A deep space photograph showing a vast field of stars in various colors, including blue, red, and yellow, set against a dark background. The stars are scattered across the frame, with some appearing as bright, distinct points and others as faint, diffuse clouds. The overall scene is a rich, multi-colored stellar population.

*“Exploring the Wonders of Creation
through the Lens of Science”*

Leslie Wickman, Ph.D.

It all started with a backyard telescope...



JERRY LODRIGUSS

Natural Philosophy => *Natural Science*

- Natural Philosophy: precursor to natural science
- Study of unanswered questions about nature
- Search for understanding via study of physical world
- Looking at the world with curiosity
- Theoretical, not empirical or experimental

BIG questions...

- Where did all this come from?
 - How big is it?
 - What's it all made of?
 - How long has it been here?
- Was there anything before all this?
 - Why are we here?
 - Where are we going?
 - How will it all end?
- Is there anyone else out there?

The Early Greeks: Philosophers to Scientists

- Nature can be understood
 - Not just randomly occurring phenomena
- The diverse behavior observed in nature is held together in rational patterns
- From ~340 BC to 1600 AD, Aristotelian thinking about nature prevailed
- Based on “First Principles” – things that were “obviously” true:
 - Since everything appears to go around us, earth must be at the center of the cosmos
 - Since the heavens are the realm of the gods, the heavens are perfect and the earth imperfect

The Deductive Process

- Use of deductive reasoning or logic, applicable to mathematics and philosophy, didn't work for science
 - Deductive reasoning starts with a few simple truths (Aristotle's First Principles)
 - All theorems that logically follow may thus be proven
 - Logic rules
 - But, the "logically proven" theorems didn't match up with empirical observations
 - Not everything moves around the earth
 - Heavenly objects aren't perfect
 - Earth moves

The Inductive Process

- Enter: Inductive Reasoning
 - Simple truths about nature are the goal of science rather than a starting point
 - Inductive reasoning is the deductive process in reverse:
 - start with many observations of nature and move toward a few robust explanations of how things work
 - Observations rule!

Development of the Scientific Method

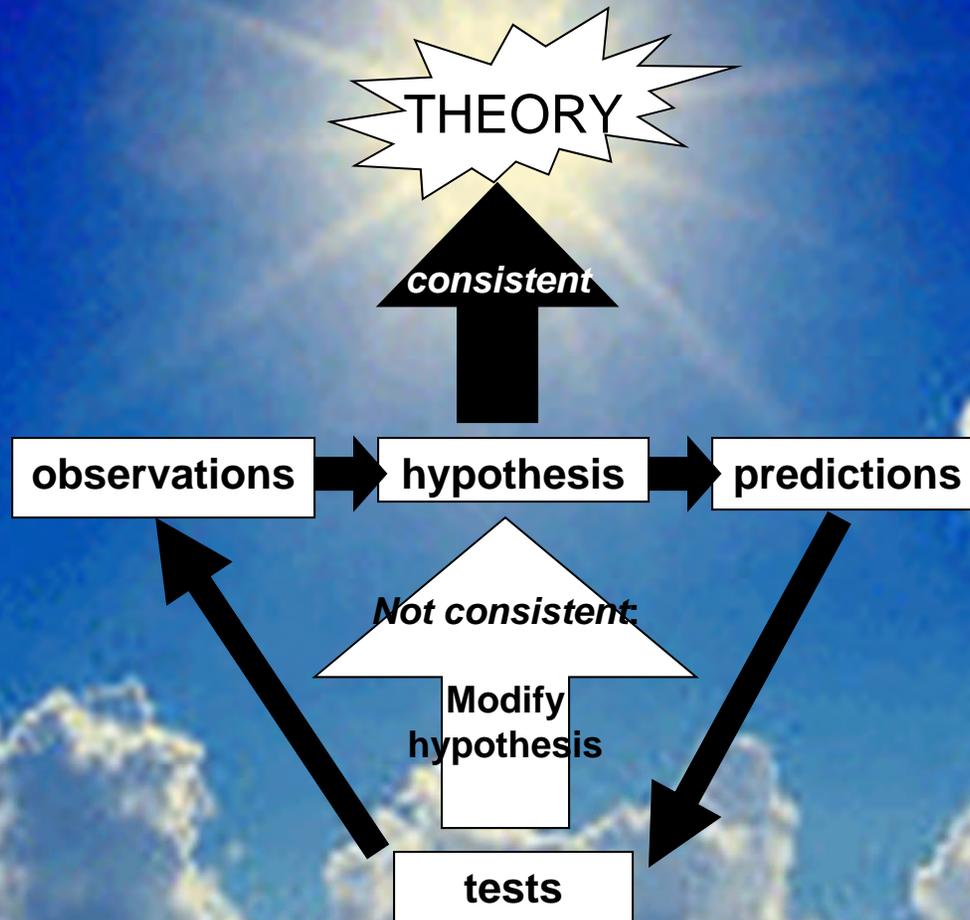
From trying to understand the heavens in the 16th and 17th centuries, modern science was born

- Roger Bacon, 1214-1294
- Francis Bacon, 1561-1626
- Galileo Galilei, 1564-1642
- Robert Hooke, 1635-1703
- Isaac Newton, 1642-1727



- A rational, empirical way of studying nature

The Scientific Method



Overview of the Scientific Method

- Rooted in observations
 - Formulate hypothesis: tentative explanation
 - Make predictions about future events
 - Verify/Test
 - Analysis/Interpretation/Evaluation of test results
 - Publish
 - Reproduce
- Evidentiary considerations: theories can't be proven, only disproved
 - Rather, looking for the best explanation given existing evidence
 - Inductive reasoning

“Scientific knowledge is a body of statements of varying degree of certainty – some most unsure, some nearly sure, but none absolutely certain.”

- Richard Feynmann

The Scientific Worldview and the Judeo-Christian Tradition

- **Modern science arose in Western Europe**
- Jews, Christians, and Muslims believe in a Creator who made an orderly, rational, understandable universe and gave us permission to investigate and utilize it, thereby legitimizing science and technology.
- Animists believe that rocks, trees, etc. have souls, and that we shouldn't tamper with nature for fear of offending the spirits.
- Most Hindus and Buddhists generally believe that the physical world is an illusion or distraction that we should try to transcend
- Atheists can't explain why it is possible for us to understand the universe.
- *Michael Covington, "Christianity and Science", 10/23/99*
- "Test all things; hold fast to what is good," I Thessalonians 5:21

The Nature of Truth

- Correspondence Theory

“Truth is a matter of a belief or idea (representation or statement) corresponding to reality.” (Dallas Willard)

- Postmodernist View:

“True is merely a compliment we pay to statements we find good to believe. Truth is not a property by beliefs in virtue of some relation they bear to worldly facts that stand outside of discursive practices.” (Richard Rorty)

Science and Theology can enlighten and inform each other as we seek to know ultimate TRUTH



"For now we see through a glass, darkly, but then we shall see face to face; now I know in part; but then shall I know even as also I am known." 1 Corinthians 13:12

Science & Religion

“Religion without science is blind. Science without religion is lame... I want to know God’s thoughts; the rest are details.”

– Albert Einstein, author of relativity theory, 1941

“The significance and joy in my science comes in the occasional moments of discovering something new and saying to myself, 'So that's how God did it!' My goal is to understand a little corner of God's plan.”

- Henry “Fritz” Schaefer III, chemist, 1991

- I believe in a God in intellectual and emotional communication with humankind, i.e. a God to whom one may pray in expectation of receiving an answer. By “answer” I mean more than the **subjective psychological** effect of prayer.

40%

- I believe in continuation of the person after death **into another world**

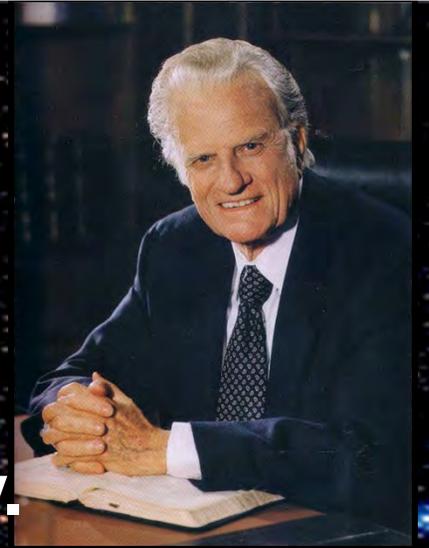
Billy Graham

“The Bible is NOT a book of science. The Bible is a book of Redemption, and of course I accept the Creation story.

I believe that God did create the universe. I believe God created humanity.

Whether it came by an evolutionary process and at a certain point He took this person or being and made him a living soul or not, does not change the fact that God did create humanity.

Whichever way God did it makes no difference as to what men and women are & their relationship to God.”



■ **SCIENCE** is the tool we use to explore
God's CREATION!



Today's Scientific Marketplace of Ideas

- **Anthropic Principle**
- **Quantum Physics**
- **The Multiverse Hypothesis**
- **Probabilities**

Teleological Argument - Anthropic Principle - Fine-tuned Universe

- **Teleological Argument: The design & order observed in the natural world point to a purposeful Creator**
 - Plato, William Paley, many others
- **Cosmological Anthropic Principle/Goldilocks Principle/Fine-tuned Universe: The universe has a large number of parameters with values that seem to be finely tuned to accommodate life.**
 - Modern-day astronomers
- “Ever since the creation of the world his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made. So they are without excuse...”
 - St. Paul, Romans 1:20
- “The heavens are telling the glory of God; and the firmament proclaims his handiwork. Day to day pours forth speech, and night to night declares knowledge.” - King David, Psalm 19:1-2
 - “***Whence arises all that order & beauty we see in the world?***”
 - Sir Isaac Newton, 1650

Science, Religion & the Big Bang

- (The idea that God created the universe is) “a more respectable hypothesis today than at any time in (the) last hundred years.”
 - science historian Frederic Burnham, quoted by David Briggs in *Science, Religion, and the Big Bang Theory*, Los Angeles Times

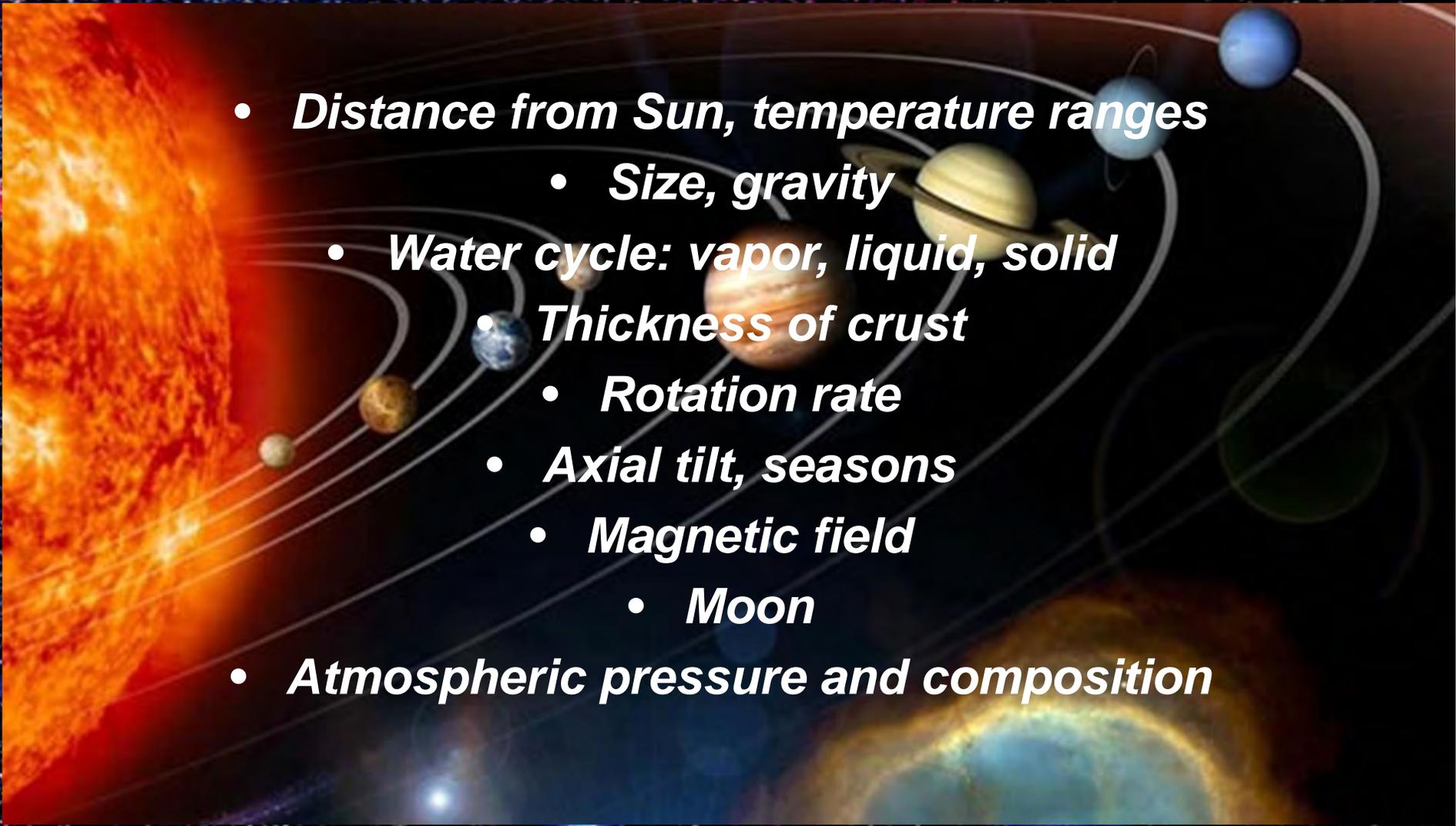
Our Unique Earth

Even though ~ 700 extra solar planets have been discovered, and perhaps 10% or more of sun-like stars could support planetary systems...

All of our space exploration SO FAR has shown that our neighbors in space are not remotely capable of sustaining life of any complexity.



The Best?

- 
- *Distance from Sun, temperature ranges*
 - *Size, gravity*
 - *Water cycle: vapor, liquid, solid*
 - *Thickness of crust*
 - *Rotation rate*
 - *Axial tilt, seasons*
 - *Magnetic field*
 - *Moon*
 - *Atmospheric pressure and composition*

Fine-tuning throughout the universe

- **Velocity of light: amount of radiation**
- **Electromagnetic force: chemical bonding**
- **Strong nuclear force: atom/element building**
- **Expansion rate of universe: galaxy/star formation**
- **Mass density of the universe: expansion/crunch**

The Physical Laws...

“The ‘law’-like regularity and consequent modelability of natural phenomenon are the unquestioned assumptions that underlie all scientific research... But common to all except for the most extreme relativists is the conviction that there is some basic, deep order in Nature that allows for the emergence of meaningful scientific practice... This view and the refrain of ultimate goodness (‘God saw all that He had made, and it was very good’) stands in clear contrast to the Babylonian imperial cosmology in which Creation results from warfare in a power struggle between competing gods... In particular, laws of Nature are not self-explanatory. To me, they are most powerfully interpreted as traces of the Creator’s handwriting.”

- Lydia Jaeger, physicist and academic dean at l’Institut Biblique de Nogent-sur-Marne, *Cosmic Order and Divine Word*

“... in Him all things hold together...” – Colossians 1:17

“...I established my covenant with day and night and the ordinances of heaven and earth...” - Jeremiah 33:25

Against the odds...

- **Probability for 9 life-supporting design characteristics existing in one of the traditional 9 planets of our solar system:**
1 in 50 million
- **If we consider the 300+ finely tuned characteristics of the entire universe, the odds are more like 1 in 10^{282} for such a planet to exist anywhere in the cosmos!**

Quotes from Famous Scientists

“A superintellect has monkeyed with physics, as well as with chemistry and biology.”

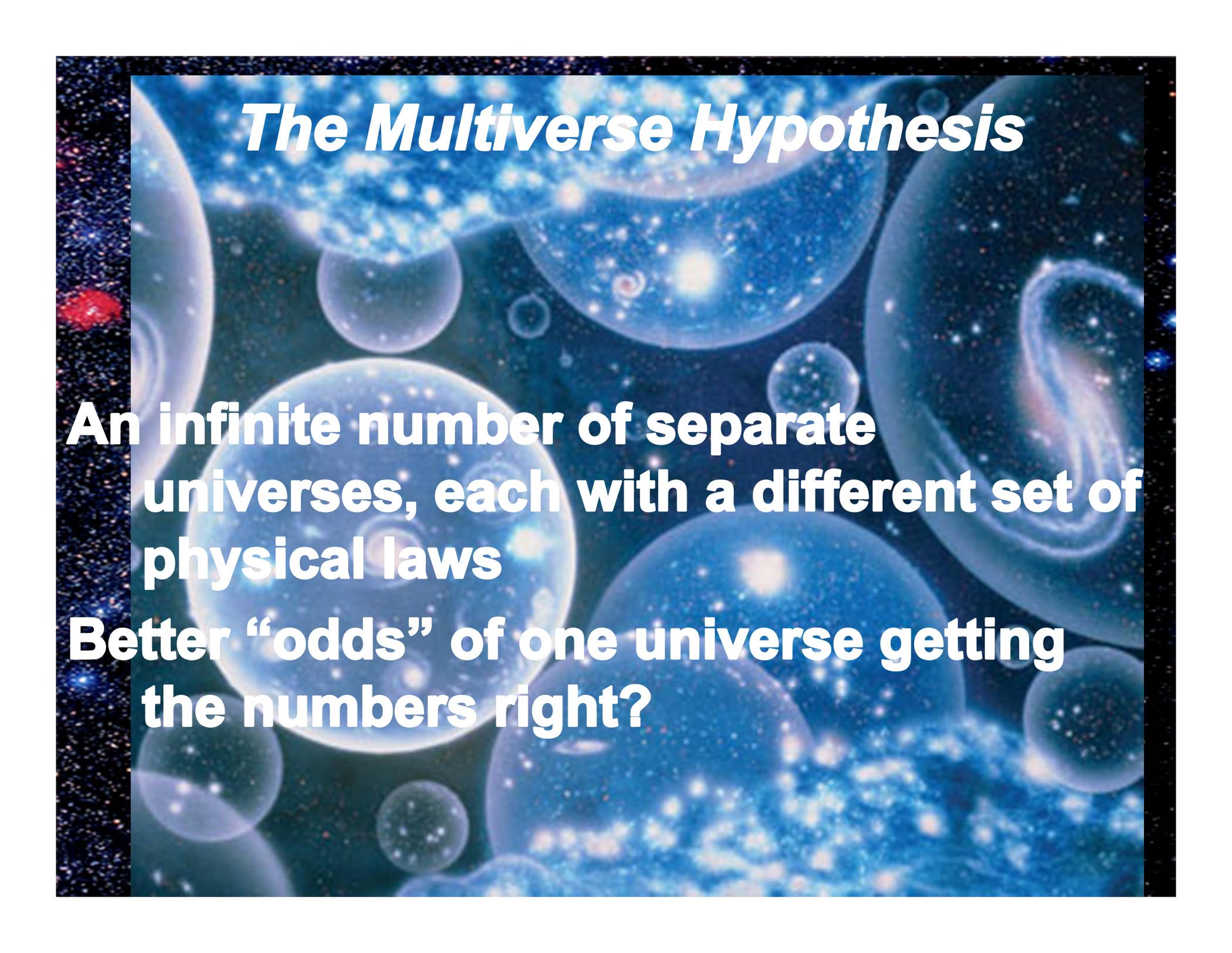
Sir Fred Hoyle, astronomer, *The Universe*

“As we survey all the evidence, the thought insistently arises that some supernatural agency — or rather Agency — must be involved.”

George Greenstein, theoretical astrophysicist, Amherst College, *The Symbiotic Universe*.

“The impression of design is overwhelming...It seems as though somebody has fine-tuned nature’s numbers to make the Universe.”

Paul Davies, physicist, *The Cosmic Blueprint*



The Multiverse Hypothesis

An infinite number of separate universes, each with a different set of physical laws

Better “odds” of one universe getting the numbers right?

Chance, or Design?

“...the degree of bio-friendliness we observe in the universe seems far in excess of what is needed to give rise to a few observers... If the ingenious bio-friendliness of our universe were the result of randomness, we might expect the observed universe to be minimally, rather than optimally, biophilic. Note too, that multi-verse explanations still need to assume the existence of laws of some sort, so they do not offer a complete explanation of the law-like order of the universe. Finally, invoking an infinity of unseen universes to explain certain features of the universe we do observe seems the antithesis of Occam's Razor: It is an infinitely complex explanation.”

- Paul Davies, theoretical physicist

Quantum Physics

“God does not play dice...” - Einstein

Does quantum uncertainty provide the space wherein God acts?

Our orderly universe is governed by physical laws

If God intervened haphazardly (miraculously) to overrule those laws:

- Order would cease
- Cause and effect would be de-coupled
- Actions would have no predictable consequences
- Free will would be meaningless

If we could PROVE God's existence, where would faith come in?

Even though the odds of getting everything just right for life are highly improbable, it's not absolutely impossible.

Maybe God is in the business of making the improbable probable!

Tips for Getting Comfortable with the “Science & Faith” Dialog

- Approach the dialog with humility and grace, for “now we see through a glass darkly...”
- Understand the spectrum of positions/arguments on all sides
- Realize that most people are on a journey, still figuring out where they stand
- Recognize that these issues are not fundamental to your faith or your salvation
- Learn to live with the tension
- It’s okay not to have it all figured out
- You don’t have to have all the “right” answers
- Don’t let arguments/disagreements upset you



Saint Augustine's Advice:

In essentials, unity;
In non-essentials, liberty;
In all things, charity