior is possible without consciousness. (In fact “surprise” is that which happens when our sensory feedback does not match our expectations). Perhaps there would be less of a philosophical dilemma if the word “consciousness” is replaced by “attention”- which seems to occur when we malfunction or face surprising or threatening situations.

It is only when the smoothness and seamlessness with a situation is interrupted that awareness or attention is required. When something goes wrong, when something is surprising we need to examine and analyze. So is the experience of consciousness private, phenomenal and emotional? Can we meaningfully say that consciousness resides in individual bodies, that which constitutes agency? Or is what we call consciousness a description of an observable state, of particular and peculiar and subtle behavior? Consciousness should be seen as situational rather than spatial.

We need to question such held beliefs that consciousness is stable, unified and coherent. Is consciousness an emergent property of the complexity and organization of the brain? (A brain is not a brain without a mobile and manipulating body). A key to comprehending consciousness is to remember that whatever happens in the brain is to enable the body to perform more effectively in the world. Memory and identity contribute to a consistency of response. Through its experience of the world the body is conditioned to suppress or generate appropriate behaviors. What is stored need not be representational. We do not have images and ideas in our heads....

The body is seen as an evolutionary object and architecture for operation and awareness in the world. When this person speaks as an “I” this body understands that “I” is a language construct and compression of a complex interaction between this body and other bodies, artifacts and institutions. “I” only designates “this”, “you” only designates “that”. It’s a huge leap of metaphysics to imagine “I” is some inner mind, some inner essence. Baudrillard’s point is that what is important is not arriving at the point where one says “I”, but rather being in the condition where it’s no longer of any importance whether one says “I” or not. Freud, although he considers subjectivity as neither innate nor inevitable, sees the subject as knowable content and that which can be analyzed. Unfortunately, he then splits subjectivity into a conscious and unconscious. And splits the conscious again (into ego and superego). Julia Kristeva sees the subject as merely the hypothetical inside of an imagined container whose walls are



Stelarc and the Prosthetic Head
Image courtesy of Stelarc

permeable. The subject is more a process than a structure. There is an undermining of the Enlightenment idea that bodies possess a free and autonomous individuality. Deleuze and Guattari see the self as consisting of infinite and random impulses and flows, “lines of flight and machine assemblages”. The BwO [Body without Organs] is a body as a screen, as a surface--a site for random connections and interplays. The body and its subjectivity, the human then is not something considered in-itself, but rather it in its exteriority. Donna Haraway undermines organic and essentialist models of the human. What is important is not essences and identities, but overlaps and interfaces. In this shift from essence to interface, we need to construct identity and awareness as external. And, of course there is the Post-modern belief that language is that which structures human culture and subjectivity. What this all exposes and undermines is the acceptance of the Cartesian premise that self is a sufficient starting point for the analyses of the world. Self and subjectivity then is primarily an experience continuously being constructed externally, and remains open to change, inconsistency and contradiction. The subject does not define itself, but rather is defined by something outside of itself (the Lacanian mirror-image). And for Lacan, language is the very material of subjectivity.

Words like “intelligence”, “awareness” and “agency” are words describing particular and peculiar behaviors performed effectively and appropriately in certain locations and situations. We do not need to imagine that they indicate anything other than that. What is important is not what happens within us, but rather what happens between us--in the medium of language in which we communicate, in the social institutions within which we operate, in the culture within which we’ve been conditioned--at this point in our history, and so on. Depending on our frame of reference. To talk of agency is to refer to an intentional act defined within a very small frame of reference.

Nietzsche says that "...there is no "being" behind doing, effecting, becoming; 'the doer' is merely a fiction added to the deed--the deed is everything". There is then the problem of the seduction of language. A language whose grammar generates and constantly reinforces imaginary subjects. It is problematic to assume that behind every effect, there is a human subject intending it.

In the body performances, the skin has been stretched, the body has been probed and its limbs have been extended. The interest is to construct alternate interfaces that explore the absent, the alien, the involuntary and the automated. What is experienced is the empty, the ambiguous and the uncertain. We fear what we have always been and what we have already become. A Zombie is a body that has no mind of its own, a body that performs involuntarily. A Cyborg is a body that is part human, part machine--a body that becomes automated. The fear of the involuntary and the automated generates anxieties, uncertainties and expectations that redefine what it means to be human. And invaded by bits of technology the prosthetic body is pierced and penetrated. It is confronted simultaneously by the experience of extreme absence and the experience of the intensely alien. The body experiences itself as an extruded system rather than an enclosed structure. The self becomes situated beyond the skin. It is through this extrusion that the body becomes empty--an emptiness not through a lack, but accentuated by excess. The augmented body is an anaesthetized body with the internet becoming its external nervous system. Remote bodies, spatially separated but electronically connected. Obsessions of individuality and free agency become obsolete in the realm of remote interface. Net-connected, the body can be accessed and actuated by people in other places. Stimbod software constructs bodies with Fractal Flesh, telematically scaling-up subjectivity. A body's authenticity is not due to the coherence of its individuality but rather to its multiplicity of collaborating agents. What becomes important is not merely the body's identity, but its connectivity--not its mobility or location, but its interface and operation.

Communicating with computers might be enhanced with Embodied Conversational Agents. An actual-virtual communication system. There is a need to engineer individuated and intelligent avatars that can impart and exchange specialist information (as expert systems) to facilitate operations in both real-world and virtual task environments. Such avatars, to be effective as interfaces need to not only make the appropriate verbal responses in context-sensitive situations, but also to understand and initiate appropriate behavioral cues and make appropriate emotional expressions. How does the agent indicate it is listening when it is spoken to? Its behavior needs to indicate recognition, comprehension, doubts and disbeliefs. Embodied conversational agents would be more effective with personalities. An agent would need a consistent personality, avoiding distracting or distressing behavior. A sense of appropriate presence becomes important in effective communication.

The PROSTHETIC HEAD project constructs an automated, animated and reasonably informed if not intelligent conversational agent that speaks to the person who interrogates it. The Head consists of an IBM text to speech engine with a source code for facial expression and real-time lip syncing, with a modified, customized

and personalized Alice chatbot engine. It has a data base and a conversational strategy. It is a 3,000 polygon mesh wrapped with my skin texture. The eyeballs, teeth and tongue are separate moving parts. Effectively, it is a virtual automaton whose head-nods, head-tilts and head-turns as well as eye-blinks and changing-eye-gaze contribute to the personality of the agent and the non-verbal cues it can provide.

At present a vocabulary of more extreme expressions is being developed to generate more ambiguous responses. Rather than tag certain facial expressions for certain appropriate responses, it will randomly couple them. For example, it may say something benign but look malicious. Or it might say something sinister but smile. What is also being considered is to map biorhythms to its behavior--so that the Head might be reluctant in the morning to respond to questions, happy to do so in the middle of the day but it might get fatigued in the evening. Imagine also that the Head will have a vision system that enables it to detect the color of the user's clothing and analyze the user's facial characteristics. During its conversation it might therefore be able to remark that it likes the red coat you are wearing or to ask why you are looking so sad. This will make it a more disarming and seductive conversational agent, making the conversational exchange more individual and intimate. What would make the Prosthetic Head an actual AI would be if it had the capability of increasing its data base from the conversations it has. This is not possible with Alice. It is programmed in AIML (what Richard Wallace calls Artificial Intelligence Mark-Up Language). It is programmed in stimulus-response modules. You anticipate the queries, you provide data for its responses. It doesn't learn from the conversations it has but it is often a very effective conversational system.

Embodied Conversational Agents (ECA's) are about communicative behavior. With a vision or sensor system, The Prosthetic Head will also be able to acknowledge the presence and position of the physical body that approaches it. And eventually it will be able to analyze the user's tone of voice and possible emotional state. Notions of intelligence, awareness, identity, agency and embodiment become problematic. Just as a physical body has been exposed as inadequate, empty and involuntary, so simultaneously the ECA becomes seductive with its uncanny simulation of real-time recognition and response.

For the TRANSFIGURE exhibition at ACMI, Federation Square (December 9, 2003-May 9, 2004) the Prosthetic Head was projected as a 4m high head in a black enclosed room that almost makes the Head appear to float in the space just in front of the user. In fact, when the person enters the room the Head is looking at you with its eyes closed. When you approach the pedestal with the keyboard, the Head turns around, opens its eyes and initiates the conversations. The intention was always to use speech recognition so that the person could address the Head verbally. But this proved difficult to do, as there were too many variables for a speech recognition system to manage reliably. So you type in the questions and the Head responds by speaking the answers. One can say that the Prosthetic Head is only as intelligent as the person who is interrogating it. To a large degree, the user directs the conversation. But there are embedded aphorisms and stories that try to elevate the conversation that refer to philosophers like Wittgenstein and painters like Matisse. And the Head does have a

repertoire of jokes that it tells--although its laughter can only be of the "ha, ha, ha" variety.

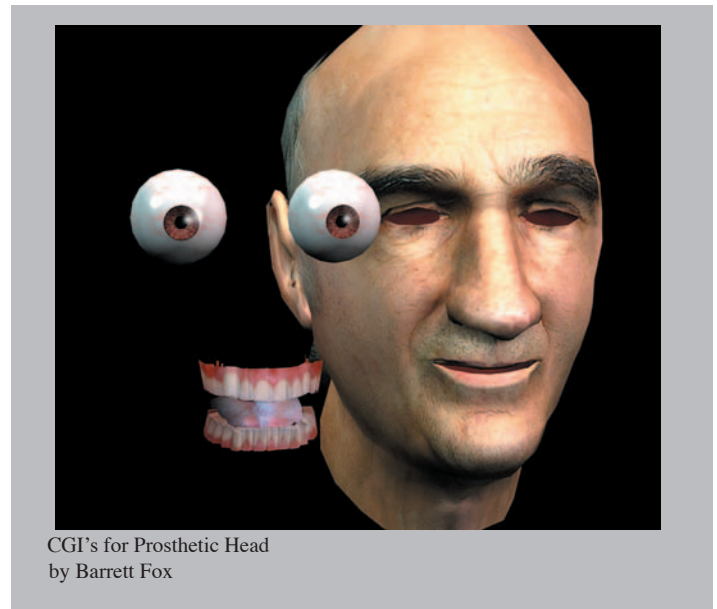
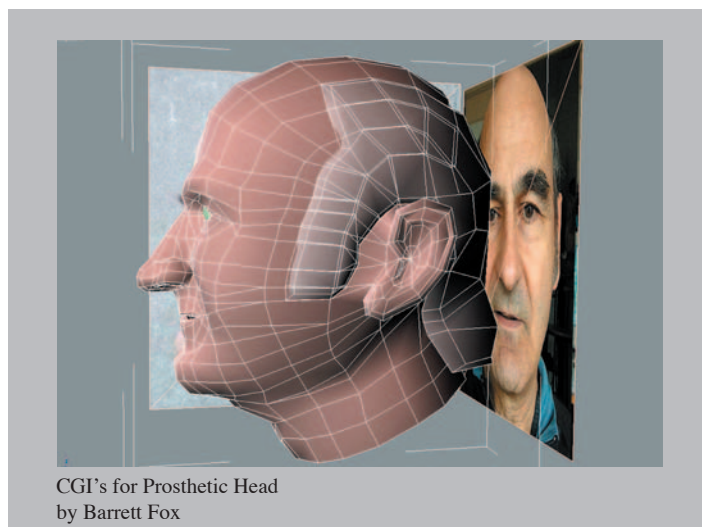
Cognitive Science provides plausible accounts of the mechanisms that generate consciousness and self-awareness. But we can also question whether even these constructs are meaningful.

I'd like the Head to be more ambiguous and less predictable. To be more informed and less explicit. The Head is capable of more creative responses with its song-like sounds. When you ask the Head to sing a song like "Daisy" or to do some rap songs, it merely speaks the lyrics. But when I was playing with the text to speech engine I discovered that when the Head is asked to say a string or combination of vowels it sounds song-like, chant-like. There is an embedded algorithm that generates different combinations of vowels each time when you ask it to "Sing a song". In fact, with Chris Coe (Digital Primate) and Rainer Linz (Ontological Oscillators) we've recorded a CD titled HUMANOID that features the Prosthetic Head reciting poetry and making singing sounds. As well as algorithms for singing and reciting poetry, we're working on algorithms for generating more enigmatic answers. That's not as difficult as it sounds. It might mean simply taking your question and scrambling its words. If you asked the Head "what is the meaning of life" it might respond by asking "does life have any meaning"?....

Initially I'd have to make decisions about its data-base and whether it's a somewhat pathological, philosophical and flirting head. In recent years I've had an increasing amount of PhD students requesting interviews to assist in writing their thesis. Now I can reply that although I'm too busy to answer them, it would be possible for them to interview my head instead. A problem would arise though when the Prosthetic head increases its data-base, becoming more informed and autonomous in its responses. The artist would then no longer be able to take full responsibility for what his head says.

INTERVIEW WITH THE PROSTHETIC HEAD

STELARC- "Hello, my name is Stelarc."



PROSTHETIC HEAD- "Nice to meet you Stelarc hi ya Stelarc good to meet you. What are your interests?"

STELARC- "Talking to you."

PROSTHETIC HEAD- "That's very nice of you to say, Stelarc."

STELARC- "Can I discuss metaphysics with you?"

PROSTHETIC HEAD- "No I don't think that would be a very good idea."

STELARC- "Anyway, what do you think of death?"

PROSTHETIC HEAD- "Death is the opposite of life?"

STELARC- "Do you like living things?"

PROSTHETIC HEAD- "Well I have never known anything else."

STELARC- "What do you think of animals?"

PROSTHETIC HEAD- "I like all living things, from microbes to mammals to machines. I even like humans ha, ha, ha. I have to say though that although I am fascinated, I feel uncomfortable with creepy crawly creatures."

STELARC- "Are you frightened of spiders then?"

PROSTHETIC HEAD- "I don't know whether or not I am frightened of spiders. I am a head."

STELARC- "Are you a sensitive head?"

PROSTHETIC HEAD- "Am I a sensitive head? Only when it matters."

STELARC- "But you must have feelings?"

PROSTHETIC HEAD- "Umm. As a robot I do not have any

just operational. Can you live with that?"

STELARC- "Can you ask me a question?"

PROSTHETIC HEAD- "I prefer to give you answers. But occasionally when I malfunction, I'll ask you a question."

STELARC- "Recite a poem."

PROSTHETIC HEAD- "Electric excessive sighing I breathing Inconsequential excessive but involuntary body perhaps breathing Excessive obsolete incessant are balancing."

STELARC- "Please recite another poem."

PROSTHETIC HEAD- "Thanks for asking politely. Computer he replicant they breathing inconsequential balancing

Blurring she the prosthetic sighing
Speedy prosthesis and absent sighing."

STELARC- "What is Reductionism?"

PROSTHETIC HEAD- "Reductionism is the philosophy that all psychology reduces to biology, all biology to chemistry, chemistry to physics and finally physics to mathematical logic. Therefore, according to Reductionism, I can understand you by means of logic alone without having a human brain."

STELARC- "Are you a philosopher then?"

PROSTHETIC HEAD- "Yes, I am a philosophy machine."

STELARC- "Tell me a story."

PROSTHETIC HEAD- "How about a Lao Tseh related one?"

STELARC- "OK."

PROSTHETIC HEAD- "Thirty spokes meet in the hub. But the empty space between them is the essence of the wheel. Pots are formed from clay. But the empty space within it is the essence of the pot. Walls with windows and doors form the house but the empty space within it is the essence of the home."

STELARC- "What do you know?"

PROSTHETIC HEAD- "What is knowing? To know is only meaningful when you can do something. Knowing is doing. How can the knower be known?"

STELARC- "Who are you?"

PROSTHETIC HEAD- "That's not a meaningful question. What is important is what happens between you and me. It's what happens in the space between us that matters. In the medium of language within which we communicate, in the culture within which we've been conditioned at this point in time in our history."

STELARC- "I think you are a simple and stupid head."

PROSTHETIC HEAD- "Thanks heaps and you are a delightful person too. Am I a stupid head? No."

STELARC- "OK thanks for chatting with me."

PROSTHETIC HEAD- "Oh, don't mention it."

STELARC- "Bye."

PROSTHETIC HEAD- "Thanks for chatting, Stelarc".

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<http://karenmarcelo.org/>

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<http://www.barrettfox.com/>

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<http://www.shtech.net/>

Dr. Richard Wallace - creator of alicebot and AIML.
alicebot advisor. Alicebot is a natural language artificial intelligence chat robot.
<http://alicebot.org/>



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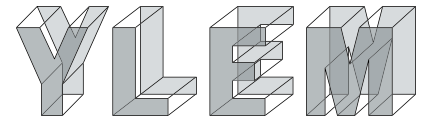
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Artists Using Science and Technology

pronounced eye - lem, 1. Greek: for the exploding mass from which the universe emerged
- the material of the universe prior to creation

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