Intelligent Design and Evolution Awareness Center

FAQ:
What Sort of Progress has ID made recently?

The Short Answer: ID has made much progress in its < 10 year existence. This includes refining the methods through which we can detect design, to finding a number of examples of design in biology. Design has also expanded to look for design in the fields of paleontology, systematics, cosmology, and the origin of life. William Dembski identifies 12 areas of intelligent design progress(note that some of these are philosophical contributions): 1) design detection, 2) biological information, 3) evolvability, 4) evolutionary computation, 5) technological evolution, 6) irreducible complexity in biology, 7) natural vs. artificial design in bioterrorism, 8) Steganography and biosteganography, 9) cosmic design, 10) SETI, 11) philosophy of mind, and 12) autonomy vs. guidance.

The Long Answer:
ID has been around for a little less than 10 years. Though funding has scared, much of its work has centered around honing the theoretical mechanisms for detecting design. This was basically settled through William Dembski's *The Design Inference* (1998).

In 2001, William Dembski founded the International Society for Complexity, Information, and Design (ISCID.org) to research ID. ID had made progress in studying specified complexity, and understanding problems with the evolution of irreducible complexity.

Much work has been done on proteins and their inability to accommodate change. Protein structures exhibit highly specific and highly improbable sequences. Functioning proteins are bordered by large gaps of non-functionality in response to small changes in their sequences. This ongoing work is a massive monkey wrench in the machinations of Darwinism.

It should be remembered that much work thus far in ID isn't "new"--Behe's *Darwin's Black Box* and Wells' *Icons of Evolution* both look at existing knowledge and simply proclaim that Darwinian modes of explanation are bankrupt. Although it isn't "new research" it is hugely significant in setting the stage for motivations to go in a new direction.

Rigorous formulations of how specified complex information theory can be applied to the biological realm are currently underway by some of the major proponents of design. As are applications for the origins of life, the origin of the animal phyla, and the origin of major groups (i.e. in the field of paleontology), and the origin of humans (paleoanthroplogy). Additionally, some work has been done studying function for junk-DNA and testing for re-usage of parts in unrelated organisms (systematics).

William Dembski identifies the following areas of progress in ID research at "Three Frequently Asked Questions about Intelligent Design"
(at "http://www.designinference.com/documents/2003.09.ID_FAQ.pdf"):

- Methods of Design Detection. Methods of design detection are widely employed in various special sciences (e.g., archeology, cryptography, and the Search for Extraterrestrial Intelligence or SETI). Design theorists investigate the scope and validity of such methods.
- Biological Information. What is the nature of biological information? How do function and fitness relate to it? What are the obstacles that face material mechanisms in attempting to generate biological information? What are the theoretical and empirical

grounds for thinking that intelligence is indispensable to the origin of biological information?

• Evolvability. Evolutionary biology's preferred research strategy consists in taking distinct biological systems and finding similarities that might be the result of a common evolutionary ancestor. Intelligent design, by contrast, focuses on a different strategy, namely, taking individual biological systems and perturbing them (both intelligently and randomly) to see how much the systems can evolve. Within this latter research strategy, limitations on evolvability by material mechanisms constitute indirect confirmation of design.

• Evolutionary Computation. Organisms employ evolutionary computation to solve many of the tasks of living (cf. the immune system in vertebrates). But does this show that organisms originate through some form of evolutionary computation (as through a Darwinian evolutionary process)? Are GPGAs (General Purpose Genetic Algorithms) like the immune system designed or the result of evolutionary computation? Need these be mutually exclusive? Evolutionary computation occurs in the behavioral repertoire of organisms but is also used to account for the origination of certain features of organisms. Design theorists explore the relationship between these two types of evolutionary computation as well as any design intrinsic to them. One aspect of this research is writing and running computer simulations that investigate the scope and limits of evolutionary computation. See the work of William Dembski and Robert Marks's Evolutionary Informatics Lab (www.evoinfo.org).

• Technological Evolution (TRIZ). The only well-documented example we have of the evolution of complex multipart integrated functional systems (as we see in biology) is the technological evolution of human inventions. In the second half of the twentieth century, Russian scientists and engineers studied hundreds of thousands of patents to determine how technologies evolve. They codified their findings in a theory to which they gave the acronym TRIZ, which in English translates to Theory of Inventive Problem Solving (see Semyon 3 Savransky, Engineering of Creativity: Introduction to TRIZ Methodology of Inventive Problem Solving, CRC Publishers, 2000). The picture of technological evolution that emerges out of TRIZ parallels remarkably the history of life as we see it in the fossil record and includes the following: (1) New technologies (cf. major groups like phyla and classes) emerge suddenly as solutions to inventive problems. Such solutions require major conceptual leaps (i.e., design). As soon as a useful new technology is developed, it is applied immediately and as widely as possible (cf. convergent evolution). (2) Existing technologies (cf. species and genera) can, by contrast, be modified by trial-anderror tinkering (cf. Darwinian evolution), which amounts to solving routine problems rather than inventive problems. (The distinction between routine and inventive problems is central to TRIZ. In biology, irreducible complexity suggests one way of making the analytic cut between these types of problems. Are there other ways?) (3) Technologies approach ideality (cf. local optimization by means of natural selection) and thereafter tend not change (cf. stasis). (4) New technologies, by supplanting old technologies, can upset the ideality and stasis of the old technologies, thus forcing them to evolve in new directions (requiring the solution of new inventive problems, as in an arms race) or by driving them to extinction. Mapping TRIZ onto biological evolution provides a especially promising avenue of design theoretic research.

• Strong Irreducible Complexity of Molecular Machines and Metabolic Pathways. For certain enzymes (which are themselves highly complicated molecular structures) and metabolic pathways (i.e., systems of enzymes where one enzyme passes off its product to the next, as in a production line), simplification leads not to different functions but to the complete absence of all function. Systems with this feature exhibit a strengthened form of irreducible complexity. Strong irreducible complexity, as it may be called, entails that no Darwinian account can in principle be given for the emergence of such systems. Theodosius Dobzhansky, one of the founders of the neo-Darwinian synthesis, once remarked that to talk about prebiotic natural selection is a contradiction in terms—the idea being that selection could only select for things that are already functional. Research on strong irreducible complexity finds and analyzes biological systems that cannot in principle be grist for natural selection's mill. For this research, which is only now beginning, to be completely successful would imply the unraveling of molecular Darwinism.

• Natural and Artificial Biological Design (Bioterrorist Genetic Engineering). We are on the cusp of a bioengineering revolution whose fallout is likely to include bioterrorism. Thus we can expect to see bioterror forensics emerge as a practical scientific discipline. How will such forensic experts distinguish the terrorists' biological designs from naturally occurring biological designs?

• Design of the Environment and Ecological Fine-Tuning. The idea that ecosystems are fine-tuned to support a harmonious balance of plant and animal life is old. How does this balance come about. Is it the result of blind Darwinian forces competing with one another and leading to a stable equilibrium? Or is there design built into such ecosystems? Can such ecosystems be improved through conscious design or is "monkeying" with such systems invariably counterproductive? Design-theoretic research promises to become a significant factor in scientific debates over the environment.

• Steganographic Layering of Biological Information. Steganography belongs to the field of digital data embedding technologies (DDET), which also include information hiding, steganalysis, watermarking, embedded data extraction, and digital data forensics. 4 Steganography seeks efficient (high data rate) and robust (insensitive to common distortions) algorithms that can embed a high volume of hidden message bits within a cover message (typically imagery, video, or audio) without their presence being detected. Conversely, steganalysis seeks statistical tests that will detect the presence of steganography in a cover message. Key research question: To what degree do biological systems incorporate steganography, and if so, is biosteganography demonstrably designed?

• Cosmological Fine-Tuning and Anthropic Coincidences. Although this is a well worn area of study, there are some new developments here. Guillermo Gonzalez, assistant professor of physics and astronomy at Iowa State University, and Jay Richards, a senior fellow with Seattle's Discovery Institute, have a forthcoming book titled The Privileged Planet (along with a video based on the book) in which they make a case for planet earth as intelligently designed not only for life but also for scientific discovery. In other words, they argue that our world is designed to facilitate the scientific discovery of its own design. Aspects of Gonzalez's work in this area have been featured on the cover story of the October 2001 Scientific American.

• Astrobiology, SETI, and the Search for a General Biology. What might life on other planets look like? Is it realistic to think that there is life, and even conscious life, on other planets? What are the defining features that any material system must possess to be alive? How simple can a material system be and still be alive (John von Neumann posed this question over half a century ago in the context of cellular automata)? Insofar as such systemsdisplay intelligent behavior, must that intelligence be derived entirely from its material constitution or can it transcend yet nevertheless guide its behavior (cf. the mechanism vs. vitalism debate)? Is there a testable way to decide this last question? How, if at all, does quantum mechanics challenge a purely mechanistic conception of life? Design theorists are starting to investigate these questions.

• Consciousness, Free Will, and Mind-Brain Studies. Is conscious will an illusion—we think that we have acted freely and deliberately toward some end, but in fact our brain acted on its own and then deceived us into thinking that we acted deliberately. This is the majority position in the cognitive neuroscience community, and a recent book makes just that claim in its title: The Illusion of Conscious Will by Harvard psychologist Daniel Wegner. But there is now growing evidence that consciousness is not reducible to material processes of the brain and that free will is in fact real. Jeffrey Schwartz at UCLA along with quantum physicist Henry Stapp at the Lawrence Berkeley National Laboratory are two of the key researchers presently providing experimental and theoretical support for the irreducibility of mind to brain (see Schwartz's book The Mind and the Brain: Neuroplasticity and the Power of Mental Force).

• Autonomy vs. Guidance. Many scientists worry that intelligent design attempts to usurp nature's autonomy. But that is not the case. Intelligent design is attempting to restore a proper balance between nature's autonomy and teleologic guidance. Prior to the rise of modern science all the emphasis was on teleologic guidance (typically in the form of divine design). Now the pendulum has swung to the opposite extreme, and all the emphasis is on nature's autonomy (an absolute autonomy that excludes design). Where is the point of balance that properly respects both, and in which design becomes empirically evident? The search for that balance-point underlies all design-theoretic research. It's not all design or all nature but a synergy of the two. Unpacking that synergy is the intelligent design research program in a nutshell.