

The Scientific Case for Intelligent Design

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Center for Science & Culture
www.discovery.org/csc

How do we explain things in ordinary life?

- Necessity
- Chance
- Design

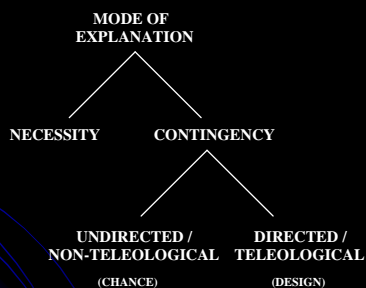
Example: You just won the lottery

- You were the only lottery player
- The lottery was fairly conducted and there were other players
- The lottery was rigged in your favor

Other Names for the Three Modes of Explanation

- Necessity: *law, regularity, natural law*
- Chance: *randomness, noise, accident*
- Design: *intelligence, purpose, agency*

Anatomy of Explanation



The Design Industries

- Intellectual property law:
 - Copyrights
 - Patents
 - Plagiarism
- Forensic science
- Detective work
- Insurance investigation
- Random number generation

The Design Industries (con'd)

- Cryptography
- Special sciences:
 - Archeology
 - Anthropology
 - Search for Extra-Terrestrial Intelligence (SETI)
 - Computer science (AI, Turing Test)
- Data falsification in science

What Is Intelligent Design?

Intelligent design is the study of patterns in nature that are best explained as the product of intelligence.

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Intelligent design is the study of **patterns** in nature that are best explained as the product of intelligence.

Pattern best explained by intelligence?



Pattern best explained by intelligence?



Pattern best explained by intelligence?



Is Intelligent Design Creationism?



What Is Intelligent Design?

Intelligent design is the study of **patterns** in nature that are best explained as the product of intelligence.

What Is Intelligent Design?

Intelligent design is the study of **information** in nature that is best explained as the product of intelligence.

Intelligent design is therefore ...

- * a theory of information
- * fully a part of science

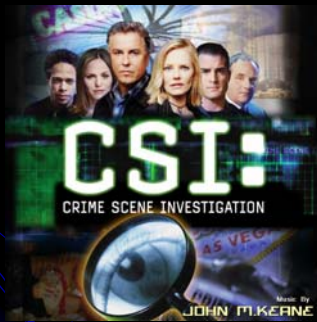
Intelligent design is therefore ...

- * a theory of information
- * **fully a part of science**

Example 1: Forensic Science



Example 1: Forensic Science



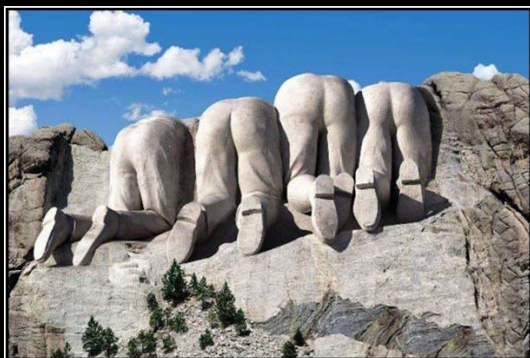
Example 2: SETI



Example 3: Archeology



Example 3: Archeology



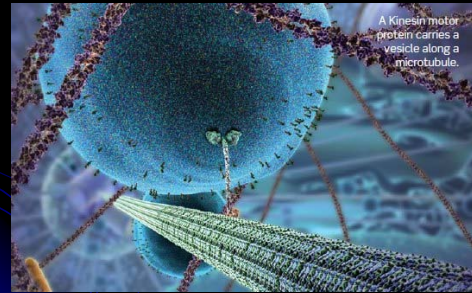
MT. RUSHMORE
The backside



Example 4: Cosmology



Example 5: Biology



But Is Design in Biology Real?

- “Biology is the study of complicated things that give the appearance of having been designed for a purpose.”
—Richard Dawkins
- “Biologists must constantly keep in mind that what they see was not designed, but rather evolved.”
—Francis Crick

But Is Design in Biology Real?

“The illusion of purpose is so powerful that biologists themselves use the assumption of good design as a working tool.”

—Richard Dawkins (ROOE, 1995, p. 98)

But Is Design in Biology Real?

Molecular biologists have themselves needed to introduce the language of high-tech engineering to describe the systems they are seeing:

- information storage, retrieval, and processing (genetic code)
- signal transduction circuitry
- high-efficiency nano-engineered motors
- automated parcel addressing (UPS labels / zip codes)
- transportation, distribution, and communication systems
- complex monitoring, error correction, and feedback mechanisms
- self-replicating robotic manufacture

But Is Design in Biology Real?

“Apart from differences in jargon, the pages of a molecular-biology journal might be interchanged with those of a computer-engineering journal.”

—Richard Dawkins (ROOE, 1995, p. 17)

The Mathematical Theory of Communication -- 1949

The Mathematical Theory of Communication

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    graph LR
      IS[INFORMATION SOURCE] -- MESSAGE --> T[TRANSMITTER]
      T -- SIGNAL --> RS[RECEIVED SIGNAL]
      NS[NOISE SOURCE] --> RS
      RS -- MESSAGE --> D[DESTINATION]
  
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Fig. 1. — Schematic diagram of a general communication system.

The Structure of DNA – 1953

James Watson & Francis Crick

“General Nature of the Genetic Code for Proteins” -- 1961

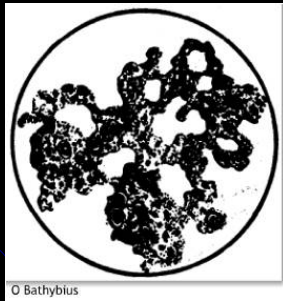
First Position	Second Position				Third Position
	U	C	A	G	
U	UUU phe UUC phe UUA leu UUG leu	UCU ser UCC ser UCA ser UCG ser	UAU tyr UAC tyr UAA STOP UAG STOP	UGU cys UGC cys UGA STOP UGG trp	
C	CUU leu CUC leu CUA leu CUG leu	CCU pro CCC pro CCA pro CCG pro	CAU his CAC his CAA gln CAG gln	CGU arg CGC arg CGA arg CGG arg	
A	AUU ile AUC ile AUA ile AUG met	ACU thr ACC thr ACA thr ACG thr	AUU asn AAC asn AAA lys AAG lys	AAG ser AGA ser AGU arg AGC arg	
G	GUU val GUC val GUA val GUG val	GCU ala GCC ala GCA ala GCG ala	GAU asp GAC asp GAA asp GAG asp	GGU gly GGC gly GGA gly GGG gly	

THE GENETIC CODE

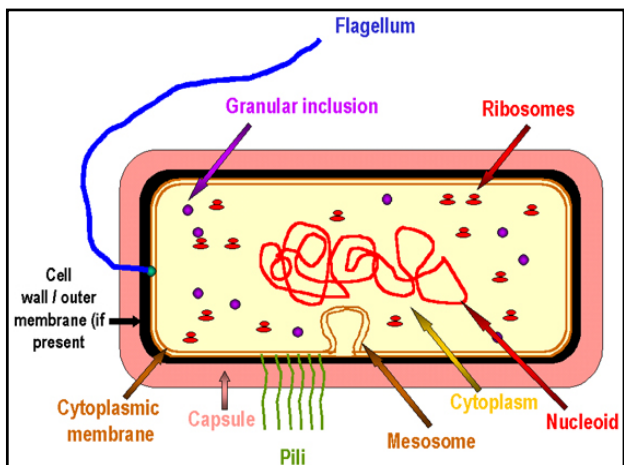
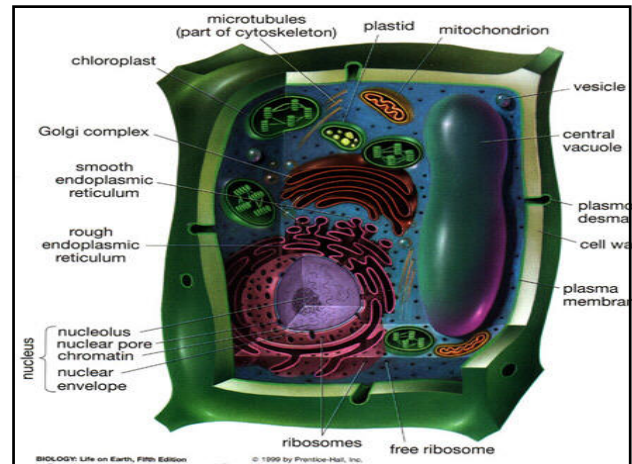
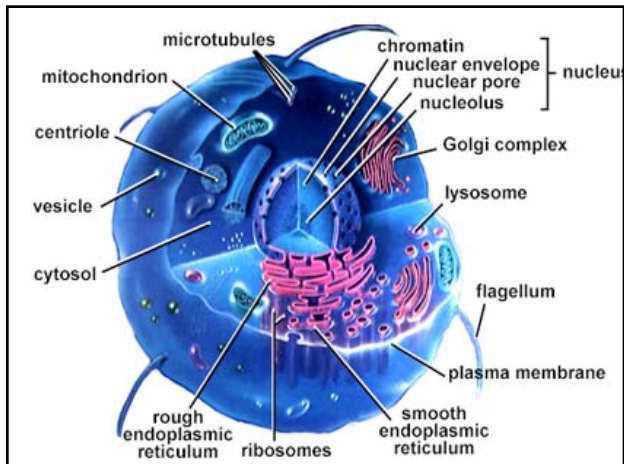
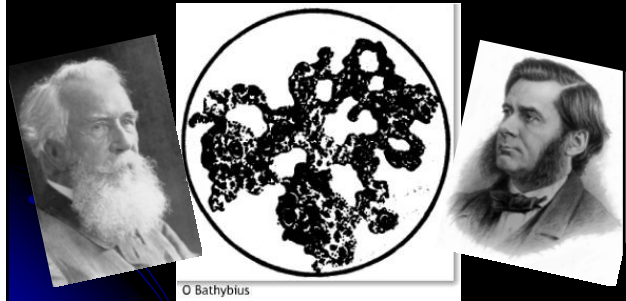
DNA (Gene) → **mRNA** (Gene message) → **Protein** (Gene product)

The Cell in Darwin's Day

The Proto-Cell in Darwin's Day



Bathybius haeckelii



Cell Phone vs. Laptop Computer



The Collapse of Darwinian Explanations

There are presently no detailed Darwinian accounts of the evolution of any biochemical or cellular system, only a variety of wishful speculations.

– Franklin Harold
The Way of the Cell
(OxfordUP 2001)

The Collapse of Darwinian Explanations

There are no detailed Darwinian accounts for the evolution of any fundamental biochemical or cellular system, only a variety of wishful speculations. It is remarkable that Darwinism is accepted as a satisfactory explanation for such a vast subject — evolution — with so little rigorous examination of how well its basic theses work in illuminating specific instances of biological adaptation or diversity.

– James Shapiro, 1996
Review of *DBB*

The Collapse of Darwinian Explanations

There are, I am assured, evolutionists who have described how the transitions in question could have occurred. When I ask in which books I can find these discussions, however, I either get no answer or else some titles that, upon examination, do not in fact contain the promised accounts. That such accounts exist seems to be something that is widely known, but I have yet to encounter someone who knows where they exist.

– David Griffin, 2000

The Collapse of Darwinian Explanations

Anyone who tells you that he or she knows how life started on the earth some 3.45 billion years ago is a fool or a knave. Nobody knows.

– Stuart Kauffman, 1995

The Collapse of Darwinian Explanations

Anybody who thinks they know the solution to this problem of the origin of life is deluded.

– Leslie Orgel, 2004

The Collapse of Darwinian Explanations

No serious scientist would currently claim that a naturalistic explanation for the origin of life is at hand.

– Francis Collins, 2006



The Failed Challenge of Biological Evolution to Intelligent Design

Premise 1: If unguided evolutionary mechanisms adequately explain biological complexity and diversity, then intelligent design is unnecessary.

~~Premise 2: Unguided evolutionary mechanisms adequately explain biology complexity and diversity.~~

~~Conclusion: Therefore, intelligent design is unnecessary.~~

The Received Wisdom

By attributing the diversity of life to **natural causes** rather than to **supernatural creation**, Darwin gave biology a **sound scientific basis**.

— Campbell's BIOLOGY, 5th ed.

The Received Wisdom

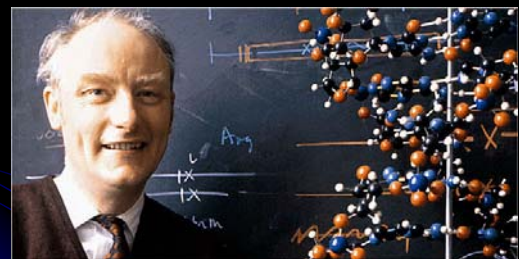
He [Darwin] dismissed it [design] not because it was an incorrect scientific explanation, but because it was **not a proper scientific explanation** at all.

— David Hull

The Received Wisdom

Intelligent design is not science because it **cannot be science**.

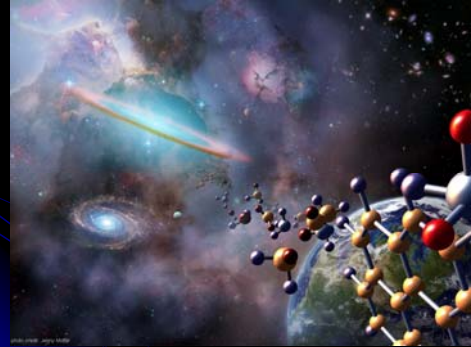
Design Theorist?



Directed Panspermia



Panspermia



Directed Panspermia

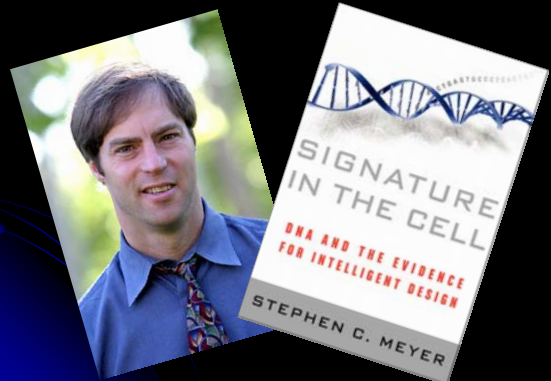


Directed Panspermia



Directed Panspermia

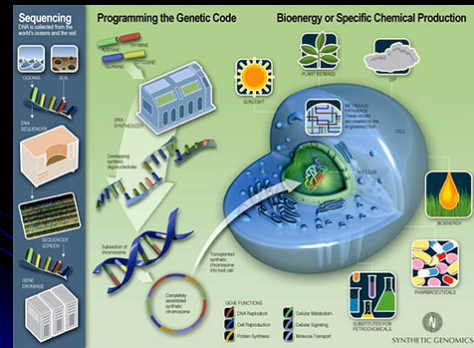
Signature in the Cell



Craig Venter



Venter's Synthetic Genomics



Venter's DNA "Watermarks"

The five coded messages embedded in the first synthetic genome :

VENTERINSTITVTE
CRAIGVENTER
HAMSMITH
CINDIANDCLYDE
GLASSANDCLYDE

—Wired, 28Jan08

Darwin's Worry

Several eminent naturalists have of late published their belief that a multitude of reputed species in each genus are not real species; but that other species are real, that is, have been independently created. . . . Nevertheless they do not pretend that they can define, or even conjecture, which are the created forms of life, and which are those produced by secondary laws. They admit variation as a *vera causa* in one case, they arbitrarily reject it in another, without assigning any distinction in the two cases.

—Charles Darwin
Origin of Species

How Do We Detect Design?

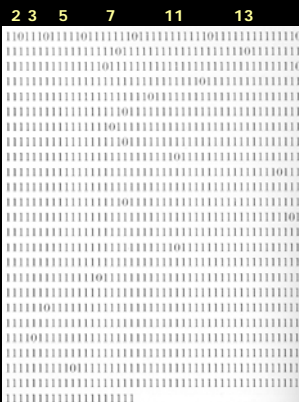
SETI: The Search for Extraterrestrial Intelligence





What persuaded the scientists that they had found an extra-terrestrial intelligence?

The detection of a highly improbable or complex specified event!



A Criterion for Detecting Design

What should we be looking for?

- Contingency (essential for choice)
- Complexity (improbability)
- Specification (independent pattern)

Why Contingency?

Intelligence presupposes being able to choose between live competing options.

Connection between Complexity and Probability



Why Probability?

Unless we discipline how we attribute chance, we can explain anything.

This Is Spinal Tap



Dumb and Dumber



"Lucking out" is not a scientific explanation!

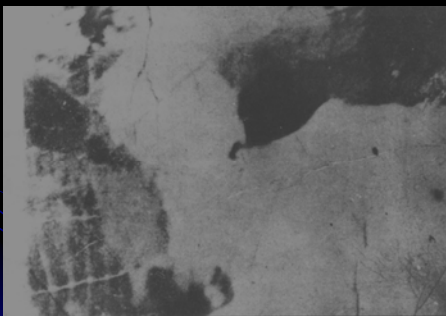
"We can accept a certain amount of luck in our [scientific] explanations, but not too much."

—Richard Dawkins (TBW, 1987, p. 139)

Why a Pattern?

Just about anything that happens is highly improbable/complex. Thus to ensure that something didn't just happen by chance, it must conform to a pattern.

What Do You See?



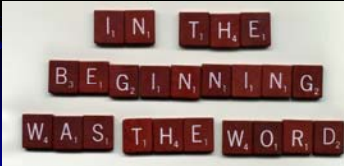
Why a Specification?

*The patterns we use to identify design must be **objectively given** – we need to make sure that we're not just reading the pattern into what we're seeing.*



Signs of Design?

Complex but not specified



Both complex and specified

Seeing What We Want to See?

“Perceiving the world as well designed and thus the product of a designer ... may be the product of a brain adapted to finding patterns in nature. We are pattern-seeking as well as pattern-finding animals. ... Finding patterns in nature may have an evolutionary explanation: There is a survival payoff for finding order instead of chaos in the world....”

— Michael Shermer
WDM, 2006

Seeing What We Want to See?

“We are the descendants of the most successful pattern-seeking members of our species. In other words, we were designed by evolution to perceive design.”

— Michael Shermer
WDM, 2006

Problem with Shermer's Criticism

Sometimes the patterns we see are just patterns we want to see. Sometimes they are objectively given. How can we tell the difference? Even Shermer admits that not all patterns are ones we make up. So there has to be some way to distinguish legitimate patterns (specifications) from illegitimate patterns (fabrications).

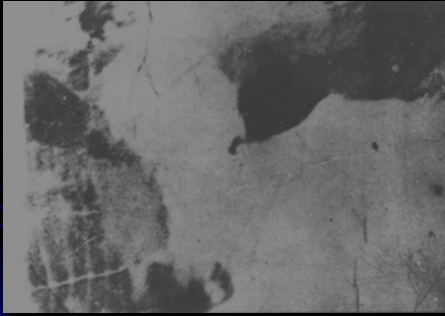
Seeing What We Want to See?



Seeing What We Want to See?



What Do You See?



Why a Specification?

Although we need a pattern to identify design, we also need to make sure that that we're not just reading the pattern into what we're seeing.

Specifications as Statistical Rejection Regions



Fisher's Approach to Significance Testing

- Identify a null hypothesis H and a significance level α .
- Use a test statistic to identify a rejection region R such that $P(R|H) < \alpha$.
- Take a sample E and determine whether it falls within the rejection region R .
- If so, reject H as responsible for E .

Design Inferential Generalization of Fisher's Approach

- Let probabilistic resources relevant to R and E determine the significance level α .
- Generalize the rejection regions by which chance is eliminated
- Sweep the field clear of all relevant chance hypotheses.

The Case of Cryptography

Encrypted Text

nfuijolt ju jt mjlf b xfbtfm

Decrypted Text

methinks it is like a weasel

Is It Random?

```
THTTTHTHTHTTTTTHTHTTHHHTT
HTHHHTHHHTTTTTTTHTTTHTTTHH
THTTTHTHTHTHTTHHHHTTTHTTTHH
THTHTHHHHTTTHHTHHHHHTHHHHHTT
```

Is It Random? (con'd)

```
0100011011000001010011100
10111011110000000100100011
0100010101100111100010011
0101011110011011110111100
```

Is It Random? (con'd)

```
0100011011000001010011100
1011101110000000100100011
0100010101100111100010011
0101011110011011110111100
```

No, It's Not

0	010	0010	1010
1	011	0011	1011
00	100	0100	1100
01	101	0101	1101
10	110	0110	1110
11	111	0111	1111
000	0000	1000	00
001	0001	1001	

Prime Numbers: 2, 3, 5, 7, 11, ..., 101

```
110111011111011111110111111
111110111111111111011111111
111111111101111111111111111
111011111111111111111111111
011111111111111111111111111
111011111111111111111111111
111111110111111111111111111
111111111111111111110 ...
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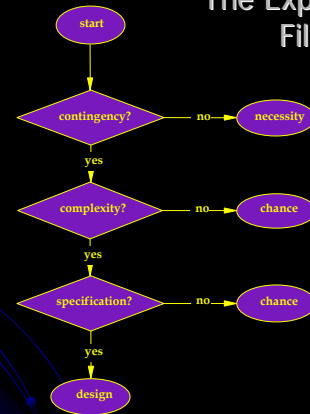
Prime Numbers: 2, 3, 5, 7, 11, ..., 101

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11011101111110111111110111111
111110111111111111011111111
111111111101111111111111111
111011111111111111111111111
011111111111111111111111111
111011111111111111111111111
111111110111111111111111111
111111111111111111110 ...
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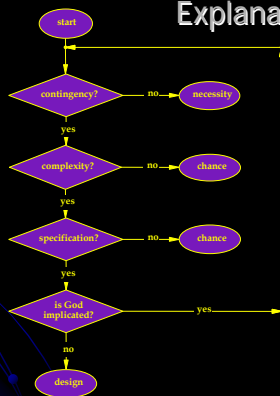

"2, 3, 5"

110111011111

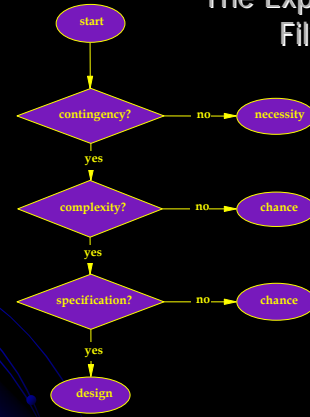
The Explanatory Filter



The Naturalized Explanatory Filter



The Explanatory Filter



Status of the Design Inference

Dembski's attempt to quantify design, or provide mathematical criteria for design, is extremely useful. I'm concerned that the suspicion of a hidden agenda is going to prevent that sort of work from receiving the recognition it deserves. Strictly speaking, you see, science should be judged purely on the science and not on the scientist.

– Paul Davies (2003)
interview

Status of the Design Inference

To explain the generation of the ancestral proteins ... by the natural unfolding of chemical processes, one would have to assume either that almost any random combination of amino acids will produce a collection of proteins adequate to make a viable cell or that the molecular specificity of the processes involved was such as to almost obligatorily produce the right mixture. [Because both are ruled out], it is claimed, there must have been something else. Such is the conclusion arrived at in a solidly argued book by the American mathematician William Dembski significantly titled *The Design Inference*.

– Christian de Duve (2002)
Life Evolving

Status of the Design Inference

[con'd] There is good reason for believing that the first sequences were much shorter than today's and that nascent life has reached its present position in the sequence space by a gradual pathway, each stage of which, honed by natural selection, allowed extensive exploration of the available sequence space. intervention by a directing intelligence is not mandatory.

– Christian de Duve (2002)
Life Evolving

Bill Wimsatt in 1998

"Dembski has written a sparkingly original book. Not since David Hume's *Dialogues Concerning Natural Religion* has someone taken such a close look at the design argument, but it is done now in a much broader post-Darwinian context. Now we proceed with modern characterizations of probability and complexity, and the results bear fundamentally on notions of randomness and on strategies for dealing with the explanation of radically improbable events...

Bill Wimsatt in 1998

...We almost forget that design arguments are implicit in criminal arguments 'beyond a reasonable doubt,' plagiarism, phylogenetic inference, cryptography, and a host of other modern contexts. Dembski's analysis of randomness is the most sophisticated to be found in the literature, and his discussions are an important contribution to the theory of explanation, and a timely discussion of a neglected and unanticipatedly important topic."

Bill Wimsatt in 2007

"Sarkar's scientific expositions and dissections of Dembski's specious arguments and Behe's lack of imagination are clear, surgical, and authoritative. For those who would fear a return to the Middle Ages, this is the best critique of ID now available."

[Blurb to Sahotra Sarkar's *Doubting Darwin? Creationist Designs on Evolution.*]

Email from David Raup to Bill Wimsatt and to W. Dembski, dated 12.19.07

"I think Bill Wimsatt is completely out of line to use such invective and has thereby fallen into the disgusting mode of ID-bashing as it is practiced by conforming evolutionary biologists (and even philosophers) everywhere. [Sorry, Bill, I guess I am resorting to invective also but your language makes me mad!]"

What does the filter identify?

Specified Complexity

Dawning recognition that specified complexity is where it's at!

"Living organisms are distinguished by their **specified complexity**. Crystals such as granite fail to qualify as living because they lack complexity; mixtures of random polymers fail to qualify because they lack specificity."

—Leslie Orgel, 1973

Dawning recognition that specified complexity is where it's at!

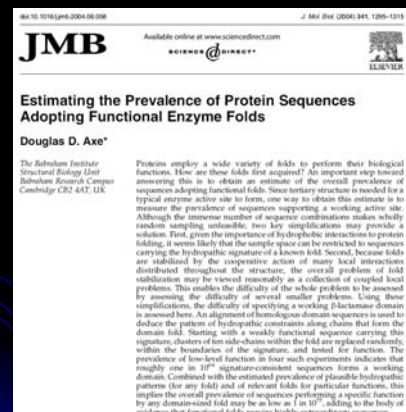
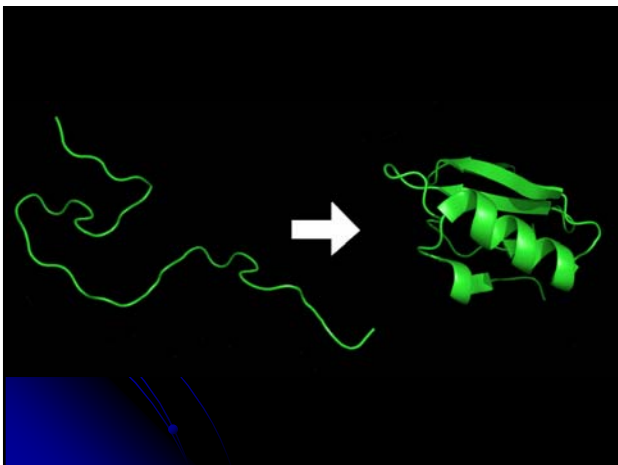
"Before the **specified complexity** of living systems began to be appreciated, it was thought that, given enough time, 'chance' would explain the origin of living systems."

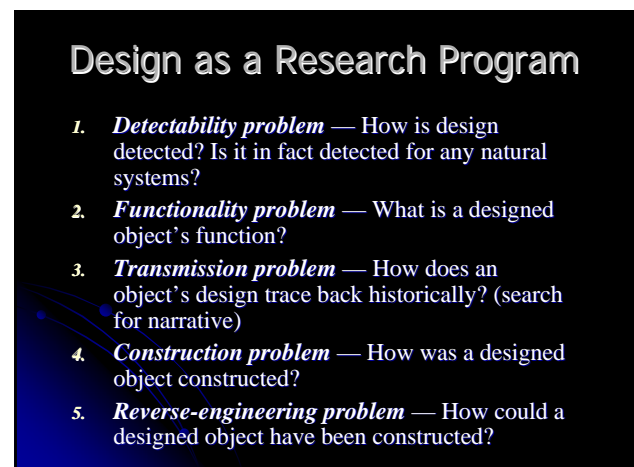
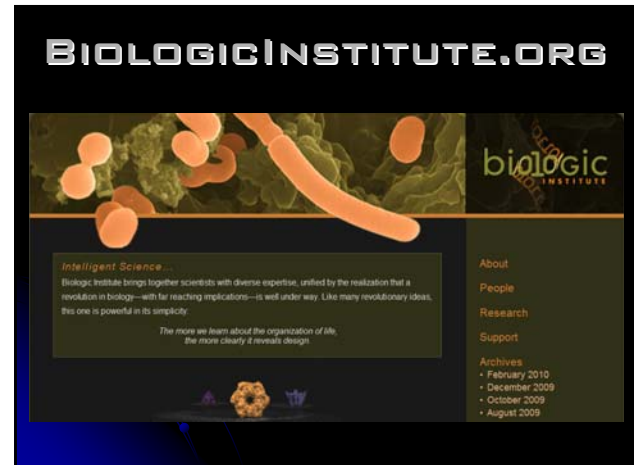
—Charles Thaxton et al., 1984

Dawning recognition that specified complexity is where it's at!

"Living organisms are mysterious not for their complexity *per se*, but for their tightly **specified complexity**."

—Paul Davies, 1999





Design as a Research Program

6. *Perturbation problem* — How has the original design been modified and what factors have modified it?
7. *Separation of causes problem* — How does one tease apart the effects of intelligent and natural causes? (Cf. a rusted old Cadillac)
8. *Restoration problem* — Once perturbed, how can the original design be recovered?
9. *Constraints problem* — What are the constraints within which a designed object functions well and outside of which it breaks?
10. *Optimality problem* — In what way is the design optimal?

Not Global Optimization but *Constrained* Optimization

"All design involves conflicting objectives and hence compromise, and the best designs will always be those that come up with the best compromise."

—Henry Petroski, 1995

Design as a Research Program

11. *Ethical problem* — Is the design morally right?
12. *Aesthetic problem* — Is the design beautiful?
13. *Intentionality problem* — What was the intention of the designer?
14. *Identity problem* — Who is the designer?