



# *The North Texas*

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## Computer evolution

by John Blanton

Creationists of the “Intelligent Design” variety have a habit of making the claim that evolution by means of genetic mutation combined with natural selection cannot generate novelty.

Many of their arguments are similar to the ones we heard before from the young Earth creationists (YEC). The YECs, for example, will agree that domestic dogs are descendents of wild wolves. However, they maintain that the divergent characteristics of domestic dogs, from the diminutive Chihuahua to the St. Bernard, to the stretch dachshund and the pug-nosed bulldog, are just variations on a theme, and nothing new has been created.

Particularly, creationist author William Dembski likes to point out that a passive and unintelligent process (like evolution using natural selection) cannot generate anything new, but can only take what exists and shape it into different forms (my interpretation of Dembski’s words). Dembski’s most recent book is *No Free Lunch: Why Specified Complexity Cannot Be Purchased Without Intelligence*.<sup>1</sup> Nothing is free, Dembski tells us. If you want novelty out you have to put novelty in. Unintelligent agencies are not able to provide any lift on their own.

Computer scientists are not so quick to agree. The idea of using mutation and selection to guide machine-based invention has been around since the 1950s. With the advent of cheap, high-performance computers, the impetus to use them in this enterprise has grown. Today computers employing genetic algorithms are developing new designs and solving problems previously left up to carbon-based thinkers.

Figure 1 helps to illustrate the problem and the approach to a solution. The wavy line represents a problem for the computer to solve. The computer knows the line as just a mathematical function. Given any position on the x-axis, the computer can quickly determine the corresponding height of the line at that point. The specific problem to be solved is a little more difficult. The computer must find the highest point on the line.

## EVENTS CALENDAR

### Social Dinner and Board Meeting

Saturday, June 26, at 7 p.m.

#### Bread Winners Cafe

By the Inwood theatre, plenty of parking.

5560 W. Lovers Lane, #260  
Inwood Village, Dallas, TX  
75209 (214-351-3339)  
<http://breadwinnerscafe.com>

It's a great place to eat, but the servings are large. Bring a friend or a homeless person to share your meal with. It's on Lovers Lane in Dallas, between Inwood Road and the Dallas North Tollway. It's in the shopping center, on the south side of Lovers Lane, same block as the Inwood Theater.

Phone 214-335-9248 for information and to let us know if you are coming. We need to make reservations.

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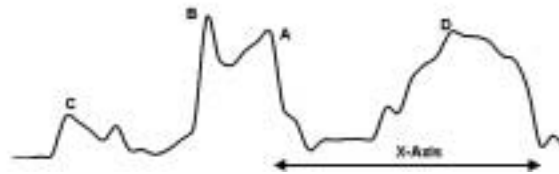


Figure 1

The problem: Find the highest point.

to point A, at which time it may be convenient to stop and declare victory.

However, the line illustrated in Figure 1 may present some difficulties. Using my remarkable human brain and eyesight, I can readily determine that point A is the highest point. However, the computer is not gifted with my eyesight and certainly not with my remarkable brain. If the search is started in the wrong place, the computer may quickly locate and settle on one of point B, C, D, or even one of the other, minor, unlabeled peaks in the line. That's because once the computer finds it-

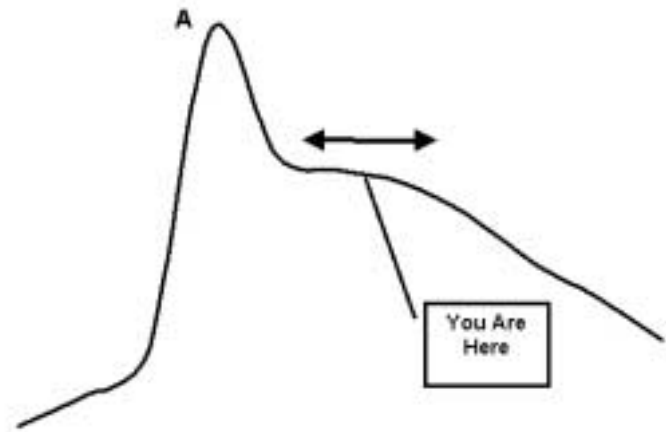


Figure 2

The micro approach: Climb the nearest mountain.

self at one of the lesser peaks it has no reason to look elsewhere. In every direction away from the point it is only down, and the computer is looking for up.

But what if we told the computer to mount multiple, simultaneous searches? And, furthermore, what if the instructions were to "get outside

Figure 2 illustrates one approach. First pick a point and determine the height of the line on either side along the x-axis. If one side is higher, then pick a new point on that side and repeat the process. Eventually this algorithm will draw the search

the box” so to speak. Look beyond the next peak. Occasionally shake things up a bit and pick new search points, not so close to home, beyond the next peak or valley.

That’s the essence of genetic algorithms, and that’s the essence of evolution by mutation coupled with natural selection. Mutation is what shakes things up, and natural selection is what determines that the higher of several choices is the better one.

If the problem of biological evolution were as simple as this illustration then everybody, and not just the creationists, would give a big yawn and look around for something more entertaining. Fortunately for our entertainment value there is more to life than a wavy line. The example shown in the figure is a linear search problem, because it’s a *line*, in one dimension. Imagine next we are searching a mountain range for the highest mountain peak — better, but still nothing that would raise a lot of excitement.

The problem of life, however, is not just one or two-dimensional. It is multi-dimensional in a grand scale. The number of dimensions of life’s search space is the size of the genome of an organism. The dimensionality of a genome is the millions of base pairs that make up the organism’s DNA, and the organism, in searching this multidimensional space, can vary any of its base-pair sequences that code for a protein. Mutation can produce a change in any code sequence (three-base-pair codon), and we can see what results from that. In living organisms what happens is usually nothing of much consequence, and often times it is bad to fatal. On rare occasions the result is beneficial, and the organism’s offspring climb the hill along one of the dimensions of its genome space.

For an organism, “climbing the hill” as opposed to “descending the hill” is whatever produces an offspring that will have a better chance of reproducing (and producing more copies of the new genome).

Computer scientists have been remarkably successful at co-opting nature’s idea of evolution. It works much like this: The problem of interest has a large number of variables, often mutually independent, that affect the performance of a system to be invented, designed, or merely improved. For example, the performance of an internal combustion engine will be affected by a combination of design parameters, such as the cylinder diameter, the compression ratio, the size and number of valves, the positioning of the spark plug, and more. For the problem to be tractable for the computer it must be possible for the computer to determine the resulting performance of the system, knowing all the design parameters. The computer will determine the performance characteristics by using the design parameters in a simulation of the system. The computed performance characteristics as a function of the design parameters is the *solution space* of the problem. In real life, the solu-

tion space can be as wildly variable as the line in Figure 1, and more so. A real solution space is apt to be very nonlinear—another way of saying that doubling the change in an input variable does not double the change in the output.

A typical approach using a genetic algorithm will mimic life by starting with a large *population* of trial solutions. Continuing to mimic life, the quality of the different solutions is evaluated, and higher quality solutions are given extended life and allowed to continue to the next generation of the solution population. The algorithm may mimic sexual reproduction by swapping parts of the genomes of the better solutions and introducing mutation by ratcheting some of the genome’s components up or down. This is possible, because in the computer the genome will be represented by sets of numbers that get swapped around and modified.

Let’s take a look at how well this method works. Adam Marczyk has summarized the whole issue of *Genetic Algorithms and Evolutionary Computation* in a Web article of the same name.<sup>2</sup> I will describe just two of his examples:

Edward Altshuler and Derek Linden used a genetic algorithm to design a circularly polarized, seven-segment antenna with hemispherical coverage. The resulting design is “unusually weird” and “counter-intuitive.” It has a nearly uniform radiation pattern, and it closely matched the design specification.<sup>3</sup>

Kumar Chellapilla and David Fogel used a genetic algorithm to develop checkers-playing neural networks. Using only six months of computer time, the algorithm produced a neural network that plays checkers at a rating of 2045.85. In one game the neural network defeated a player ranked 27 points below master level.<sup>4</sup>

Dembski is having none of this, of course. He argues all the intelligence exhibited by these computer programs has been “smuggled in” by their designers. In effect he is saying the designing programs were designed to win—to produce good designs. Their makers built the solution *in* by carefully describing what they wanted *out*.

If I were inclined to cut Dembski some slack here I would agree that these designer programs were designed to succeed. Once their designer wrote all the code, entered all the initial parameters, and typed the *run* command, the result was pre-ordained. Even though these programs simulate randomness by using pseudo random number generators, they are, in principle, completely predictable.

But that’s all the slack Dembski gets. Whether the computer programs provide (in principle) predictable results or not, their designers at the beginning cannot predict the results. They cannot rig the programs in advance to produce optimal designs. The programs follow the rules of life, and the results are the

same as is often the case in life: The successful candidates survive the winnowing process of, in this case, *unnatural* selection.

Dembski and the “intelligent design” creationists can attack from another front: “Life does not tell you to design an ideal antenna or a master checkers player. It only tells you to survive. It’s like a box of chocolates. You never know what you’re going to get.”<sup>5</sup> He might further elaborate: “Just because your genome is working (unintelligently) to survive and make copies of itself, that doesn’t explain why you have eyes.”

And it doesn’t. The best answer to that argument is that eyes are so useful—even essential—to survival, that not only do I have eyes, but other creatures have eyes of vastly different designs from my own.

Finally, Dembski and the other “intelligent design” creationists make a lot of noise about “intelligence” and “complexity.” I am not sure they or most other people involved in this argument have a correct grasp of these two terms. How can you tell “intelligence?” Is an Apollo spacecraft the result of intelligent activity? Is an anthill? The creationists seem to be looking for a master designer who exhibits human qualities and wants to do what people do. People design things for the same reason they rearrange furniture in a room. They want to make themselves more comfortable. They want to extend their existence. They want to survive.

Ouch! We’ve come full circle. “Intelligence,” if there is such a thing, is just a manifestation of the need to survive. It’s a product of evolution. A product of nature. A product of the chemistry of carbon-based molecules. Just like William Dembski.



## References

- 1 You can buy this book from Amazon. The link is at <http://www.ntskeptics.org/books/creationists.htm>.
- 2 <http://www.talkorigins.org/faqs/genalg/genalg.html>
- 3 Altshuler, Edward and Derek Linden. “Design of a wire antenna using a genetic algorithm.” *Journal of Electronic Defense*, vol.20, no.7, p.50-52 (July 1997).
- 4 Chellapilla, Kumar and David Fogel. “Evolving an expert checkers playing program without using human expertise.” *IEEE Transactions on Evolutionary Computation*, vol.5, no.4, p.422-428 (August 2001). Available online at <http://www.natural-selection.com/NSIPublicationsOnline.htm>.
- 5 See Not a Free Lunch But a Box of Chocolates, A critique of William Dembski’s book *No Free Lunch* by Richard Wein. <http://www.talkorigins.org/design/faqs/nfl/>

## Has science found God?

by Prasad Golla

Apparently not.

In April Victor Stenger came from Colorado to talk about his latest book, *Has Science Found God? The Latest Results in the Search for Purpose in the Universe*, (Prometheus Books, 373 pages, ISBN: 1591020182).

It’s good when a noted skeptical author comes to visit us. We tend to wind up with more than the usual crowd, and there is no way of knowing who will turn out. This time we had a fair number of walk-ins plus a full house of skeptics. We had to bring in extra chairs.



Autographs! Virginia Barnett snags one for her copy of Stenger’s book

Vic has been a physicist for about half a century, and he’s retired after teaching at the University of Hawaii. He is currently an adjunct professor of philosophy at the University of Colorado.

Vic uses his vast experience of teaching and researching “how things are” to address the pseudo scientific pursuit of “how things aren’t.”



Many questions awaited Stenger after the lecture

Unscrupulous and, by and large ignorant, people have suggested that science—especially modern science in the form of quantum physics—has validated many of their age old beliefs, including belief in the supernatural.

Since evidence for the paranormal is something skeptics have long sought—without a hint of success, I might add—we are eager to discuss the tension between science and the supernatural.

Vic's title slide contained the "case in point." The cover page of *Newsweek* magazine in bold letters proclaimed, "Science finds God," with the "church window mosaic" of astronomers peering through a telescope into the heavens and stick diagrams of molecules in the foreground.

As this popular magazine—which purportedly reports "true current events"—shows, the media are ever too ready to distort the findings of science and to perpetuate the myth that science has found evidence for people's beliefs.

Who better to repudiate these false claims than a physicist? In the New Age, when "quantum" is being attached to every weird belief and cult fad, a nuclear physicist who actually knows what *quantum* stands and who has worked on a team which demonstrated strong evidence that neutrinos have mass, should step up and point where we and the media have gone wrong.

As scientists peer into atoms and the far reaches of the universe, explaining the mechanics of how things work, it is significant to discover that there is no evidence for our paranormal or supernatural beliefs. In fact, there is counter evidence for such beliefs.

Furthermore, lack of positive evidence for the supernatural poses a problem for the belief in God, which is being fit into the ever narrowing gaps of our ignorance, gaps that science is constantly constricting.

The god that lives in that vanishing realm is called the God of the Gaps.

The laws of nature and the properties of the void show that the right question to ask is "why is there no thing rather than some thing." Additionally, the argument for design—as put forth by the Intelligent Design (ID) creationists—regarding the creation of the universe is flawed and has no basis in science.

Creationism mistakenly talks about how evolution incorporating natural selection violates the second law of thermodynamics, specifically with respect to entropy. The ID proponents have a wrong understanding of this principle, which Vic explained in terms of the "house and trash" analogy. In this scenario "trash" pertains to the mess natural processes make of the universe, the entropy of the second law of thermodynamics. The "house" represents the universe, which accumulates mess with every action of an irreversible process. ID creationists insist the house is getting messier and cannot support naturally occurring designs as magnificent as ourselves. In reality the house is getting larger and at a faster rate than the mess is being



Vic Stenger takes on creationism and intelligent design during his presentation

made. The result is we never run out of room to make additional mess and new designs. Please don't attempt this at home, however.

Vic talked about the problems of many epidemiological studies and much of the confusion that is associated with health

studies. Although these “statistically” based studies are called scientific studies, they lack the rigor or the high standards of other branches of science, such as particle physics. Epidemiological studies are often flawed, Vic emphasized, because they do not consider all parameters that effect a particular “phenomenon,” hence accepting results that have no statistical significance.

These studies often get published and hyped by the media, while the “file drawer effect”—the practice of discarding studies that do not produce a positive result—skews the public’s impression of the underlying facts.

Finally, Vic provided some major points from his book:

- No laws of physics were violated at the origin of our universe.
- No observations in science require the hypothesis of God or the supernatural.
- The laws and constants of nature are not intentionally fine tuned for the production of life by natural means.
- Biological complexity can be generated by solely natural processes.
- Even if a connection between religious behavior and health existed, there is likely a natural explanation.
- No experimental evidence exists that prayer or other supernatural healing method works.
- No experimental verification of paranormal powers of the mind has been found.
- Quantum mechanics does not provide support for the supernatural.

The presentation is available on Vic’s Web page (see the URLs below). He also maintains an e-mail list called *avoid-L*. The list consists of physicists, scientists, professors, and some interested parties and is exclusively for the discussion of science and skepticism. You may join the group by sending Vic an e-mail (He calls himself the *Fuhrer* of the list, which I take to mean he doesn’t suffer fools gladly. If you join the list, tread lightly and stay on topic.)

<http://www.colorado.edu/philosophy/vstenger/Found/Found.ppt>

<http://www.colorado.edu/philosophy/vstenger>



## What’s new

By Robert Park

*[Robert Park publishes the What’s New column at <http://www.aps.org/WN/>. Following are some clippings of interest.]*

### Placebo effect: use of alternative remedies continues to grow.

A new government survey of adult Americans found that 36 percent of us use some kind of “complementary or alternative” therapy. The number jumps to 62 percent when prayer is included. I find it surprising that the percentages are not higher; you make the list if you take vitamins, or meditate, or get a massage, or go on some fad diet. Echinacea turns out to be the most popular herbal supplement, although studies stubbornly refuse to uncover any benefit. Wisdom has it that echinacea wards off colds, but when adults taking echinacea three times a day inhaled a strain of common cold virus, ninety percent came down with a cold.

### Homeopathy: demonstrators in Belgium resort to mass suicide.

A Special Report in the current issue of *Skeptical Inquirer* looks into the ultimate protest by a group of skeptics. They objected to a decision by the major health insurance companies in Belgium to begin covering the costs of homeopathy in response to popular demand. Depressed by the willingness of the insurance companies to encourage quackery, the 23 skeptics resigned themselves to committing mass suicide by drinking a cocktail of lethal poisons including arsenic, snake venom and deadly nightshade. To the horror of the homeopaths, they even increased the potency in true homeopathic fashion by preparing a 30C solution of the cocktail. That means the cocktail was diluted one part per hundred and shaken, which was then repeated sequentially, 30 times. All newspapers and TV stations were invited to watch the death agonies of the 23 deranged suicides, who included a number of prominent citizens and professors of medicine, “and a few normal people armed only with common sense.” The media coverage was excellent, but the suicide attempt was a failure.

### Open-access journals: does anyone care who pays the bills?

“*Evidence-based Complementary and Alternative Medicine* (eCAM) is a new international journal that seeks to encourage rigorous research in this new, yet ancient world of complementary and alternative medicine...particularly traditional Asian healing systems.” So begins an Oxford University Press announcement <http://www.oup.co.uk/jnls/list/ecam/>. All eCAM

## Skeptic Ink

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papers are available online at no cost and without subscription. Unlike other open-access journals there are no author submission fees. Who pays, skeptics might ask? The “generous support of Ishikawa Natural Medicinal Products Research Center, co-owner of the journal with OUP.” Yes, it’s the ancient-wisdom scam. You are asked to believe that before it was known that blood circulates or germs cause disease there were these miraculous cures. If you can live with a little superstition, you can save a couple of bucks on page charges. They may be on to something big here. Other industries might be equally generous. Perhaps the Journal of Gambling Studies, which deals with gambling addiction, could cut a deal with the slot-machine industry. And perhaps Join Together Online, which opposes gun violence, could team up with the National Rifle Association. On the other hand, maybe not.

### Dietary supplements: Consumer Reports lists the “dirty dozen.”

A cover story in the May issue of *Consumer Reports* identifies 12 supplements that should be banned, increasing pressure to amend or repeal the obscene 1994 Dietary Supplement and Health Education Act (WN 02 Jan 04).

Bob Park can be reached via email at [opa@aps.org](mailto:opa@aps.org)

## Web news

*The World Wide Web is a great source of skeptical news. Here are some clippings:*

### Zambia: Traditional Healers Called in to Treat HIV/Aids

<http://www.ntskeptics.org/news/news2004-05-21.htm#zambia>

<http://allafrica.com/stories/200405200322.html>

*From UN Integrated Regional Information Networks*

With less than two percent of HIV-infected Zambians able to access antiretrovirals, plans were announced on Tuesday to begin testing traditional medicines as an alternative treatment for the pandemic.

Dr Patrick Chikusu, head of the department of pharmacy at the University of Zambia (UNZA), and chairman of the National Aids Council (NAC) Technical Working Group on Traditional and Alternative Remedies, said orthodox medicines on their own had failed to contain the rising number of HIV/AIDS deaths, and it was time alternative medicines were tested for their efficacy in treating the disease.

The announcement ended many years of debate and speculation in Zambia as to whether modern and traditional medicines could be combined in the fight against the pandemic.

### Crazy For Kabbalah

<http://www.ntskeptics.org/news/news2004-05-21.htm#kabbalah>

<http://www.nypost.com/entertainment/24275.htm>

By COREY LEVITAN

May 18, 2004 — LOS ANGELES - CRITICS can't hurt Scientology, Hollywood's leading independent religion. They've been trying for decades. But competition might. Compared to the celebrities who've been hawking Scientology since the '80s - Tom Cruise, John Travolta and Kirstie Alley - the recent converts to kabbalah study pack far brighter stardom: Ashton & Demi, Madonna and even Britney Spears.

“Positive energy” kabbalah water is the draw at “this one-story former youth center that combines Spanish missionary architecture with Taco Bell.” Kabbalah water claims to cure cancer and is only \$3 per 1.5 liters. Sure beats chemo at twice the price. □

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