

Shrink Rap Radio #180, October 31, 2008 — Consciousness and Technology.
David Van Nuys, Ph.D., aka “Dr. Dave” interviews Nova Spivack
(Transcribed from www.ShrinkRapRadio.com by Goh LH, Lawrence)

Excerpt: *Computer program, artificial intelligence are simulation of intelligence and in those simulations the cognition is happening at a symbolic level that's very very removed from the physical substrate, the medium of space and time. In the human body that is not the case. In the human body and the human brain, everything that happens cognitively is directly tied to the physical substrate.*

Introduction: That was my guess, Nova Spivack, explaining why he does not expect that computers will ever attain anything like human consciousness. Nova Spivack is a long time and seriously committed student of Tibetan Buddhism and entrepreneur, Semantic Web pioneer and technology visionary. He's founded EarthWeb, Radar Networks and the San Francisco Web Innovators Network. He is also the founder of Lucid Ventures and he is the grandson of Peter Drucker, the management consultant guru. You can find more details on Nova's fascinating background in our shows notes.

One warning before we cut to the interview, you've heard of bad hair days? Well we were having a bad Skype day; consequently the audio is not up to our usual standards. There are portions where Nova's speech comes through with a sort of warbly choppy quality. I tried breaking the interview off at one point and calling him back but there was no improvement. Still it's worth putting up with, everything is still quite intelligible. I felt so lucky to get the interview with Nova in the first place and to find a hole in his super-busy schedule for this interview that is all just too good to pass up.

So that being said, let's cut to the interview.

Dr. Dave: Nova Spivack, welcome to Shrink Rap Radio.

Nova Spivack: Thank you. I am glad to be here.

Dr. Dave: Well one of my listeners turned me on to your two part interview on Buddhist Geeks and right away I said, "I've got to get that guy on my show." And so I am really happy to have you here because the conversation that you had there was fascinating and I've since been on your blog and found the reference to what you describe as your best presentation ever that I think you were given an award in Stockholm.

Nova Spivack: Well it was actually not really an award but it was an invitation to give a talk to a large media company, largest media company in Scandinavia about the global brain.

Dr. Dave: Yeah well I think that was in a word in itself then, it's giving that invitation.

Nova Spivack: Yeah. I am certainly there was a number of other really wonderful speakers that were invited and it was kind of like a mini tech conference for Scandinavia.

Dr. Dave: Yeah and I've — the tech conference is truly a wonderful thing. I enjoyed a lot of the video from the tech conference. You know I think of "Nova" as the name of the PBS series as well as a galactic explosion. How did you come by that first name?

Nova Spivack: Oh there are many different stories ... my mother is a poet and it's partly poetic license I think, my parents were artist it wasn't — in my case it was 1969 and they were thinking they thought — my brothers' name is Marion like Marion County so we both have this kind of unusual name. I guess in my mother's case so one story goes she was looking up at the star and had a big inspiration. There are some other stories that are more humorous but it's hard to tell which one is the real story.

Dr. Dave: (laugh) Okay, okay. I just double checking to see if it was a hippy name that you adopted yourself. But I see ... (laugh)

Nova Spivack: No, no, it's actually my given name.

Dr. Dave: (laugh) Yeah, okay. So for our listener, tell us a bit about your background. I understand you were attending university even while enrol in high school. Maybe you could start there?

Nova Spivack: Yeah. I grew up in the Boston area, spend a lot of time around Cambridge when I was a kid I was kind of one of the early computer users and I was kind of immerse in the beginning of the pc revolution, there were a number of start up there. Members of my father family were very involved in that. And while I was in high school, I got very interested in computers and in any case I ended up convincing University of Massachusetts to let me attend instead of my senior high school. So I actually did my senior high school in my freshman year of college at the same time. And then — after that I transferred over to Oberlin College and so I actually ended up doing five years of college one with my senior high school and then I had four years at college at Oberlin.

Dr. Dave: And if I recalled correctly, Oberlin got one of those programs that allows considerable latitude right, in terms of how you structure your studies?

Nova Spivack: They do have that option. And actually I did do that for awhile focussing on cognitive science there. Effectively I was running my own department so I ...

Dr. Dave: (laugh)

Nova Spivack: ... just do all the things you would do if you run a department, like getting lots of signatures and petitioning to do different things and create a curriculum and all that. That eventually turn out to be just too much work and so instead the philosophy department agreed to let me take the same courses but to do it under their department, which actually freed me up to not have to deal with a lot bureaucracy but I still got to study the same thing. So I studied neuroscience, computer science linguistics, intellectual history, artificial intelligence and philosophy.

Dr. Dave: Yeah. That begins to get us into some of the juicy areas that we want to talk about. But also want to touch on the fact that you attended the International Space University and were a space tourist. Can you tell us a little about that?

Nova Spivack: Yeah. After college I — through various twist and turns I read a book by an author named Frank White, called the *Overview Effect* which is about the sort of unexpected spiritual transformation that astronauts went through when they saw the earth from space. So a very interesting book call the *Overview Effects* and Frank White is out of Harvard. I wrote him a letter after reading it — cause that was so interesting and he actually wrote back and invited me to participate in the formation of a new graduate school that he was involved in call the International Space University which came out of MIT. So I got involve in that, help to create their space humanity program and then was invited to actually attend the program, at that point it was in Japan, and so I attended the International Space University which is basically a business school for the space industry, the different space agencies all sponsor it. It's now permanently located in Graffenstaden, France but at that time it was in Japan. And so I did that and then a numbers of my friends from that program eventually went on to start a company called Space Adventures which many of you probably know, it's the company that takes billionaires up to the space station. So in the early days of Space Adventures in 1999, after the IPO of my first Internet company, I had a little spending money and I was invited over to Russia with the Space Adventures term to sort of test out some of the things they were putting together. I mean that included flying to the edge of space and also doing zero-gravity training in Russia. So that was pretty exiting.

Dr. Dave: You know, in fact, years ago I did a magazine interview with Edgar Mitchell who was one of those astronauts who looking at the earth had a transformative experience. Did you in fact find it to be transformative yourself?

Nova Spivack: In a way that I didn't expect, yes. I mean I have spend so much time reading about it and imagining it and also doing enough spiritual practice and training on my own that I think some of the ... just sort of big shocking experiences that the astronaut had weren't really that unexpected for me. On the other hand I did see things which I didn't expect. In fact instead of the giant experience of we are one which I think a lot of astronauts had which is something I already had (laugh) on my own.

Dr. Dave: (laugh) Yes.

Nova Spivack: I actually experience the profound sense of isolation and loneliness up there. You are so far up and so far away from the Earth and what I really realized was how empty space really is. That was pretty interesting and also just to see, you know, just really how far away I was from the Earth and to really see the Earth from that perspective. I already had this bit of general sense of Earth being one big living system but understand really how isolated it is I think was interesting.

Dr. Dave: Yes. Well you've also being a very serious student of Tibetan Buddhism for some time. Give us a thumbnail sketch of that if you can.

Nova Spivack: Yeah. I've been studying Tibetan Buddhism formally for about 20 years and Buddhism in general for significantly longer. I started actually reading when I was pretty young and in high school got more interested when I was studying cognitive science in college. I actually ended up doing some pretty focus study of the Buddhist philosophy of mind, after studied other philosophy of mind, the Hindu philosophy of mind for example which is similar in some respect. Mainly because I just couldn't find the

answers I was looking for in western thinking. Must western philosophy and certainly western science, in my opinion is around 25 hundred years behind what eastern thinkers are doing and thinking about when it comes to consciousness of the mind and so that's kind of lead me there. And then in 1992, I spend a year wondering around in South-East Asia, living in monasteries in Nepal and India, spending a lot of time with Tibetans.

Dr. Dave: What is it about Tibetan Buddhism as contrasted to Zen and some of the other variants that particularly speaks to?

Nova Spivack: Well, you know all forms of Buddhism share quite a lot in common. The difference ultimately comes down to the message they employ for practice and in some cases there are some philosophical subtleties that where you can see distinctions. In the case of Tibetan Buddhism what appeal to me is first of all a broad range methods and also an extremely develop analytical system ... extremely develop all scientific explanation instead of text that really delve into some of the more esoteric and subtle aspect of consciousness which I was very interested to learn about. I actually studied in all the tradition, I studied Zen, I studied in the partsen (**sp 0:12:01.9**) out there about tradition ... I studied other forms of Buddhism as well. So I've really made a pretty broad survey but Tibetan Buddhism appeal to me in particular because I was attracted to the practices of Mahayana dzogchen which are extremely esoteric practices that focus pretty intensively on the nature of consciousness itself.

Dr. Dave: Okay. Well I don't it is possible for you to just kind of give a sort of a capsule description of those two practices?

Nova Spivack: Well yeah. I mean rather then going into each one separately the essence of the two it's really about uncovering what is all the nature of mind. So even there is mind which is the conceptual and dualistic process of consciousness there we are all familiar with. And then there's the nature of mind which is actually awareness itself. So awareness is not a concept or a conceptual process. I guess a good analogy would be, you know, awareness is kind of like space and thoughts and concepts that kind of like the things that appear in space so we got planets and stars and galaxies. These appear in space but they are not exactly the same as space. There are also not exactly different from space in that they are really nothing but space if you actually analyse them but they are distinct from space. You can say a planet is a planet, you can see a distinction and similarly concepts and the things that take place in the mind aren't really different from the mind, they aren't really different from its nature but they are distinct in that you can isolate them, you can say, you know, that's a particular thought or there is a particular process taking place. And so the nature of mind is kind of a space in which the mind is arising and that is really what Mahayana dzogchen really focuses on. They have a variety of techniques to help the practitioner first come to a very clear direct realization of that nature an all of its cuparious characteristics and implication and then a whole set of techniques for really developing that further ... ultimately to the point where one can actually achieve Buddhahood which is essentially the full fruition of the inherent of that nature.

Dr. Dave: I really like that metaphor the space metaphor it makes it very clear and understandable. Now I believe you are currently CEO of yet another company I think you've morph through several companies, is that right?

Nova Spivack: Yeah my first Internet Company was called EarthWeb and that is 1994, it was one of the early Internet Company and we went public actually in 1998. I started another Internet Company a number of years ago in around 2003 that company is call Radar Networks and it's what I am presently running and our product is a web site call twine.com, twine like the string. It's a service that ties it all together and it's using the Semantic Web. So twine basically helps you track your interest, discover things around your interest and organize information around your interest. And it's using the Semantic Web which is this new generation of web technology that — and essentially makes it possible for applications to do smarter things with content on the web.

Dr. Dave: Yeah. Say just a bit more about Semantic Web because that's — it's not a concept that I had run into before hearing you speak. And I thought I was reasonably sophisticated about what was going (laugh) on the web but it was a new concept for me.

Nova Spivack: Well Tim Berners-Lee who originated the Web also originated his second act what he call the Semantic Web. The Semantic Web goes beyond just html which we probably are all familiar with, html is the language that used to mark up and format content on the Web so that web browser knows how to display that content. The Semantic Web proposes a set of additional mark up languages that essentially sort of standard for creating metadata, which enable content to be mark up so that software can understand what the content means. So you might imagine, when news article that mentioned companies, people and places. Well if a software program sees that article, it can't really tell that a certain word is a company and a different word is a person and another word is place. It doesn't know because it can't really read and understand the language. However with the Semantic Web, you can put little tags around things that say; this is a company or this is a particular company and there's more information over here about it, this is a particular person, this a reference to a product, this is a reference to an event. So it allows you to mark up content with little tag essentially that add meaning to that content and this is a meaning that machine can understand. So rather than having to create artificial intelligent that can read and understand documents, you simply need applications which can read and understand these tags and the tags are much simpler. The can be standardize or at least the meaning of the tags can actually be define in a way that machine can understand. And so it's sort of an attempt to add more structure to the Web so that machine can make better sense of it.

Dr. Dave: Interesting. You say instead of using artificial intelligent so it's if we are implanting a bit more of our intelligence into each of those pages if you will ...

Nova Spivack: Exactly and if fact that's how I often describe it. If we sort of moving intelligent out of applications and into the data, we could think of it as smart data.

Dr. Dave: Yeah.

Nova Spivack: The data — the carry — the data starts to carry more of what's needed to make sense of the data and that means that application don't have to be as powerful, they can be essentially "thinner" as long as they can speak this kind of "meta language" they can then pull in what's needed to understand different sets of data that they might encounter. And so this kind of a beginning of what I think of as "The externalization of human knowledge." We started with the Web just putting content out there, then things like the Wikipedia building giant collections but those collections aren't

really understandable to software, so this next step is to actually make all of that understandable to software so that human knowledge can start to be processed by a machine.

Dr. Dave: One of the things I like about the talk that you gave in Stockholm was the progression that you took your audience through of Web . 0 — Web . 1 through Web . 40, maybe you can just kind of step us through that. It's a nice version of the kind of sweep from the past to the future.

Nova Spivack: Sure. Basically I see the Web proceeding in decades, we can talk about them as well 1.0, 2.0, 3.0 and 4.0 and these are the four decades of the Web. We are currently in Web 2.0 the second decade. 1.0 was 1990 to 2000, the first decade of the Web and now we are in 2000 to 2010 decade. So each of these decades has a different kind of character main theme. The first decade of the Web was really focus on the backend core technology of the Web, the second decade that we are in now Web 2.0 it's really been focus on the user experience or what we might call the "frontend of the Web." It's really about making it useable and making it more social. As we move in to the coming third decade 2010 to 2020, the emphasis shift back to the backend of the core technology of the Web and there we are upgrading the structure, the content, the software of the Web to be smarter. And then when we go to the fourth decade Web 4.0 in 2020, the focus will shift back again to the frontend so there is a pendulum that's kind of swinging back and forth every decade. It will shift back to the frontend and there the focus will be on making smarter applications that make use of the more structured content on the Web and of course in that period of time, I don't expect that people be sitting at computers anymore, I think for the most part, it will be in a much more mobile kind of world where we will always be online and will be through some kind of mobile device or devices imbedded in our physical environment. So where ever we are, the Internet will always be there. The key will be to make it smart because we won't always have a keyboard and we won't always have the time and patience to be scrolling through lots of pages. We want the Web to really be able to anticipate or understand exactly what we want and just give us one or two things that really relate to what we really want in the context we are in.

Dr. Dave: You see the Web immersing as a kind of global mind. How so?

Nova Spivack: Well the concept of a global mind actually started with this notion of a global brain which is actually been a big idea that's been developing for at least 100 years if not more. You could trace it back to people like H.G. Wells in fact or even earlier thinkers who have call for this — Pierre Teilhard de Chardin a French philosopher also wrote a lot about the omega point which he believe we are heading towards. And there've been really many other writers in the past and great thinker who's kind of originated this idea. Most recently with the Internet we've seen the kind of resurgent in thinking around this and there are been people like Pierre Russell, Gregory Stock, Kevin Kelly and others whose been writing about the global brain and how the Internet seems to be heading in this direction.

My own thinking, I tend to make a certain distinction ... I don't think that the Internet on its own it's a global brain. I don't think that artificial intelligence or software no matter how much of it we have would constitute a global brain because there's one essential element that it's require and that is consciousness. And where does the consciousness come from not from machines, it comes from people, we are the consciousness of the

system. So I think we are creating a kind of global brain and a global mind but we have to include people in that picture. So the sum total of all the people on the Web and then all the content and all the software and hardware and infrastructure, we get all of that together as one big system, it is actually quite brain like, it is actually an organism or what we might call a super-organism like and ant colony, it's a organism — it's made of organism. It's definitely thinking, it's learning, it's evolving, it's getting smarter and in a couple of decades it will probably start to become more self aware. Now the self awareness is the big question. In what form will it be self aware? Will it be one sort of mental fusion single identity out there that say, "I am the Web, I am aware of myself." Highly unlikely.

I think instead what will have is kind of high level representations of collective identity and collective self, it will be kind of like sights that reflects back what's going on or what masses of people are doing and thinking and then the feeling or sense, "I am there," for the awareness or might be call the knowing or qualia in a philosophical technical sense of this experience of the Web. That will actually have resided in the minds of the people who are watching. So the — if you will the self construct of the Web will be sort of existing on various web sites that stir that sort of high level representations of what's going on but the self awareness or the knowing of the construct will reside in the mind of the people who make up the Web.

And so in a sense there will be a kind of collective intelligence, a collective self and a collective awareness taking place. You won't be able to find one particular point that is the self or the awareness of the system and in fact if you look at our own brain and mind, you can't find a single point anywhere in there that is the self awareness either. So it's quite an elenchus, if we admit or believed that the human brain which is an essentially complex system, it's able to have a sense of self and some form of awareness even though it or it's comprising billion of separate parts, then why can't the same thing happen for the Web which also comprises billions of parts.

Dr. Dave: I am starting to have a fantasy of this giant super-organism meditating and asking itself, "Who am I?" (laugh) ; "Where is myself?"

Nova Spivack: Well it's an interesting question. It could happen although I think the larger the system and the higher you get on the scale of super-organism, the less likely there is that you'll have a single coherent thought on, you know, it's possible that there might be moment where a large majority of the people and machine on the Web focus on one thing. You know we — there's actually a project, quite interesting, it's call the Global Consciousness Project out of Princeton and they had a random number generate so they are scatter the Web these are machine that are isolate from electrical interference and so forth. And what they found is very strange but that — it's turn curious in time and nobody can explain why, all this random number generator become highly correlated, it's brief but there is no explanation for it. They should always be random, it should always be kind of noisy but in fact there are moments when they all seems to get kind of synchronise and it doesn't make sense, there's no statistical explanation, it violates our understanding of statistics. The with even more strange is that at the moment we also — if we look — they tend to corresponds at least in on and off and have corresponded with major global events, such as 9/11 or in earthquake and wars and other catastrophes. So strangely enough it seems like these random number generators kind of go into a form of coherent at the same time as large number of people seems to be also in coherent. So nobody's

knows why but one speculation is that there is some kind of a field that is at play here and when consciousness is somehow effecting that field or maybe it is that field and when you get enough people or enough consciousness as if you will, kind of focus in — together on one thing, the nature of that field changes enough to actually change the randomness of the universe or the local region of the universe that we are in. And so the random number generators would then behave differently. It's a very strange project, it's quite scientific but it has a lot of implications. And anybody can look this up and look at the data and see for yourself. Nobody knows what's going on and they also don't know what's going on, all they can say is, "There is something strange happening."

Well that's evidence for possibility of collective consciousness or a collective consciousness having some kind of an affect on the physical world. As far as collective consciousness getting to a level of sophistication where it could actually think a thought and everybody in it could actually feel it, experience that thought, I won't say is impossible but I think it's a long way off. I think will probably start with much more primitive things first such as simply creating some sort of shared mirror of what the global mind is thinking and that's a project I am very interested in. To kind of create a site which tries to figure out and represent back what the global mind is thinking about.

Dr. Dave: In a sense it seems to me that maybe "tweeter" (laugh) does that a bit. What do think about that?

Nova Spivack: Well not exactly, I mean, so it is like "tweeter" don't really do any interpretation they just, you know, you can look at the stuff that's streaming through, it's just like at their services which sometimes show for example, stream of queries in a search engine, you can see what people are searching for. But a global mind or global self needs to actually be higher level construct that derive and interpretation from this vast flow. One example is Google's site guide which you can dig around for and find and google and it basically show what are most popular queries on Google right now. That gives you a sense of what the — some of the big entrust but still a very primitive and not very high resolution picture. It's beautiful though. Well I am thinking about is that but taken much further, not only see what people are searching for, what they are thinking about but look at trends, look at sentiment about certain issues, look at differences in different places or different demographic group, be able to slice and dice. The day that to really understand — either the difference between what people in the U.S. are thinking and what people in China are thinking, I mean, how does it differ? Also how are our thoughts moving if you will.

I wrote a paper once call *A Physics of Ideas* which propose the way to analyse the media in order to basically figure out how ideas are moving through the world that is geographically and demographically to trace how a particular ideas is spreading from one population to another for example. So I think there's a lot of things we can actually do using technology to start to figure out what's going on in a vast collective brain which we call the Web and by doing that we can actually start to represent it back and create something that becomes the seed of a kind of global mind.

Dr. Dave: You may have just invented a new field maybe call "Memology."

Nova Spivack: (laugh) Well there is the Matics maybe Memology is certainly an interesting term. You know, I do think that means which are ideas that replicate and move

around kind of like viruses, means are very important, possibly the most important things that are shaping our world and our understanding or even recognition of (laugh) the most incredibly primitive today. Some people have even propose that just as we would see really the human body is just a life support system for gens, for spreading gens?

Dr. Dave: Yes.

Nova Spivack: It may also really be just a life support system for spreading means.

Dr. Dave: That we may be the life — we are the hosts of spreading means?

Nova Spivack: Yeah. And maybe what's really going on is that ideas are evolving and you know, the human genome and human body (laugh) really are there just to help ideas evolve. That's a very could have Meta level way of looking at what's going on. Of course idea itself aren't really physical things, they have sort of physical representations in various places, they definitely seem to be shaping our world, I mean, if you look into intellectual history, you can look at it as a battle of ideas.

Dr. Dave: You know as I hear you talk about this I have the feeling that somehow Buddhism cross cuts some of what you've been talking about. I mean isn't there even the — for example the Hindu idea that all of this is illusion and Maya ... that maybe we are not even real in the way that we think we are real.

Nova Spivack: Sure. Actually I studied with Hindu teachers as well in the past, Buddha's is focally really a reaction to Hinduism and so they had actually quite a lot in common. The basic difference is that Buddhism goes one step further then a sort of Hindu philosophy. Where the Hindu philosophy focuses on ultimately achieving the sort of oneness with the cosmic self, they might call it Atman, Buddhism pursuit the notion of the simple cosmic self instead what you achieve oneness with is the cosmic essence itself. And so there is a very important subtle distinction there.

However many have misunderstood the Buddhism notion of emptiness or the absence of self as a form of nihilism. It's not a from of nihilism, in fact, there is still a kind of cosmic being but it's not a self and so Buddhism sort of says the Hindu almost got it right. There is this kind of cosmic oneness but it's not a truly existing entity of — that could be personified or even thought as one sort of single entity instead it's much more like a vast infinite space from which everything springs. And that's be have a quality of being aware or at least being the source of awareness but awareness itself it's just like space and also it's kind of empty. So these are the kind of highest view in Buddhist philosophy and very hard to print to words because of so much paradoxical and which is why Zen doesn't even attempt to put them into words instead it just deals directly with paradoxes to help you break free of grasping at dualistic at explanation as of reality.

Dr. Dave: Okay. Now to step back just a little bit, you've been influence by the ideas of Ray Kurzweil with whom you've also worked and he talks about a concept that he calls the "singularity" which I have taken to understand as the Internet if you will, actually becoming conscious. It sounds like you don't go quite as far with that as he does.

Nova Spivack: Well to be specific, the concept of a "singularity" was not originated by Ray Kurzweil although his been the one who's popularize it. The first

person really talk about it was a science fiction writer name Vernor Vinge and he talked about technological singularity which was going to occur when we created software or hardware or both that was so intelligent that it exceeded our ability to imagine what it could do. So basically it would be a point in time when computers became so much smarter then people that we couldn't really predict what would happen after that. In other words, they'll be ultra intelligent, they'll be the last thing we've ever invent because from then on they'd be making all the inventions.

Ray Kurzweil concept of the singularity sort of modernise it a bit, his been charting the course of technological progress particularly around information technology over the last 20 or 30 years and what he found is that there this exponential growth curve which are — that just occur no matter ... pretty much no matter what happens whether we have a great depression or not, whether we have a war or whether we have a recession, no matter what happens everything seems to keep continuing to progress on it's excellent approach in particular for example, one of the famous one is what's call Moore's Law which talks about the density of semiconductors and the fact that the cost of to put them on the chip, decreasing as well as in density which we can put them on the chip it's increasing so basically there are a number of this different laws out there we could say pattern we see which indicate the pace of technological progress that is surrounding information technology is rapidly advancing on it's exponential curve. If that continues and it looks like it will, then by about 2030 or 2040, the computation necessary to simulate or do ... same amount of computation that we currently think that the human brain does will cost about \$1.00. So it will mean that you could very easily have a brain simulation or at least if our present understanding of what that entails is correct, you know, and that could fit on a mobile devise like your phone, beyond that before the end of this century it should be possible to simulate or actually to exceed the computing capacity of all human brains with perhaps a small amount money and what small means is relative but it could be anywhere about a few thousands dollars to a few million dollars but it won't cost that much. So if that's the case then in this century pure intelligence or at least computation as far artificial will exceed natural computational of the form human beings. And when that happens, the next question is, "Well will it actually be smarter?" Just because you can do more computation doesn't mean that you make something smarter, because intelligence isn't merely just brute force computation, it's really a very highly refined form of computation; there's a particular structure taking place. So I am pretty sceptical actually that just because will have brute force computation that entails that we would somehow have artificial intelligence. I think intelligence is extremely subtle and it doesn't relied purely on brute force computation.

People who believed in the singularity in a strong sense would say, "Well, what we'll do is we'll map the brain, will basically scan it into a computer. We'll map it down to the neuron or even sub neuron level and we'll just literally copy it and will just runs simulation of the brain in a computer. We won't have to understand what it does; it will just be intelligent because it will be copying it." Well this all breaks down is first of all, at what resolution does the brain really compute? Currently we think it's happening on the neuron ... neuronal level but there's evidence now coming out that's its happening at a much deeper level; at a quantum level that within the neuron. If that's true then the resolution of the brain's computer if you will, the granularity maybe 12 times deeper than what we currently think. So it might be significantly longer before we can really copy it or simulate it no matter how many computers we can bring to bare in the factory. We

might not get even in the factory, depending on how much computation's really happening.

But there's even more to the story and that's just to kind of I have been writing lately. We don't yet know how important the media is to intelligent and consciousness, that is, the only intelligent and consciousness we currently know of happens in living organic things like people, animal and insects. We have not seen any evidence of it in any other form. Now those sort of in the strong AI and computer science camp and certainly the hard core singularity people would say, "Well there's nothing particularly about one form of matter that's special. Why should organic molecule have some special privilege of being consciousness and also by the way computer is made of plastic, there are organic too. So why not?" Well what I would say is this, computer programs, artificial intelligence are simulations of intelligence and in those simulations the cognition is happening at a symbolic level that's very very far removed from the physical substrate, the medium of space and time. In the human body that is not the case. In the human body and the human brain, everything that happens cognitively, is directly tied to the physical substrate. That is when a neuron fires or when chemical interact within a synapse, that is actually cause and also conditions the quantum by and ... on the quantum level. So in other words, there are quantum things to any place, in space and time that are percolating up and although there are effects that are percolating down that are affecting the quantum structure of space and time and that's all happening in our bodies. And our ...

Dr. Dave: So yeah. So a lot of what you are talking about then is a kind of very rich sensory stew. Is that right?

Nova Spivack: No. It's just not a rich sensory stew though, it's that we are literally space and time and our thoughts and our cognition and very very tightly connected to the structure of space and time. In a simulation, in a computer for example, what's happening is the cognition in that simulation is actually shielded directly from space and time. In other words, what's going on on a quantum level in the vicinity that the computer is in may have not being on what takes place at this very very high level in it's simulated cognition. That's not the case in human body. In human body we are literally processing the quantum structure of space and time, we are physical machines and our thoughts actually connect to the physical reality that we are embedded in. So in a computer simulation its many levels removed from physical nature of the universe, in other words the computer when it made a construct for example let's say, within a computer program you make a cube that appears, floating in space. Whatever happens in physical space with where that computer is, doesn't affect that cube in any way. That cube is a kind of high level construct that exists many level removed from physical reality and all of the structure and the circuitry and the computer is really designed to actually shield the computer from effect, from electromagnetic effects. Really control what's going on. But in a human brain that's not the case. If you imagine a cube in your mind that cube is somehow taking place in space and time, it's imaginary but it's connected to your brain which itself is highly sensitive to what goes on at the quantum level and in fact what appears in your mind may in fact filtered back down and actually have effects on quantum level at reality itself. So there may actually be much more interaction between what we are doing in our minds and our brains and the — and actual physical reality itself. And that's quite different than the setup of an artificial intelligence, simulation of intel — of a mind. It's very hard to explain this but in fact there is a very very different setup, it's a night and day situation. So if we are going to create artificial intelligence, it

probably, in my opinion, will need to be imbedded in a system that's much more like a human body, that's much more connected to the actual substrate of space and time. And I don't think that currently that's the direction that AI research is going in. In any case, if that turns out to be important, if the substrate — that is physical reality — is quite important to true consciousness in intelligence then it might be a long time or maybe never before we are able to actually make quote "Artificial Intelligence." I am sceptical about that; I think that artificial intelligence isn't really that necessary, at least in the way that some people think about it. We don't need to replace people, we already have them. We don't even need to simulate them ...

Dr. Dave: (laugh)

Nova Spivack: ... yeah. It's very useful I think to make intelligent machine that can assist humans but I am very very sceptical that, that we'll be able to synthesize consciousness. I — we don't even know what consciousness is and to synthesize it is hubris. We're so far, so far behind even eastern thinker, on the subject of consciousness. It took them thousands of years to evolve a high refine understanding of consciousness and we haven't even started. So we might make brains, we might make sophisticated machines but I don't think they will be very smart, I think they will basically glorified video cameras.

Dr. Dave: It's really interesting to hear you think about this things because I think it's — you are in a unique position, coming at the study of consciousness both as a Buddhist and as a technologist. And so that's a very unique and fascinating blend. I ...

Nova Spivack: Yeah. It's important. I only wanted point out of it ...

Dr. Dave: Yeah.

Nova Spivack: ... if anybody is listening, who might be picking up on this. I am not promote — proposing some form of dualism, it very important to make that clear. I am not proposing that. Consciousness is some special magic substance ... I am not proposing that it's a mysterious ghost that appears. I am saying that it may be fundamental just like space and time are fundamental. So this is the key point. Space, time and new energy are fundamental property of the universe and no physicists would claim to know what they are. In fact you can't even measure them directly, nobody actually measures them directly. Nobody can grasp space, nobody can grasp time, nobody can grasp energy. All the measurement of these things are actually inferences that we make by looking at things that we can measure. For example how do we know that there's really time? Well we measure the change in various things that we can see, we never see time right. Similarly how do we know that there's space? Nobody can see space, but we can ... we do see that there are object that get larger and smaller or that things tend to move and that for example light bends when it goes past a star. There are various things that happen that enable us to infer that there is something that we call space and it has some kind of shape and that it exists, but we never actually see it.

Well the same is true of consciousness and in fact I tend to think space, time and consciousness and even energy are really one thing. And this with the future grand unification which we will some day reach, in a cognitive we've unified a few of these thanks to Einstein right, matter and energy and to some the real space, time, matter and

energy have been unified but you know consciousness, that other aspect is still not in the equation and that's the big weakness in our civilization. It's something which, by the way ancient civilization were further on, they didn't get as far on the matter-energy a part of the equation but they made more progress in the consciousness part. We don't even see the equation yet. But in any case we spend our points on physical external material — up side, other civilizations the ancient Peruvians, the Native Americans, Ancient Africans, Ancient Indians civilizations, Chinese and Buddhist civilizations, there ancient civilizations were actually quite far along on the other part of the equation, the consciousness dimension.

Dr. Dave: Wow. I think that's probably a good place for us to rap this up and I know that you are extremely busy with all of your undertaking, so I really want to thank you for taking time out to be my guest today on Shrink Rap Radio.

Nova Spivack: Thanks a pleasure. I hope this made sense and that people can get some interesting new direction for thinking for them.

Dr. Dave: I hope you enjoyed this conversation with Nova Spivack and you didn't find the audio too taxing. I have to say he did give me some new directions for my own thinking. I was particularly fascinated by his notion towards the end of our conversation; that consciousness maybe another primary dimension of the universe along with space, time and energy. I think I've heard this idea before but I've never heard it stated in quite these terms. And maybe it's just starting to sink in with me finally.

Synchronistically later in the same day, I was listening to one of my favourite podcasts, the Australian series All In the Mind with Natasha Mitchell and they were examining the question of just how far down the phylogenetic scale cognition and possibly therefore consciousness goes. I was surprise to learn that there are leading microbiologist who (laugh) feel like it goes sort of all the way down.

Quoting from Natasha Mitchell in her episode On the Secret Life of Bacteria; Small, Smart and Thoughtful, she says quote, "It turns out you are possibly only 1 percent human and 99 percent microbial if you were to do a cell count." In Mars these single cell critters manage to do staggering things without a head or a heart. They cooperate with each other, coalescent vast intricate patterns, bio films and swarms, sense and response to the world around them, hunt and kill in coordinated packs; they even processed a form of memory. But does all this means bacterial colonies are cognitive? Even conscious? And might their behavior reveal something about our own far fetch suggestions for some not so for others.

And then she goes on to interviewing some leading microbiologist who are devoting their careers to studying mentation in microbes with some arguing that they appear to have all the qualities that we would associate with consciousness. To me, this would add weight to Nova Spivack's assertion that consciousness may indeed be one of the basic building blocks of the universe. Certainly this has long been the position of many metaphysical schools of thought. Sounds like science might be moving in that direction as well. Exciting stuff.