A Transhumanist Argument for the Existence of God(s):
Ben Goertzel interviews Hugo de Garis
on his modest hypothesis that God is probably an alien mathematician

Ben:
Hugo, you've recently published an article on KurzweilAI.net titled "From Cosmism to Deism" (*link here*), which essentially posits a transhumanist argument that some sort of "God" exists, i.e. some sort of intelligent creator of our universe -- and furthermore that this "creator" is probably some sort of mathematician.   I'm curious to ask you some questions digging a little deeper into your thinking on these (fun, albeit rather far-out) issues.

Could you start out by clarifying what you mean by the two terms in the title of your article, Cosmism and Deism?

Hugo:
I defined these two terms rather succinctly in the kurzweilai.net essay (*link here*), so I'll just quote those definitions here. Deism is "the belief that there is a "deity" i.e. a *creator* of the universe, a grand designer, a cosmic architect, that conceived and built our universe." Cosmism is the "ideology in favor of humanity building *artilects* this century (despite the risk that advanced artilects may decide to wipe out humanity as a pest). *Artilects* are "artificial intellects, i.e. godlike massively intelligent machines, with intellectual capacities trillions of trillions of times above the human level." *Deism* is to be distinguished from *theism*, which is the belief in a deity that *also* cares about the welfare of individual humans.

Ben:
Previously you have talked about "Building Gods" as the ultimate goal of artificial intelligence technology. So is your basic argument in favor of deism that, if we humans can build a god, maybe some other intelligence that came before us also was able to build gods, and already did it?

Hugo:
Yes, pretty much. The traditional arguments in favor of a deity (as distinct from a theity, which I find ridiculous, given that last century 200-300 million people were killed in the bloodiest century in history – so much for a *loving* deity) are less strong and persuasive in my view than the artilect-as-deity argument. The rise of the artilect is based on science, and the extrapolation of artilectual intelligence to trillions of trillions of times above the human level, seems very plausible this century. If human beings (e.g. Prof Guth at MIT) have theories on how to build baby universes, then perhaps artilects could actually build them, and hence, by definition, become deities (i.e. creator gods). That was the main point of the kurzweilai.net essay.

Ben:
I see.... This is actually very similar to the "simulation argument" made by Nick Bostrom

and others, that since creating computer simulations as complex as our universe is probably possible, the odds seem fairly high we're actually living in a simulation. But Bostrom focuses on the simulation itself, whereas you seem to focus on the intelligent entity you assume to be the creator of the simulation. And this brings up the question of what intelligence means. What's your working definition of "intelligence"? In other words, how do you define "intelligence" in a way that applies both to human minds and to the potential super intelligent universe simulation creating deity that you hypothesize?

Hugo:
As a common sense, man-in-the-street definition, I would say, "Intelligence is the ability to solve problems quickly and well." As a research scientist, I am made constantly aware, on a daily basis, of the fact that intelligence levels differ greatly between individuals. I spend my time studying PhD level pure math and mathematical physics, trying to wrap my head around the works of Fields Medal winners such as Ed Witten, Michael Freedman, Richard Borcherds, etc, all mostly likely with extraordinarily high IQs. Believe me, with my only moderately high intelligence level, it gives me "brain strain". So it's easy for me to imagine an ultra intelligent machine. I only have to imagine a machine a little bit smarter than these genii. I am in awe at what these genii create, at what the best examples of the human intellect are capable of. I am in awe. However at a neuro-scientific level, we don't know yet what intelligence is. A five year old can ask questions about the nature of human intelligence that are beyond state-of-the-art neuroscience to answer, e.g. "What was so special about Einstein's brain that made him Einstein?" "Why are some people smarter than most?" "Why is the human brain so much smarter than the mouse brain?" I dream of the creation this century of what I label "Intelligence Theory (IT)", that would provide real answers and understanding to such questions.

We should aim at a universal definition of intelligence that would be applicable to all levels of (humanly) known intelligence. It is an interesting question how far up the superhuman intelligence level a human concocted IT could go. One would think that the finite level of human intelligence, by definition would preclude humans thinking of an IT at a level that an artilect could manage.

Ben:
Following up on that, one question I have is: If there is some "superintelligence" that created the universe, how similar do you think this superintelligence is to human intelligences? Does it have a self? a personality? Does it have consciousness in the same sense that humans do? Does it have goals, make plans, remember the past, forecast the future? How can we relate to it? What can we know about it?

Hugo:
My immediate reaction to that question is that with our puny human brains, we very probably can't even begin to conceive of what an artilect might think about or be like. If we think that a universe-creating, "godlike" artilect has the human like attributes you list above, then that might a "category mistake" similar to a dog thinking that human beings are so much smarter and capable than dogs, that they must have many more bones

lying around than dogs do. One thing that is interesting about this question though, is that by conceiving of the artilect as a scientific based creation, we can begin to attempt answers to such questions from a scientific perspective, not a theological one, where theologians are all too likely to give all kinds of untested answers to their particular conception of god. Is a consciousness, or sense of self a prerequisite to the creation of superhuman intelligence? These are interesting questions, that I don't have answers to. Perhaps I haven't thought deeply enough about these types of questions.

Ben:
In a nutshell, how does your deism differ from conventional religions like Christianity, Islam, Judaism and so forth? And how does it differ from Buddhism, which some have argued isn't really a religion, more of a wisdom tradition or a practical philosophy?

Hugo:
Traditional religions such as the above, that were invented several thousand years ago, after the agricultural revolution and the growth of cities (with their occasional genius level priest-theologian) I find ridiculous, utterly in conflict with modern scientific knowledge. The cultural anthropologists of religion have shown that humanity has invented on the order of about 100,000 different gods over the broad sweep of history, and across the planet. These many gods are so obviously invented (e.g. New Guinea gods have many pigs, etc) that their human origins are obvious. However, the fact that every primitive little tribe has invented its own gods makes one deeply suspicious that human religiosity is in fact physiologically based, and hence has Darwinian survival value (e.g. if you can believe in a loving god, you are less likely to commit suicide in a cold, indifferent, callous universe, so religiosity inducing genes would be more selected for).

Deism, on the other hand, especially with the artilect-as-deity argument, is much closer to modern science in its conception. The very real possibility of the rise of the artilect this century virtually forces anyone confronted with the argument to accept its plausibility. Our sun is only a third the age of our universe, and there are a trillion trillion 2nd generation stars that we can "observe" that probably have generated life and intelligence. Once a biological species reaches an intelligence level that allows it to have mathematics and science, it is then only a small step for it to "move on" to the artilectual stage, whose potential intelligence is astronomically larger (pun intended) than any biological level. An artilect of the distant past in an earlier universe may have designed and built our universe. It would have been our deity.

Ben:
Traditional religions serve to give people comfort and meaning in their lives. Do you think that the form of deism you advocate can serve the same purpose? Does it serve that purpose for you -- does it make you feel more meaning in your existence, or in existence in general?

Hugo:
I look down on traditional "religionists" as ignorant deluded fools. The fact that where I

lived when I was living in the US, namely Logan, Utah, there were hard-science professors who were converted Mormons, showed me that the human brain is modular, with some compartments isolated from other parts, e.g. the religious areas from the critical analytical scientific areas, so that these professors were unable or unwilling to destroy their religious beliefs with just a little analytical scientific thinking. I don't have much patience with people who have low "RQs" (reality quotients). If I present these religionists with the idea that many tens of millions of theists last century were killed in the bloodiest century in history, they just block thinking about its implications. If I show them the evidence that humanity has invented 100,000 gods, they do the same. I don't deny that if one is able to believe in a loving god, it might be comforting, especially to someone who is, in Darwinian terms, sexually unattractive, and gets no human partner, so remains unloved, especially older widows, whose supply of men has run out due to the greatest of human realities, death. But emotional comfort and high RQ may not be compatible. If forced to choose, I prefer not to be a gullible child. A non-theist deist looks at the massively indifferent universe as a given. Having "faith" is no argument to me. Believing something simply because one wants to believe it allows one to believe in the "tooth fairy."

Accepting the idea that a deity might be possible, certainly increases my sense of awe. Imagine (if that is humanly possible) the capabilities of such a creature that can design and build a whole universe. That is why I call artilects "godlike". They may have godlike capabilities, but still can be thought about (by humans) as falling within the domain of science. Such a possibility makes me look on existence with a different light. I would then see the universe as having a meaning, i.e. the meaning given to it by its artilect creator. Of course, one can then ask, how was the artilect that created our universe itself created? The ultimate causation question, simply gets put back a step. The ultimate existential question "Where did all these embedded universes come from and why?" remains as mysterious as ever. But, thinking about what was going on in the "head" of an artilect deity when it designed our universe (with all its wonderful mathematical physical design) is fascinating to a scientist. How to design a universe? What a wonderful challenge for science to grapple this century and beyond. Of course, as humans, we may be too stupid to answer such a fascinating question.

Ben:
I'm curious what is your own history with religion. Were your parents religious; were you brought up in a religious environment at all? I know you lived for a while in Utah, a very religious part of the US, and found that a bit uncomfortable.

Hugo:
My parents were Church of England and sent their 3 kids to private Methodist schools. So until my teens I was conventionally religious, having to listen to "Christist prayers" every morning at "school assembly". I was rather late going through puberty, so my brain didn't start becoming adult and critical until I was 17. I then "discovered" science with a vengeance, and decided that I would not become a doctor but a scientist. Once I absorbed the basic scientific credo of "test your hypotheses", my old religious beliefs began to look more and more ridiculous. I then met an atheist who was a few years

older than I was and very smart. What he was, served as a model for me, as to what I could become, so I rapidly switched to non-theist beliefs. The more science I learned the more ignorant traditional, 2000 year old Christist beliefs appeared to me. For decades I was an "unquestioning atheist", until the "anthropic principle" came along in the 1980s (i.e. the values of the constants in the laws of physics are so *fantastically* finely tuned to allow the existence of matter and life, that it looks as though the universe was designed) and the more math physics I learned, the more suspicious I became that the universe was designed according to highly mathematical principles – the deity-as-mathematician argument. These two principles – the "anthropic principle" and the "mathematical principle" feature in the kurzweilai.net essay *(link here)*.

Ben:
Now I'm going to get a little more technical on you. You've spoken of the "deity as mathematician" argument. Is this a version of Eugene Wigner's observation of the "unreasonable effectiveness of mathematics"? It seems to me that this is an interesting intuitive argument for the existence of some fundamental hidden order in the universe -- related to the order we see in mathematics -- but not necessarily a strong argument for an actively intelligent "deity" with its own coherent memory, consciousness, goals, and so forth. Can you explain how the observation of surprising amounts of mathematical structure in the universe suggests the existence of a "deity" rather than just a "subtle hidden order"? Or is your deity basically the same thing as what I'm (somewhat awkwardly) calling a "subtle hidden order"? Hopefully you can see what I'm getting at here; unfortunately English isn't really ideal for discussing such things with precision (but if I switched to Lojban I'd lose most of the audience, including you!)….

Hugo:
Yes, subtle question. I think the rise of the artilect with its massive intelligence levels this and later centuries makes very plausible that our universe operates according to such deep mathematical principles. These principles would be the result of the artilect deity's design. Whether such principles could "be there" without such design, is hard to imagine. The deeper the physics genii of this century (such as Ed Witten, etc) delve into the deep structure of our universe, the more mathematical it seems to be, e.g. with superstring theory using the very latest ideas in low dimensional topology, with its beautiful mathematics. This creates in my mind the deep suspicion that our universe is designed according to such mathematical principles. If it is not designed, then is it just pure chance that our universe is so highly mathematical? That seems so implausible. This "mathematical principle" is closely analogous to the "anthropic principle" in the sense that our particular universe design seems so fantastically a priori improbable. One is virtually forced to accept it has been designed. The so called "designer" traditionally was conceived of as a theity, but now that we humans can image artilects, we have a new way to imagine the designer, i.e. as an artilect, and hence compatible with our deeply held scientific principles. I guess what I'm saying is – "artilectual deism is compatible with science", whereas "traditional theism is simply pre-scientific garbage." You (may have) alluded to Spinoza's ideas with your "subtle hidden order". Einstein talked about "der Alte" (the "old one", who designed the universe). He wanted "to know his thoughts."

I agree with you that if there were no artilect-deity concept, then the existence of a subtle hidden order would support the idea of a creator less strongly. But science based artilects are now very credible, so give strong support to the idea of our universe being designed by an earlier artilect in a previous universe. One fascinating question this raises in my mind is the status depth of mathematics. Are the principles of mathematics in some sense "deeper" than even the artilect deities? Are such artilects obliged to use mathematical principles as a given, or are these principles, in some (humanly unfathomable?) sense, concocted by these artilects? This is a really deep mystery for me, but fascinating philosophically.

Ben:

Hmmmm..... You say " If it is not designed, then is it just pure chance that our universe is so highly mathematical?"

But it seems to me that an alternate hypothesis would be *self-organization*.... That is: perhaps abstract mathematical structures are in some sense "attractors" of hyper-physical self-organizing processes. Imagine some primordial "stuff" self-organizing into a more concrete state .. at first it's so abstract it's not governed by any specific physical laws, but then physical law gradually emerges within it. This is the great physicist John Archibald Wheeler's notion of "law without law"..... Then imagine that this self-organization process inexorably tends to lead to the formation of physics-es with the same habitual deep structures.... In vaguely the same way that multiple molecules with different structures tend to form similar crystalline patterns ... because these particular patterns are attractors of crystalline self-organization.

So, it could be that math is what tends to self-organize when primordial stuff concretizes into universes with concrete laws of physics. That's pretty much what John Wheeler thought....

Of course, that "law without law" idea doesn't contradict the idea of a deity that was constructed by prior advanced civilizations. But it's an alternate possible sort of explanation for why there might be so much abstract math in the universe, and it's not a boring facile explanation like "random chance"....

Anyway ... while we're on the topic of physics, I'm also intrigued by your notion of hyper-physics *(link here)* -- i.e. the study of the physical laws of all possible universes, not just the one we happen to live in. But I'm perplexed by the role played in this notion by the choice of one's mathematical axiom system. It seems to me that if one has a fixed choice of mathematical axiom system (say, standard Zermelo-Frankel set theory, or whatever), then one can ask which "physical law sets" are consistent with this axiom system. So for instance, if one has a theory of what kinds of sets qualify as "space-time continua", one can then ask what kinds of space-time continua are possible according to ZF set theory. But then the question becomes: where does the axiom system come from? Godel showed us that there's no one correct choice of mathematical axiom

system. So it seems to me that hyperphysics ultimately rests on an "arbitrary" choice of mathematical axiom system, if you see what I mean. You can't get away from making some kind of foundational assumption, if you want to say *anything*. Or am I somehow misunderstanding your idea? Do you think there's some special distinguished mathematical axiom system governing all the universes in the hyperverse? If so, which one is it??!! Or maybe this is something only the transhuman mathematical deity knows??

Hugo:
Your questions are getting deeper and subtler. I had to think about this question a while to get its essence (maybe). I interpret your question to mean "How to map the hyper-physics to a mathematical axiom system?" The ZF system currently used by us seems to work for our universe. Our (human) mathematics seems to be sufficient to understand the physics of our universe. Whether it may prove sufficient for a hyper-physics is a deep and unanswered (unanswerable?) question. As humans, it is possible that we may never get an answer to that question. Our human intelligence level is finite. There are probably many deep questions that we are too stupid to find answers to. There may be many other questions too subtle for us as human beings to even conceive of. Just how deep does mathematics go? Are we humans evolved to be mathematical? Perhaps the universe was built according to mathematical principles, hence for Darwinian survival reasons, our brains were forced to evolve to think in mathematical terms to interpret the behavior of our universe, to survive.

Ben:

Yeah... the point is that the scope of all "possible" physics-es is implicitly delimited by some mathematical axiom system. So it seems to me that what happens is

A) a mathematical axiom system is, somehow, chosen

B) within that axiom system, many physics-es are mathematically possible, each corresponding in principle to a different universe

So one question is whether deities can choose to build different possible universes.

And another question is whether deities can choose to operate within different mathematical axiom systems, each giving a different definition of what universes are possible.

In a sense, a mathematical axiom system serves as a "meta-physics", right?

Arguably, if a deity operates internally according to a certain mathematical axiom system, then it can't create universes outside the scope of this axiom system, except by making choices that are "random" from its perspective. So mathematical axiomatizations might form a constraint even on deities, to the extent these deities are

rational and logic. On the other hand, deities might totally transcend our petty human concepts of logics, axioms and laws...

So all in all, I guess the basic question I was asking is **whether you think mathematical axioms serve as a constraint on deities, or whether deities can create their own mathematical systems and structure universe based on them freely.**

But of course, none of us stupid little humans knows the answers to those questions, do we? So asking such questions is more useful for exploring the scope of possibilities, than for getting at answers in the current timeframe. Although, if you do have an answer, that would be great

Hugo:
When you put it like that, it's very clear, I have no problem getting your question. It is a fascinating one, and I have as yet no thoughts on the matter. Your question stimulates me though.

The only thing I've come across related to it, was the SF novel by Sagan "Contact" in which at the very end, the hyper intelligence that kept an inventory of life forms in the galaxy was smart enough to put a message in the decimal digits of the value of pi. You may remember that lovely little twist at the very end of the novel.

My human intuition is that math is prior to the deity. That even deities must obey them.

Ben:
Hmmmm, OK. So let's get back to the practical a bit. Right now your approach to deism is unusual ... whereas religions like Christianity, Islam, Hinduism and Buddhism occupy most of the world's population. What do you think are the prospects for a broader acceptance of your form of mathematical deism? Do you think this will become a common religion among human beings as the Singularity gets nearer? Do you think it can help people deal better with the unsettling nature of the technology-driven transformations to come? Perhaps making Cosmism more appealing to people who are attached to some sort of religious point of view? Do you envision the emergence of actual Mathematical Deist churches, where people sit and ritually collectively worship mathematical order, and the priest recites great theorems to the crowd?   Where is this all going?

Hugo:
I spent about 30 years of my life living in western Europe, which is highly secular. Traditional religions have pretty much died out, especially in countries like the UK, Scandinavia, etc. People are becoming better informed about the basic principles of science, so will be more accepting of a science-based deism. But, since this is a rather intellectual conception, it may only be popular with the "sages" (my word for the intellectual, high IQ types -- I intend writing a book in the future, on Sagism, which

hopefully will raise people's consciousness that sages are discriminated against in the modern world). As the "species dominance debate" (i.e. should humanity build artilects this century or not?") heats up in the next few decades, the Cosmists (i.e. people who want to build artilects) will use the "building gods" argument as one of their strongest, to persuade people to choose to build artilects. As secularism becomes more widespread, as theism dies, then the Darwinian religiosity components of our brain can then be "satisfied" with a "science based religion", i.e. Cosmism, the ideology in favor of building artilects. I see the "religiosity argument" of the Cosmists, being their strongest. Will there be Cosmist churches? Maybe - for the less intelligent. Churches are for the masses. Cathedrals evoke a religious response. They are bigger than a human being, making people think about higher things than where their next meal will come from. Maybe some reader of this essay will start the "Globan Cosmist Church." (Globa is the name I give to a global state, the topic of my second book "Multis and Monos" (amazon.com)). I've seen a video on youtube of some Scandinavian guy invoking the name of Turing as a future god, with "religious gestures" and incantations using words such as the bit, the byte, etc. It was quite hypnotic. I felt like rushing out into the street shouting, "I've been forgiven of my bugs, saved by the great compiler in the sky."

But how about you? Whats your view on deities and math? Have you given the question much thought?

Ben:
Hmmmm.... I do feel there's something deeply spooky in the universe, related to the omnipresence of subtle math structures in the universe. And I've had my share of strange spiritual experiences, which have made me sometimes feel very directly in contact with transhuman intelligences --- not necessarily creators of universes, but intelligences that aren't human. So, at a gut level, I do feel there are intelligences greater than ours out there somehow. But, whether these intelligences created our universe or somehow co-evolved with it via some self-organizing process -- on that I really have no strong intuition. I find that the older I get and the more I think about the Singularity and the real possibility of transhuman intelligence, the more humbled I am regarding the tremendous ignorance of the human race, and our limited capability to understand the universe. Do these words of ours like "deity", "mathematics" and "create" really say anything much about the universe, or are they pretty much as limited as a dog's conceptual vocabulary, compared to how a post-Singularity mind is going to understand things?

Hugo:
Gosh, I didnt know you had had experiences with higher powers. Do you take them seriously, or interpret them as happening while you were in a certain state?

Ben:
Heh ... I suppose I take them about as seriously as I take everything else -- which is to say, not totally! I go through my life intensely aware that Hume's problem of induction is not solved ... i.e., we have no sound logical or empirical reason to believe the sun is going to rise tomorrow just because it's risen on so many previous days. Every time

you pick your foot up and then set it down again assuming the ground is still going to be there, you're making a leap of faith! So I suppose I interpret my peculiar spiritual experiences about the same as as I interpret all my other experiences. If I find out there are superintelligences out there I won't be shocked, and nor will I be shocked if I find out this world we're living in is just some video game created by some bug-eyed alien in his kindergarten programming class (and that he got a bad grade for his project because the humans in his creation are so extremely stupid ;p ...). Nor will I be shocked if it turns out the modern scientific consensus view is correct and we're the only intelligent life-forms in a physical universe that was created by nobody for no purpose whatsoever.

The main point, to me, is to improve our intelligence and our wisdom and our scope so that we can understand more and more of the universe and ourselves. I don't know if there's a deity or if our universe is a simulation, nor if the deity is a mathematician if there is one, but I'm sure I'll understand these ideas better if I can multiply my intelligence by a factor of 100. If I'll even be "me" at that point, anyways....