

Session 3: Why is the Universe bio-friendly?




Graham Swinerd
 grahamswinerd@hotmail.com
 www.bigbangtobiology.net
 www.howspacecraftfly.com

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

1

Session 3: Why is the Universe bio-friendly?



Recall ...

- Came to faith in 2001, at age 51
- Prior to that – an agnostic scientist & engineer
 - Steadfastly influenced by 'the Science Delusion' (Session 1)
- Subsequently, a 23 year journey as a scientist & engineer, and a 'young' Christian

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

2

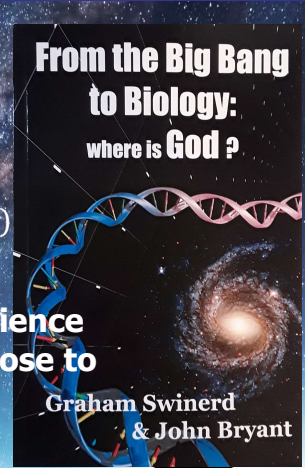
Session 3: Why is the Universe bio-friendly?

Transformative events

☐ My testimony

- Book
- Handouts
 - (www.bigbangtobiology.net)

☐ The relationship between science and faith is something very close to my heart



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

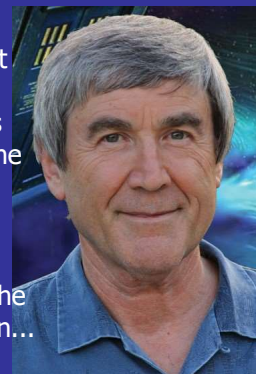
3

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

☐ Paul Davies (*British astrophysicist*)

- "There is for me powerful evidence that there is something going on behind it all....It seems as though somebody has fine-tuned nature's numbers to make the Universe....The impression of design is overwhelming"
- "The laws [of physics] ... seem to be the product of exceedingly ingenious design... The universe must have a purpose"



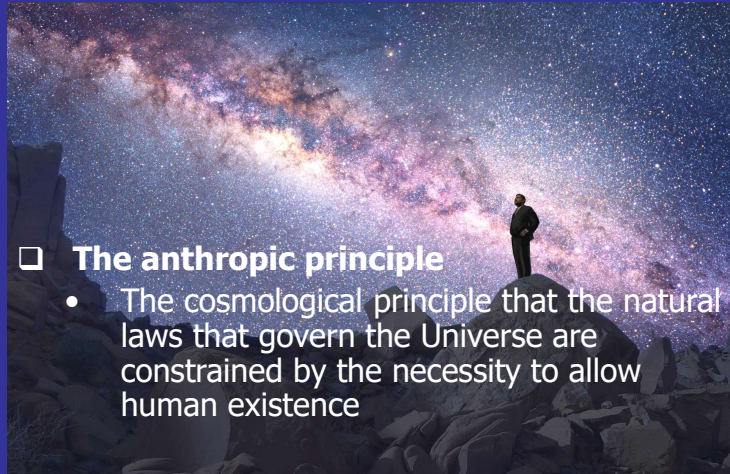
13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

4

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe



□ The anthropic principle

- The cosmological principle that the natural laws that govern the Universe are constrained by the necessity to allow human existence

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

5

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

Recall ... $f_{a,\sigma^2}(\xi_1) = \frac{(\xi_1 - a)}{\sigma^2} f_{a,\sigma^2}(\xi_1) = \frac{1}{\sqrt{2\pi\sigma}} \exp\left\{-\frac{(\xi_1 - a)^2}{2\sigma^2}\right\}$

□ The Universal laws of nature ...

- ... describe how the physical content of the Universe (matter and energy) behaves and evolves under the influence of the four fundamental forces of nature:
 - the gravitational force
 - the electromagnetic force
 - the strong nuclear force
 - the weak nuclear force

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

6

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- The last 40 years or so has witnessed incredible advances in observational technology

- Observing the very big ...



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

7

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- Observing the very big ...



13 March 2024

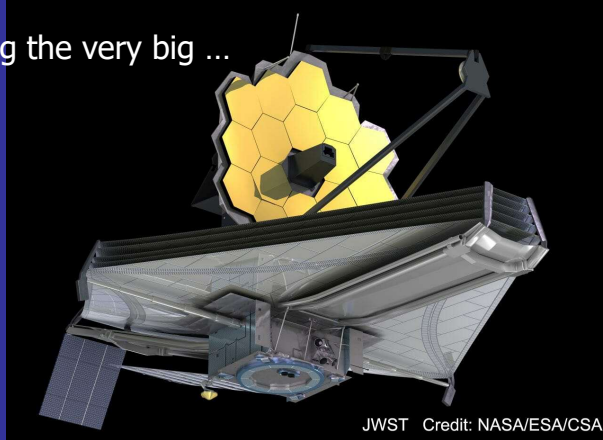
From the Big Bang to Biology:
do detect the hand of God?

8

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- Observing the very big ...



13 March 2024

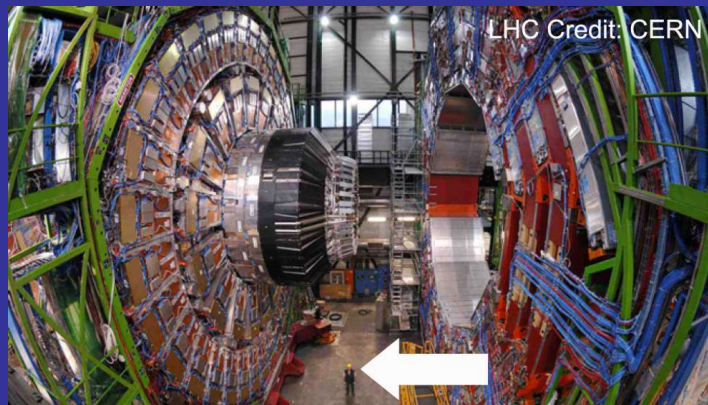
From the Big Bang to Biology:
do detect the hand of God?

9

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- Observing the very small ...



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

10

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- **Improved technology** → gives the **Anthropic Principle (AP)** a 'sharper edge'
 - AP → 'cosmic fine-tuning' / 'bio-friendliness'
 - The Universe is 'a very unlikely place'

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

11

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- **In 2001, my own conclusion** -
 - – that "... the laws which govern the immense universe are in some way fine-tuned in order that life can exist in this tiny corner which we call Earth!"
- **Cosmic Fine Tuning / bio-friendliness**
 - "... a challenge to the physics community ..."

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

12

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

□ God: new evidence (Focus, Southampton)

- Series of 6 short videos at www.focus.org.uk (or on YouTube)
- Featuring:
 - John Polkinghorne
 - David Wilkinson
 - Rodney Holder
 - Peter Williams
 - Graham Swinerd



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

13

Session 3: Why is the Universe bio-friendly?



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

14

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- ❑ **There are many examples of cosmic fine-tuning ... e.g. :**
 - The initial conditions of the Big Bang
 - The strength of the force of gravity
 - The uniformity of density in the early Universe

13 March 2024

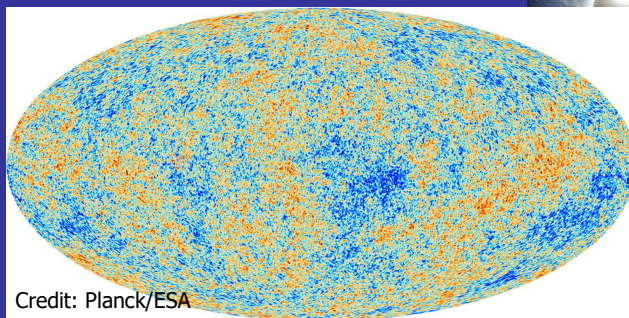
From the Big Bang to Biology:
do detect the hand of God?

15

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- ❑ **Thinking about this last point ...**
 - The uniformity of density in the early Universe



Credit: Planck/ESA



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

16

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

□ 'Hawking's final theory'



"If any one of about forty physical quantities had more than slightly different values, life as we know it would not exist."

Stephen Hawking

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

17

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

□ 'Hawking's final theory'



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

18

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- **Reflection** on all this, way back in 2001, provoked the obvious question ...

Why is it like this?

- At the time I came up with three possibilities ...



13 March 2024

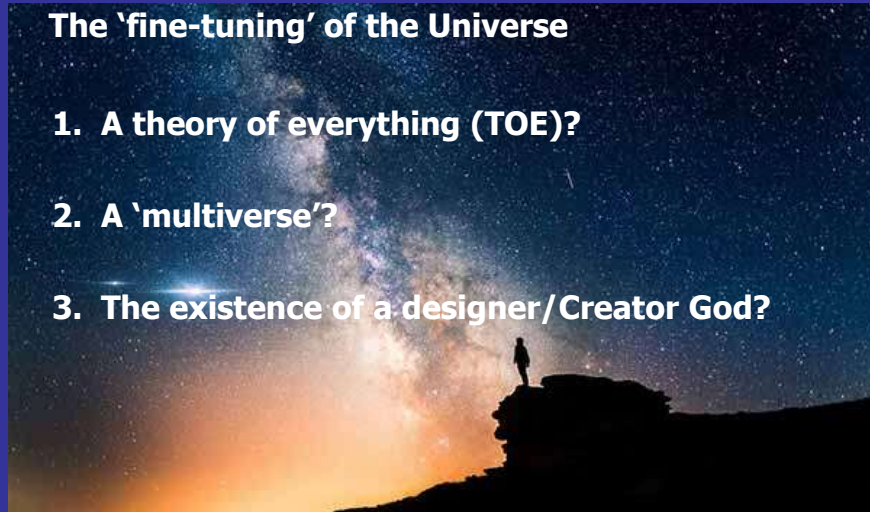
From the Big Bang to Biology:
do detect the hand of God?

19

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

1. A theory of everything (TOE)?
2. A 'multiverse'?
3. The existence of a designer/Creator God?



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

20

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- ❑ Clearly, this 'academic discussion' certainly does not constitute a 'proof' that God exists ...
- ... but, for me, it was a 'strong pointer' to a **creator God**



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

21

Session 3: Why is the Universe bio-friendly?

The 'fine-tuning' of the Universe

- ❑ However, I still had some way to go to the Christian God ...!



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

22

Session 3: Why is the Universe bio-friendly?

Summary

- ❑ **Our shared faith can live side by side in harmony with science**
 - Science is simply **God's revelation in Nature**
 - Our appreciation of God's creation can be enhanced through science
 - Scientific research, and learning, can be a form of worship

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

23

Session 3: Why is the Universe bio-friendly?

Thanks for

1 Peter 3:15 "Always be prepared to give an answer to everyone who asks you to give the reason for the hope that you have. But do this with gentleness and respect ..."

Listening!

13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

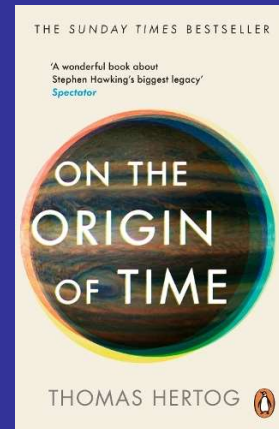
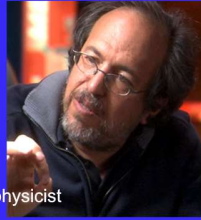
24

Session 3: Why is the Universe bio-friendly?

□ Quotes, etc.

"One can estimate the probability that the constants in our standard theories of the elementary particles and cosmology would, were they chosen randomly, lead to a world with carbon chemistry. That probability is less than one part in 10^{220} !"

Lee Smolin American physicist



13 March 2024

From the Big Bang to Biology:
do detect the hand of God?

25