AN EXAMINATION OF ANTI-CREATIONISM ARGUMENTS IN THE PERSPECTIVE OF HYPOTHESIS TESTING

Chong Ho Yu, Ph.D., D. Phil
Azusa Pacific University

February 2015

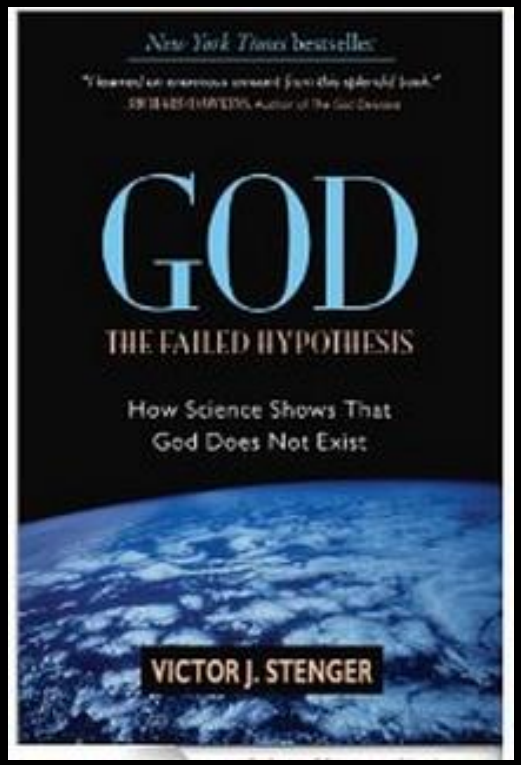
Presented at Southern California Christian in Science Conference, Azusa, CA

Clarification of terminology

- Creationism: does NOT mean Young earth theory or scientific creationism.
- Creationism: does NOT mean Intelligent Design (ID).
- A more generic way: The universe is created by a Creator (open to "How? When?")
- Anti-creationism: the claim that the above is false.

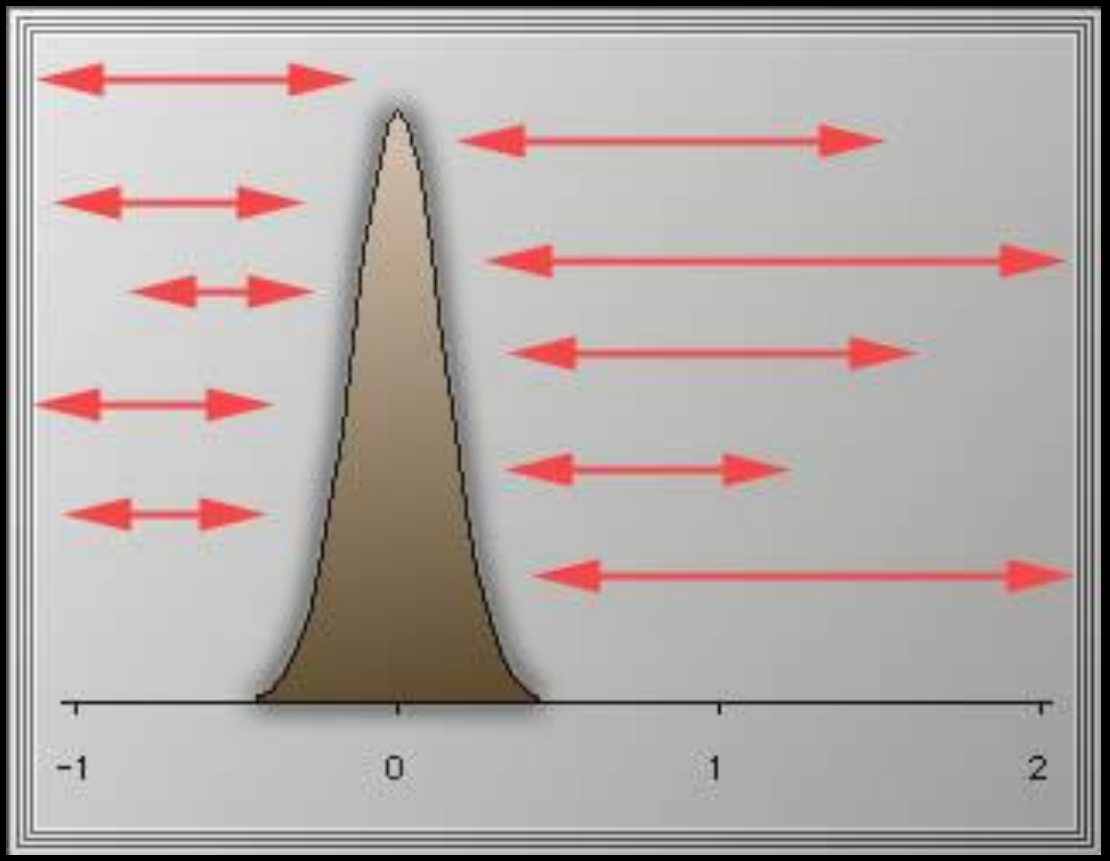
Classical scientific methodology

- Classical scientific method has been used to "disprove" God (Stenger, Shermer)
- Hypothesis testing:
  - Null: No effect, no difference, no association or else
  - Alternate: There is an effect, difference, or association.



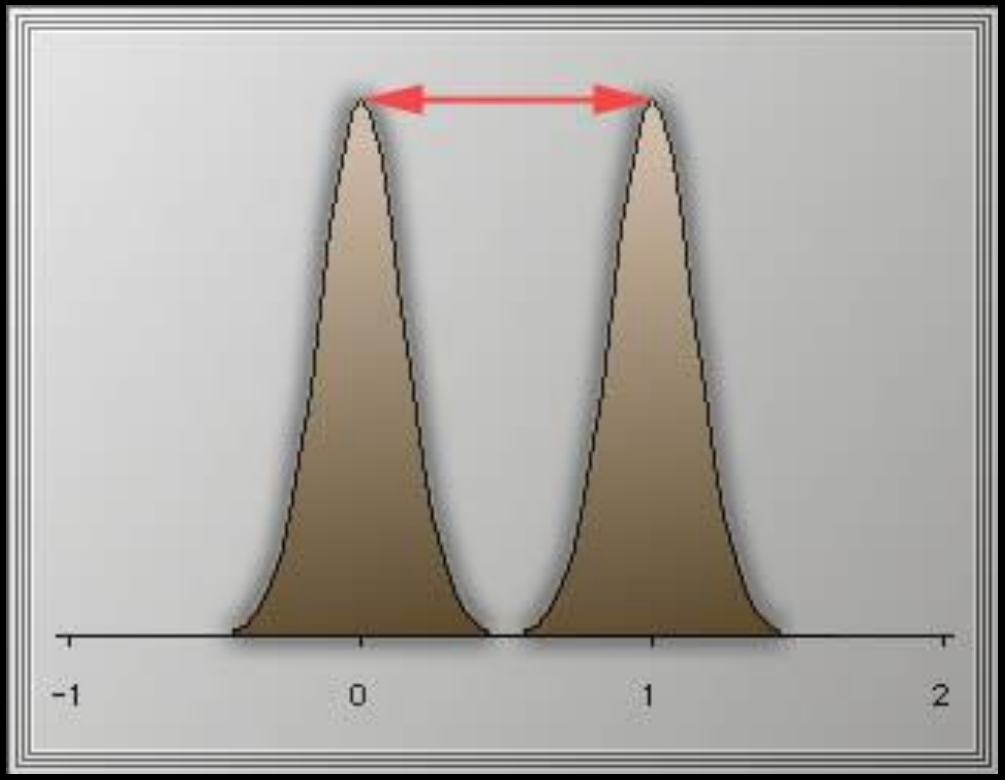
Classical scientific methodology

- Significance testing (Fisher)
- Null or else



Classical scientific methodology

- Hypothesis testing (Pearson/Neyman)
- Null or alternate



How is hypothesis testing related to God?

- American skeptic Michael Shermer used null hypothesis testing to challenge many extraordinary and supernatural claims.
- The null hypothesis is a statement assuming that **the claim is untrue**.

Null hypothesis: Burden of proof?

- If a psychic claims that he can use extra-sensory perception to foresee the color of a card randomly drawn from a stack of pokers, our default position should be: there is no ESP.
- The burden of proof is on the shoulder of the psychic.

Null hypothesis: Burden of proof?

- If someone insists that UFO and aliens had visited the earth, the burden of proof is on the people making the assertion.
- We should not believe in the existence of UFO or aliens unless we see strong evidence.

Argument against religion

- Shermer applies the same argument into religion. This is a classic philosophical question: **Why is there something rather than nothing?** Why is there a universe? Why do we exist?
- The theist's answer to the question is that God existed before the universe and subsequently created it out of nothing.

Argument against religion

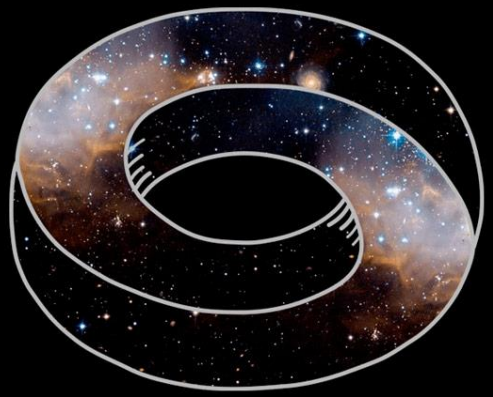
- Shermer argues that this is the wrong question. Asking this question presumes "nothing" is the natural state of things and when there is something, we need an explanation.
- But maybe "something" is the natural state of things and "nothing" would be the mystery to be solved.

What is the default position?

- Shermer cites physics to assert that there must have something because **something is more stable than nothing**.
- Our default position should be accepting that nothing could happen spontaneously.
- God created something out of nothing is an extraordinary claim and we should see it as opposed to the null hypothesis.
- The burden of proof is on the shoulder of Christians.

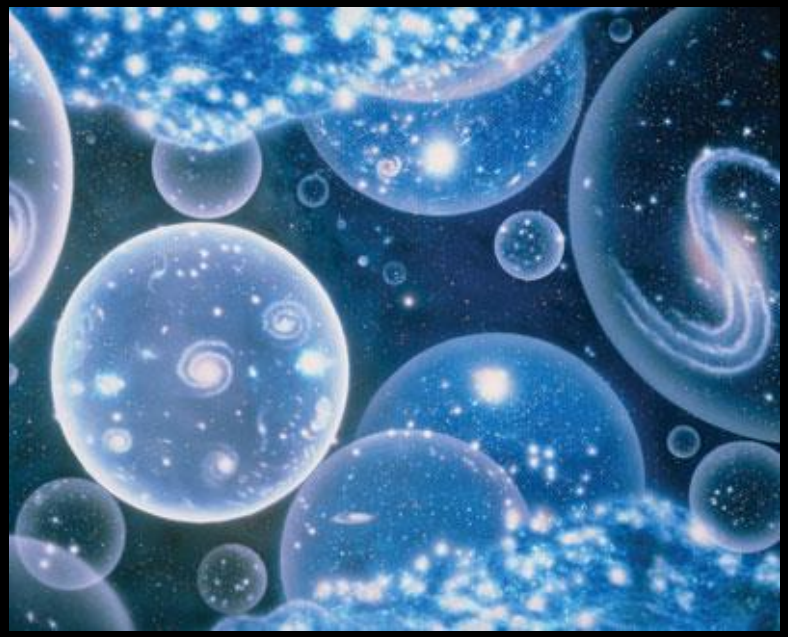
Cycle of Big bang/big collapse

- Cosmologist Sean Carroll suggests that our universe may be just one in a series of cyclic expansion and contractions of the universe. Therefore there is no beginning of our universe and there is no God's creation.



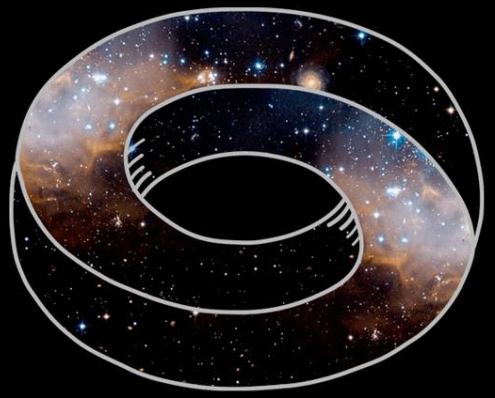
Multiverse

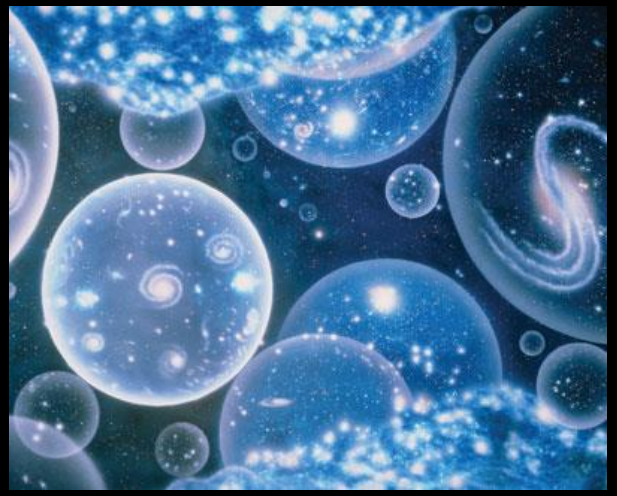
- There could be many universes and each of them has a different set of natural laws.
- By chance our universe has a set of natural law that makes the earth suitable for humans to live.



Cycle of Big bang/big collapse and Multiverse

- Shermer said that some people may argue where the multiple-universe comes from. Scientists cannot explain the origin of multiple-universe, but theologians also cannot tell us who created God.





Extra-ordinary claims

- Claiming that our universe is one in a series of boom-and-bust cycles of expansion and contractions of the universe is **extraordinary**.
- Saying that there are multiple universes is also a very profound proclamation.
- The null hypothesis should be: there is no expansion and contraction cycle in the universe; there is no multiple-universe.
- My default position should be disbelieving in these theories until seeing very strong evidence.

Do we always side with the null?

- Two competing philosophies in hypothesis testing
- Presumed innocent until proven guilty: assume "null" unless you prove the otherwise.

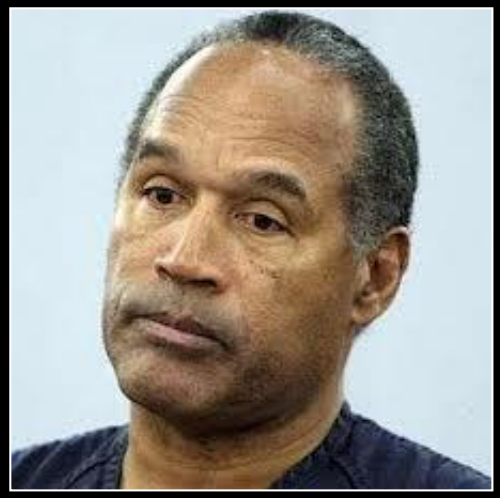
Balancing Type I and Type II errors

	Actual: Null	Actual: Alternate
Proposed: Null	Bingo!	Miss: Type II error
Proposed: Alternate	False alarm: Type I error	Bingo!

- In most cases the logic of null hypothesis testing follows the principle of "presumed innocence until proven guilty".
- So, the default position is the “null”?

Cannot "prove" the hypothesis

- In the O. J. Simpson case or the Casey Anthony's case, there is not enough evidence to convict the suspect, but it doesn't mean that we have proven the otherwise.
- By the same token, failing to reject the null hypothesis does not mean that the null is true and thus we should accept it. At most we can say we fail to reject the null hypothesis.



Precautionary principle

- However, in public health it is often trumped by the **precautionary principle**, which states that if an action could potentially causing harm to the public or to the ecology, without scientific consensus, the burden of proof that it is not harmful is on the shoulder of the party taking the action.
- In other words, the precautionary principle prefers "false alarm" (Type I) to "miss" (Type II).

Silicone breast implants

- Silicone breast implants have been commonly available since 1963, and Dow Corning was the major chemical company that manufactures silicone gel.
- But after some women who received the implant complained that they were very ill and the possible cause was the silicone gel, the US Food and Drug Administration (FDA) conducted a review and decided there wasn't enough data to show silicone breast implants were safe.

Silicone breast implants

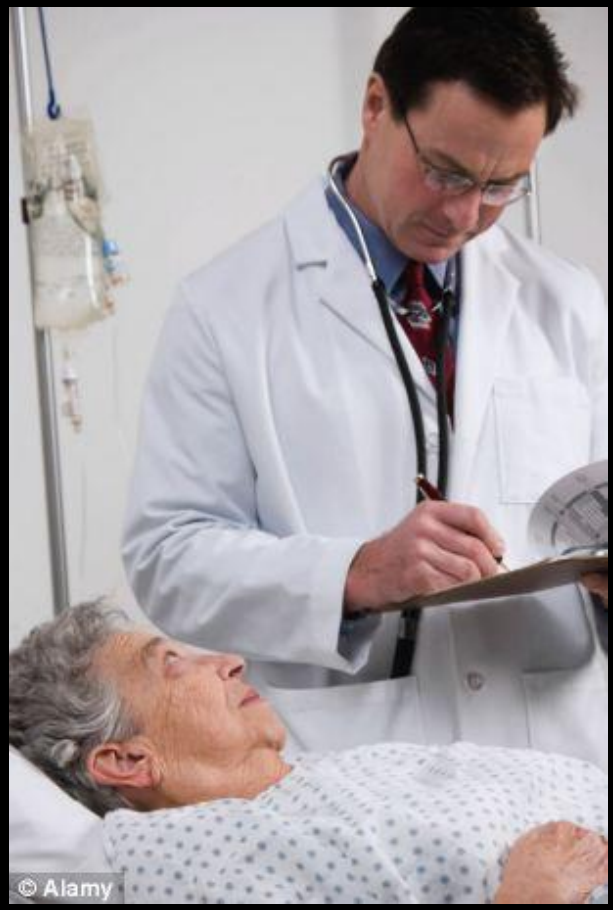
- As a **precautionary measure**, the FDA banned all silicone breast implants from 1992-2006. It is important to point out that the FDA did not have evidence to indicate that silicone breast implants are unsafe; rather, it demanded the evidence to ensure its safety.

Silicone breast implants

- Later many independent scientific studies, including the one conducted by U.S. Institute of Medicine (IOM), found that silicone breast implants do not seem to cause breast cancers or any fatal diseases.

Not clear-cut

- If a Type I error (false claim) is made and we jump into the conclusion that a new drug is safe, people will die.
- If a life-saving drug is not approved because of a Type II error (miss), people will die, too, because they didn't have access the the drug.



Review of Null, alternate, Type I and Type II

- Null: Excessive CO emission does not cause global warming (climate change)
- Alternate: Excessive CO emission causes global warming (climate change)
- Type I error: False alarm, the null is right
- Type II error: Miss, the alternate is right
- Should you believe in the null or alternate? Which error (Type I and Type II) is more serious?

Consequence

- Consequence of Type I: There is no climate change or CO emission does not lead to climate change. All investments in alternate energy are misdirected. But we might have alternate energy sources that are greener and cleaner. The air quality will be better in big cities. And we no longer depend on Middle East's oil.
- Consequence of Type II: Global warming is real and CO emission is the cause. Sea level rises and coastal cities, including LA and New Orleans, are under water.

Probability theory

- Victor Stenger: “Fine Tune and the multiverse” (Skeptics)
- “They (proponents of fine tune) misunderstand or misuse probability theory, ignoring the fact that events with mind-boggling low probabilities occur billions of times a day. The only way one can use a low probability to argue that something is unlikely is to compare it with the probabilities of all alternatives.”

Probability

- The passage above is a description of the frequency approach of probability. Probability is the desired event/all events. This is an objective approach.
- But right after the passage Stenger, "What is the probability of God? In Fallacy(one of his books) I compared the calculations for the probability of God using sophisticated Bayesian statistics…"
- The Bayesian approach is subjective probability!

Conclusion

- Null hypothesis testing may be misused by skeptics and new atheists.
- What is the null? What is the default position? No God or no multiverse?
- Even if we agree what the null is, we do not always side with the null hypothesis (e.g. precautionary principle of drug approval, climate change). It is not clear-cut.

Conclusion

- Hypothesis testing is based on frequency in the long run (objective probability).
- The origin of the universe (e.g. Big Bang or Genesis) is not a repeatable event. How can we compare this with all possible events (frequency approach to probability)?

Contact Info

- Chong Ho (Alex) Yu
- Quantitative Research Consultant, Office of Sponsored Research and Grants
- Associate Professor, Department of Psychology
- Azusa Pacific University, CA
- cyu@apu.edu