



Welcome to  
Los Alamos Faith and Science Forum

Summer Series  
2019

5 June -31 July 2019

# Purpose: Provide a venue for community dialogue on the Big Questions that drive discussion at the interface between Faith and Science

---

## Who are we?

- Consciousness, self –awareness
- Neurology, psychology, brain science
- Free-Will

## Where did we come from?

- Cosmology
- Physical and Biological Origins of Life
- Evolution

## What lies ahead?

- Technology
- Ethics

# **Purpose: Provide a venue for community dialogue on the Big Questions that drive the dialogue between Faith and Science**

---

In addressing these Big Questions, we are asking how science can inform faith; and how faith can add depth and meaning to our scientific endeavors.

Addressing the Big Questions is a tall order, and we don't claim to have the answers – or even a comprehensive approach to addressing those REALLY Big Questions.

**Making a start;**

- **2015: Origins: Where Did We Come From**
  - Deborah and Loran Harsaama
- **2016: What Makes us Human**
  - Justin Barret
- **2017: Evolution and Hope**
  - John Haught
- **2018 : Purposeful Evolution**
  - Dennis Venema
- **2019: Are You a Robot: Brain, Mind and Soul**
  - Warren Brown

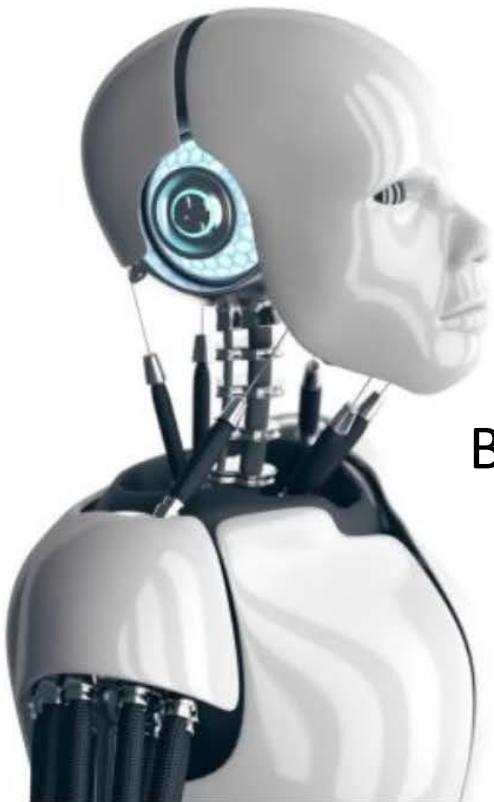
Over Time we will, undoubtedly, circle-back ,returning to some of the topics we have already discussed – hopefully adding new information and insight.

Los Alamos Faith and Science Forum  
Summer 2019

# “Are you a Robot: Mind, Brain and Soul”

Lecture I

## The Questions



Bob Reinovsky

5 June 2019

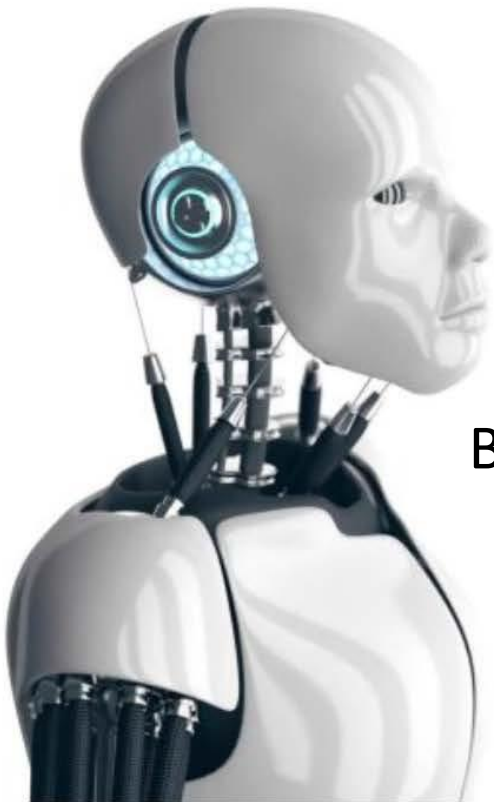


Los Alamos Faith and Science Forum  
Summer 2019

# “Are you a Robot: Mind, Brain and Soul”

Lecture I

## The Questions



Bob Reinovsky

5 June 2019



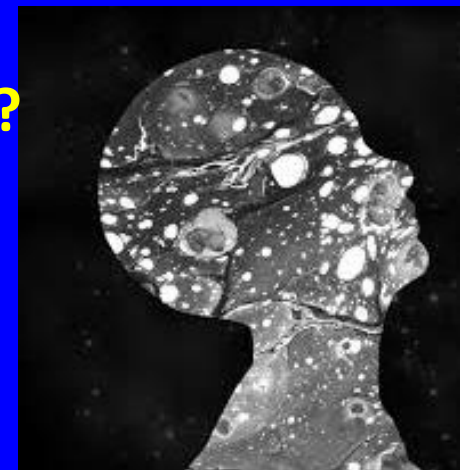
# Are you a Robot: Mind, Brain and Soul?

---

- Given that we see steadily increasing overall robotic capability , and increasing capability in specifically (digital) robotic brains”...
  - and that we are experiencing an increasing understanding of the neurological functioning of the human brain...
  - Is there a “robotic mind”? -- and how does it differ from a “human mind”
  - ... and if there is NOT NOW a “robotic mind” could there be one in the future
- 

**Big Question#1: Is this world, the one we perceive around us, real? – or is all this inside my head?**

**A: Of course it is all inside your head – but does that mean it is not real?**



# Are you a Robot: Mind, Brain and Soul

---

## Some Questions for this summer

- What is a Robot
- What is “Consciousness”?

What distinguishes Brain from Mind from Soul

- What is emergent behavior
- What will this series include

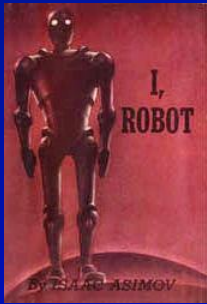
# The role of “Robots” in human society has been a rich and fertile topic for speculation and popular fiction for longer than you might think.

## Karel Capek – “R.U.R. Rossums Universal Robots “ (1920) – a dark future

- *R.U.R. quickly became influential and by 1923, translated into thirty languages.*
- *By 2000 artificial people, more like androids, that think for themselves are common.*
- *A robot rebellion leads to the near-extinction of the human race, but not before the formula for creating the artificial organic-like matter that makes-up robots is destroyed*
- *Two advanced robots , slated for dissection in the effort to recover the formula, display altruism, fall in love – and become a “new Adam and Eve.”*



## I. Azimov – *I Robot Series* (1940)- a future of technological advancement in which technology is the servant of human kind – strictly, but adequately, governed by Three Laws



- A robot may not injure a human being (or humanity) or, through inaction, allow a human being (or humanity) to come to harm.
- A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws

## Gene Roddenberry – “Star Trek” (1966 ff),

- Data is a synthetic android life form with artificial intelligence .
- Data is self-aware, sapient, sentient, anatomically fully functional and serves as the as second officer and chief operations officer on the USS Enterprise
- His positronic brain allows him impressive capabilities but he experiences ongoing difficulties during the early years of his life with understanding various aspects of human behavior and offers an "outsider's" perspective on **humanity**.





# The role of “Robots” in human society has been a rich and fertile topic for speculation and popular fiction for longer than you might think.

---

George Lucas -- Star Wars (1977 ff) - Two distinct (comedic) personalities embodied in two very different but fully “mechanical” robotic forms

- C-3PO and R2D2 (along with “Data” in Star Trek”) may be the contemporary public face of robotic technology
- C-3PO is a mechano-humanoid, frequently sarcastic, “protocol” robot whose skills are translation, interpretation and facilitating communication
- R2D2 is a “Swiss Army Knife” of astro-mechanical capabilities with a “loyal puppy-dog” personality



**Other perspectives on Robotic Capability in film...**

- **Six Million Dollar Man (1973)** – *an injured astronaut , “rebuilt” with bionic parts giving him super-human capabilities , is then employed as a heroic secret agent .*
- **Bicentennial Man (1999)** - *In 2005, a domestic robot begins to show sentience and creativity, and spends two centuries in a quest to become “human” ; to be recognized as human by other humans, and to have a human companion – his quest is successful*

**Robots as conquerers,**

**Robots as co-equals**

**Robots as leaders**

**Robots as servants**

**Robots as variously indistinguishable from humans**

# Just what is a Robot ?

“A **robot** is a **MACHINE**—especially one programmable by a computer—capable of carrying out a complex series of actions automatically.”

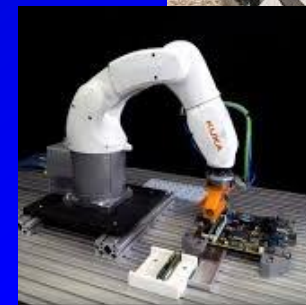
- As long as robots are confined to manufacturing tasks, like welding automobile frames



...or vacuuming our carpets



...or assembling our mother-boards and cell phones



we are comfortable sharing our world with them.



- We are happy to have them defend us, or gather intelligence for us, ... as long as they are on “our side”



# Just what is a Robot ?

“A **robot** is a **MACHINE**—especially one programmable by a computer—capable of carrying out a complex series of actions automatically.”



- We welcome them into our workplace. Especially if they do repetitive, or hazardous, tasks for us – and don't threaten to displace us from our job.

- They can help our doctors and surgeons perform incredible precise operations -- ON US...



... and they can even help us recover afterward

**And this is about all we are going to say about robotic technology -- this summer....  
Because our focus is really on the Brain, Mind and Soul**

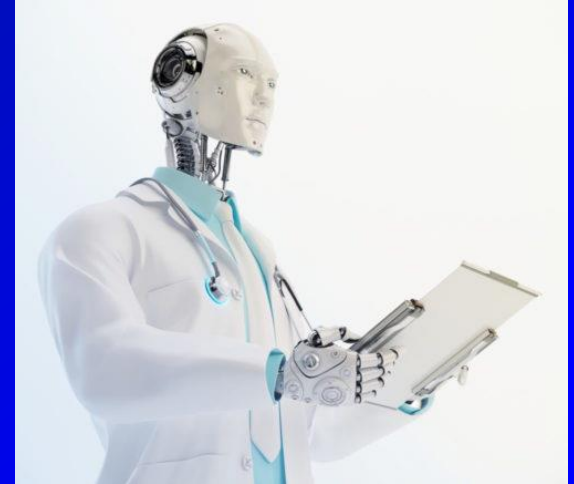
## EXCEPT to perhaps to ponder .....

... what if our doctor WAS him/herself a robot?  
Coupled with the precision that might imply, would  
there be the EMPATHY we expect?



...or if our closest, or most intimate, companion  
was a robot,

... or if our “robots” began asking questions?  
especially ones we, humans, can't answer  
... or if they have answers – about life, the universe  
and everything -- that we don't have?

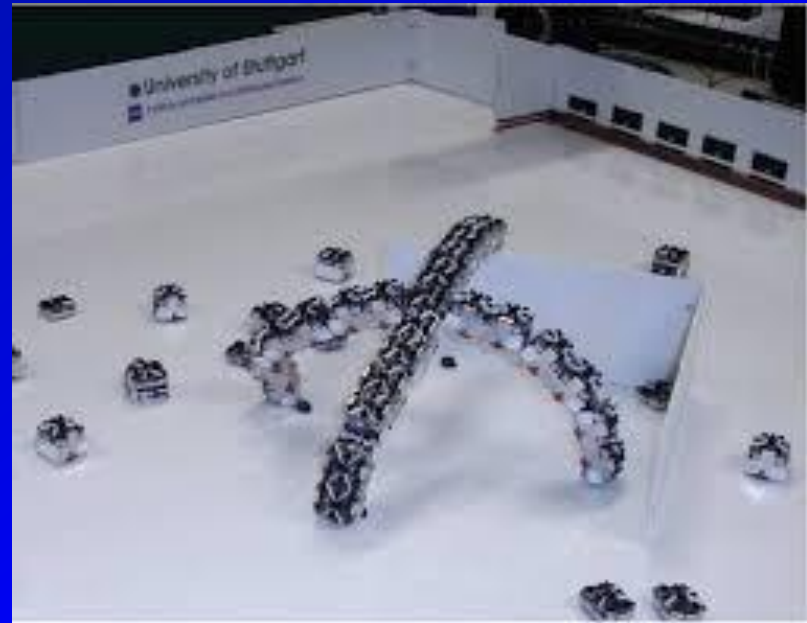


## EXCEPT to perhaps to ponder .....

---

... or to wonder about the implications if robots begin to display autonomous, collective behavior ?

What would these, not completely remote possibilities, imply about the human Brain, Mind, and Soul



**Big Question #2: What do advances in robotic technology, machine learning, massive computational capability imply about the nature of the human Brain, Mind and Soul?**

**Our series, this summer, is our first foray into exploring the, hard to define, concept of consciousness –**

**What is it?**

**What are its components?**

**What are its limits?**

---

Consciousness

?

**For purposes of discussion this summer, we have approached the question of consciousness by identifying three components....**

---

Consciousness

Mind

Brain

Soul

**...but how really distinct are there three components?  
Do they look like this....**

.... Or like this

---

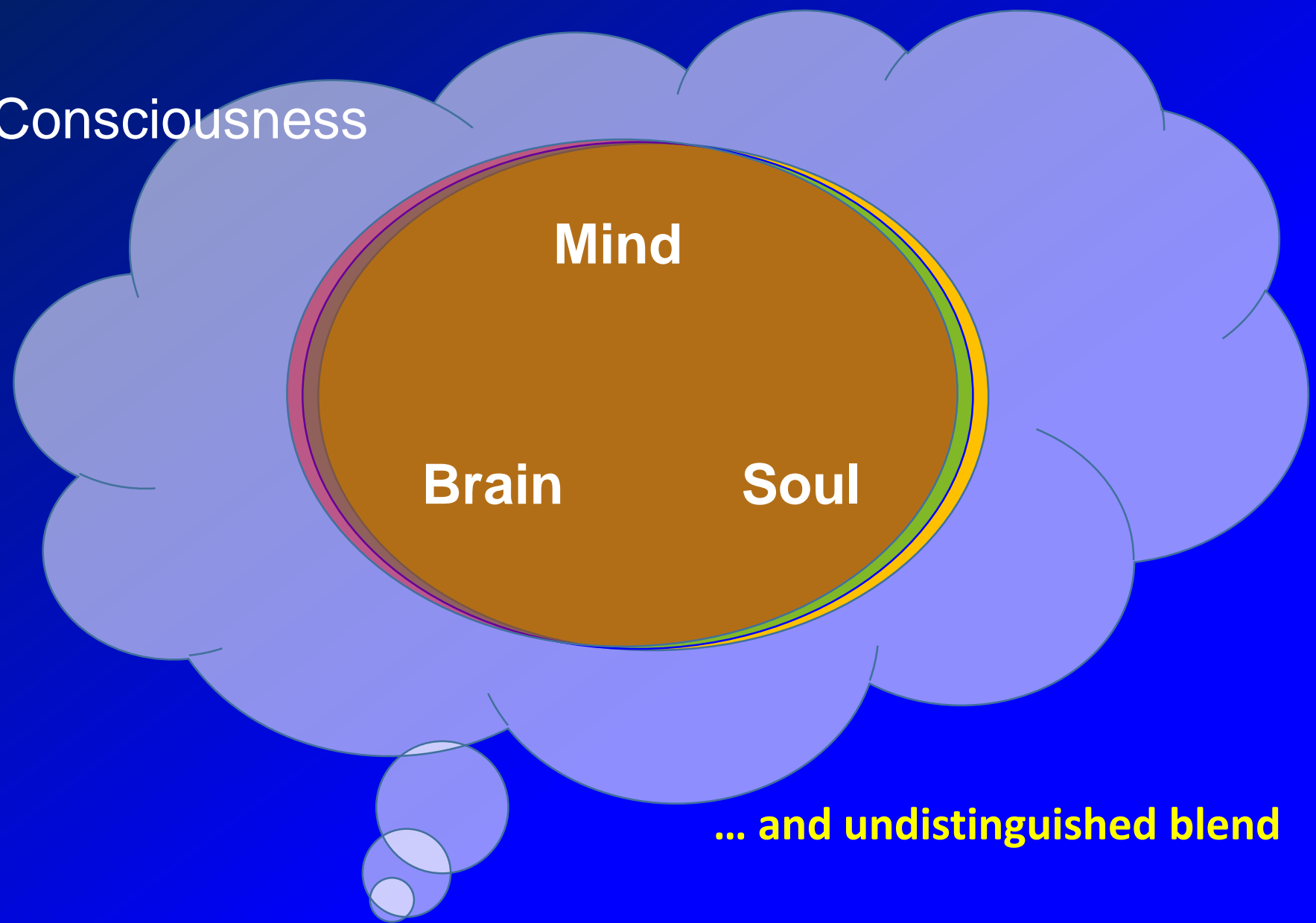
Consciousness

Mind

Brain

Soul

... and undistinguished blend





# Big Question #3: Do the components of Mind, Brain and Soul each stand alone or do they actually overlap...

---

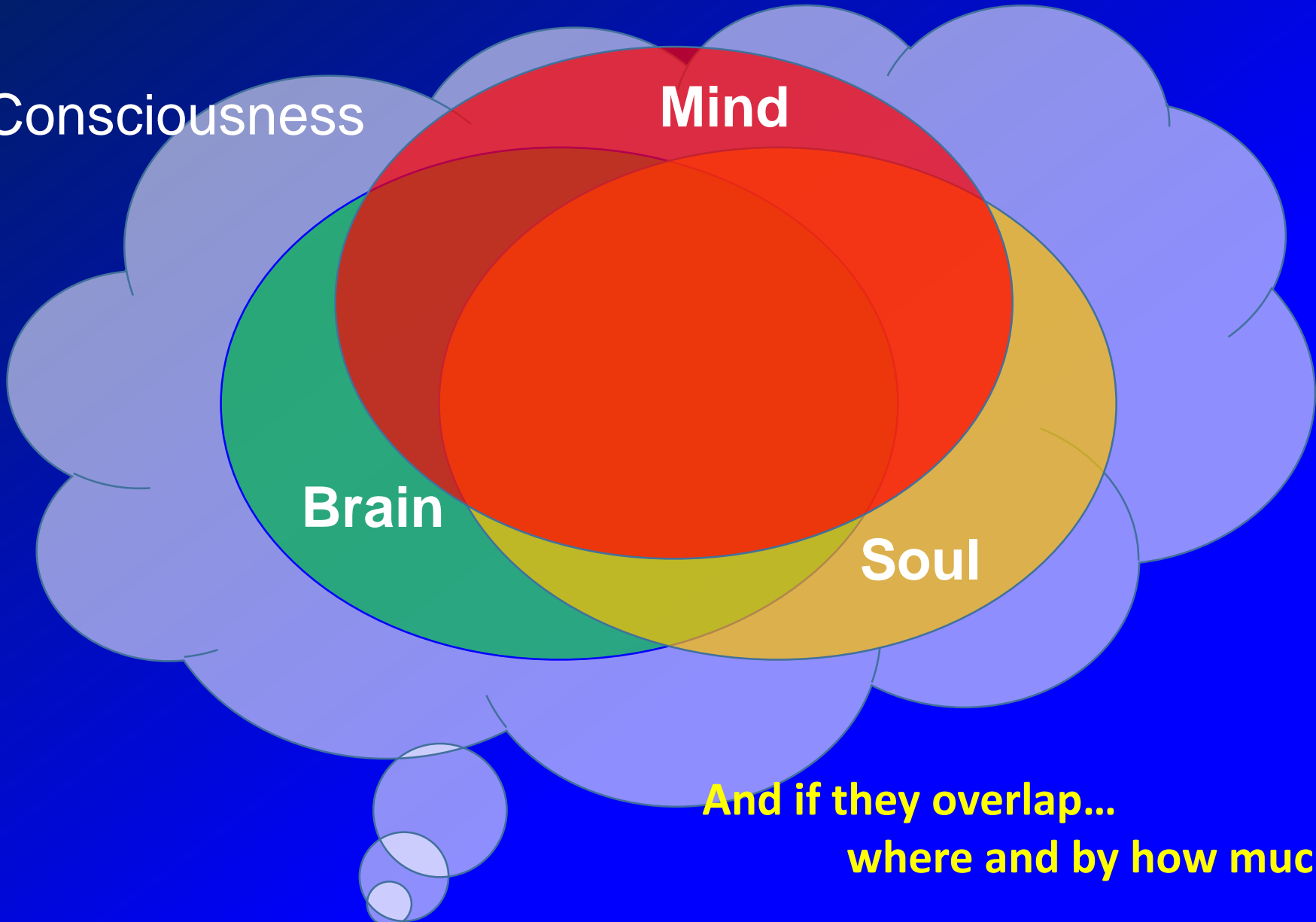
Consciousness

Mind

Brain

Soul

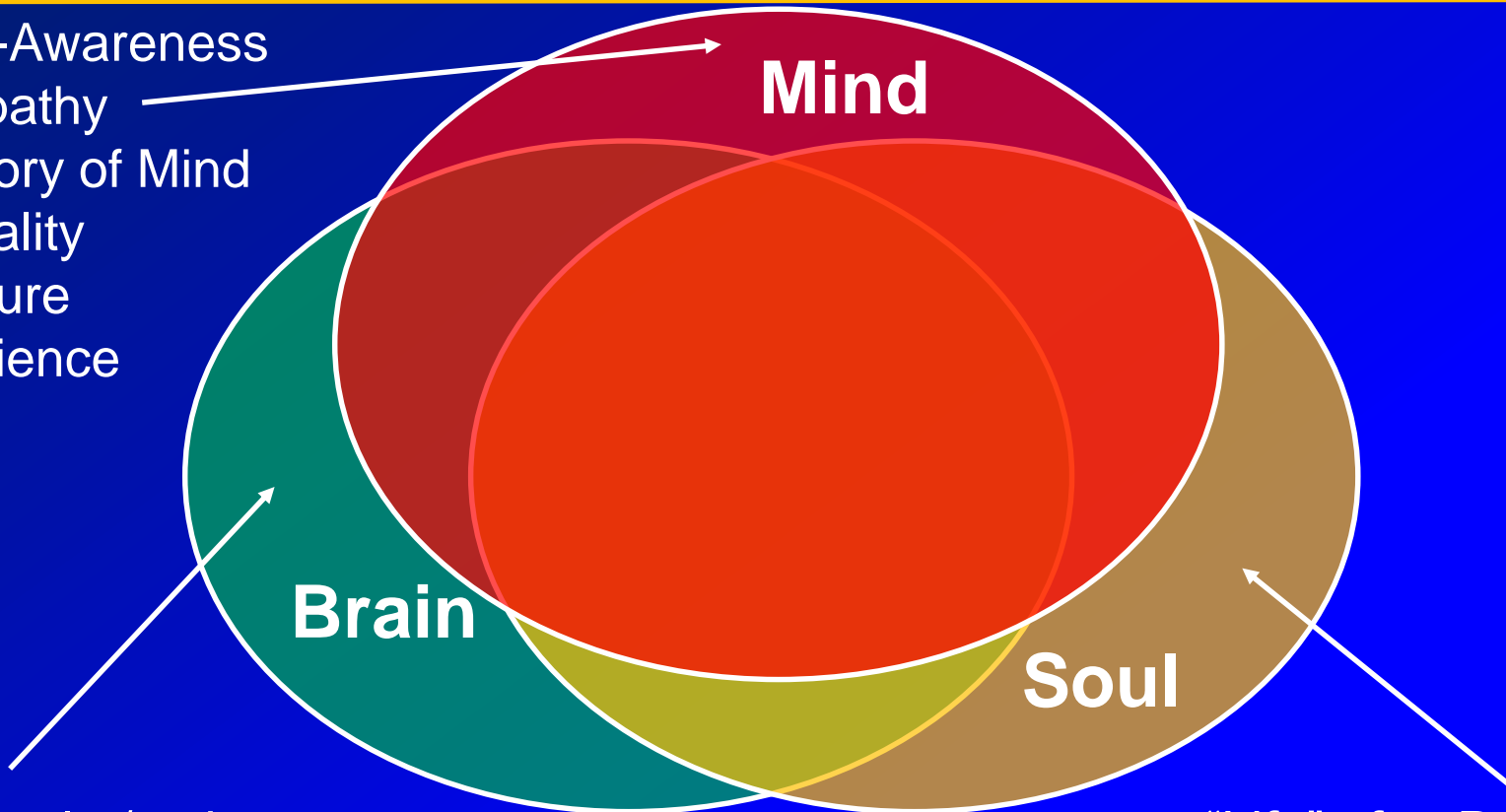
And if they overlap...  
where and by how much?



There are some functions that we can “generally” identify with each of these components, suggesting some justification for the concept that **BRAIN, MIND** and **SOUL** are **NOT** completely synonymous.

---

Self-Awareness  
Empathy  
Theory of Mind  
Morality  
Culture  
Sapience

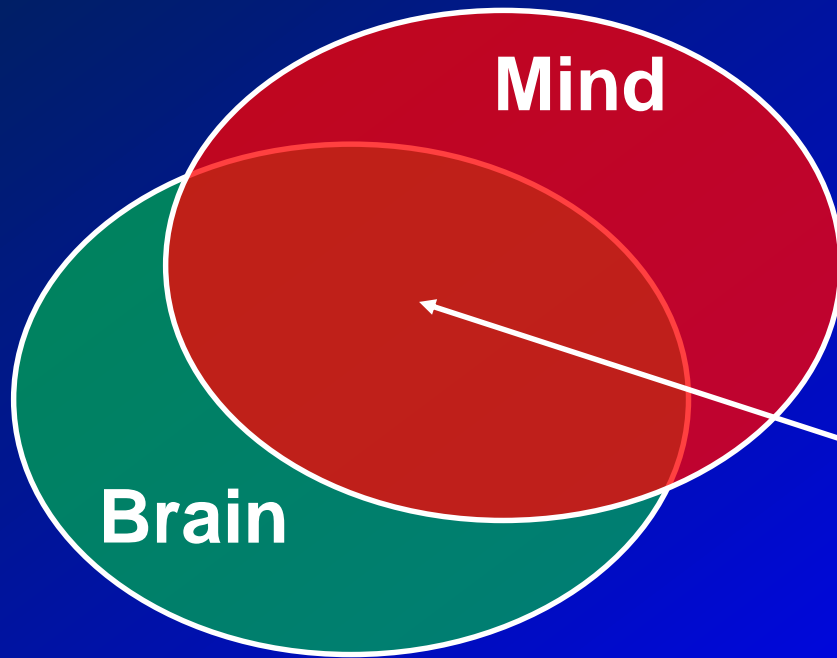


Startle / pain responses  
Fight / flight responses  
Heart and respiration rates  
Hormonal response  
Thermal regulation

“Life” after Death –  
appearing in earliest  
cultures

# We now know that there is very significant overlap between many mental “states” and specific, neurological activity in the *physical* brain.

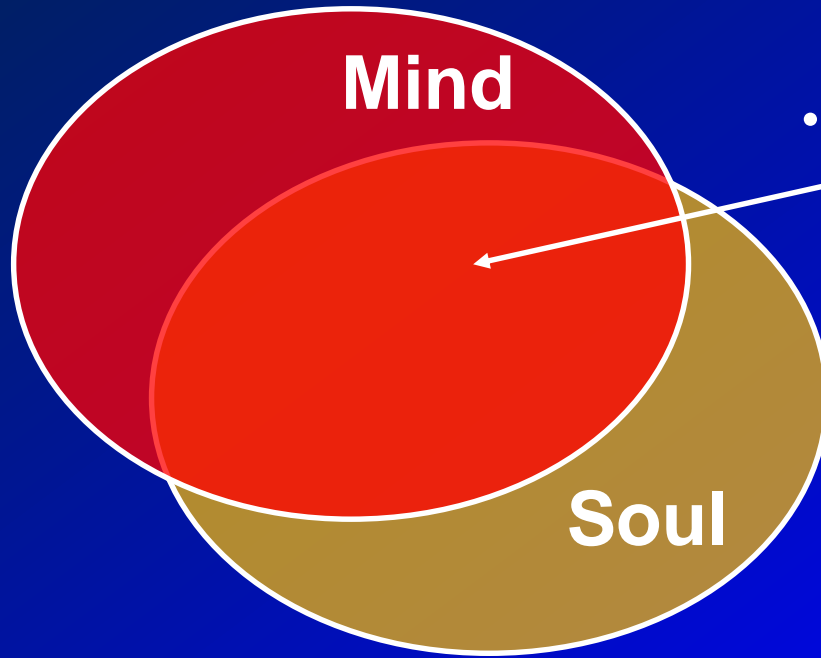
---



- A major focus of current neurological research is directed to “locating” areas of the brain that are activated when specific mental states, especially sensory related ones, are operative.
- The success of “brain mapping” (eg. using f-MRI) shows a strong OVERLAP between MIND and BRAIN in a great many areas.
- Not all mental activities have been “mapped” to specific brain area – but we see advances every day.
- Additionally, researchers can affect MENTAL states by stimulating parts of the BRAIN (psychoactive drugs – electromagnetic)
- Our post-Enlightenment outlook tells us that the, immaterial and non-locatable, function we call MIND must be the RESULT of what is happening neurologically in the BRAIN.
- **But the bi-directionality of the processes suggests we should be careful about assigning causality**

**Because both MIND and SOUL are immaterial, we are less able to say as much about the overlap.**

---



- Certainly the concept of religiosity:
  - Search for “Meaning”
  - Concept of a “Creator of the universe”
  - Concept of a “cosmic Ruler”
  - Concept of an anthropomorphic “Lord”  
or involved “supreme being”
  - Heaven, Hell, Predestination

**Big Question #3: How distinct are Brain, Mind and Soul as components of “Consciousness”**

# **An important aspect of understanding the overlap of Brain, Mind and Soul MAY be the concept of “emergence” as it applies to neuroscience, brain function, consciousness, and perhaps theology as well**

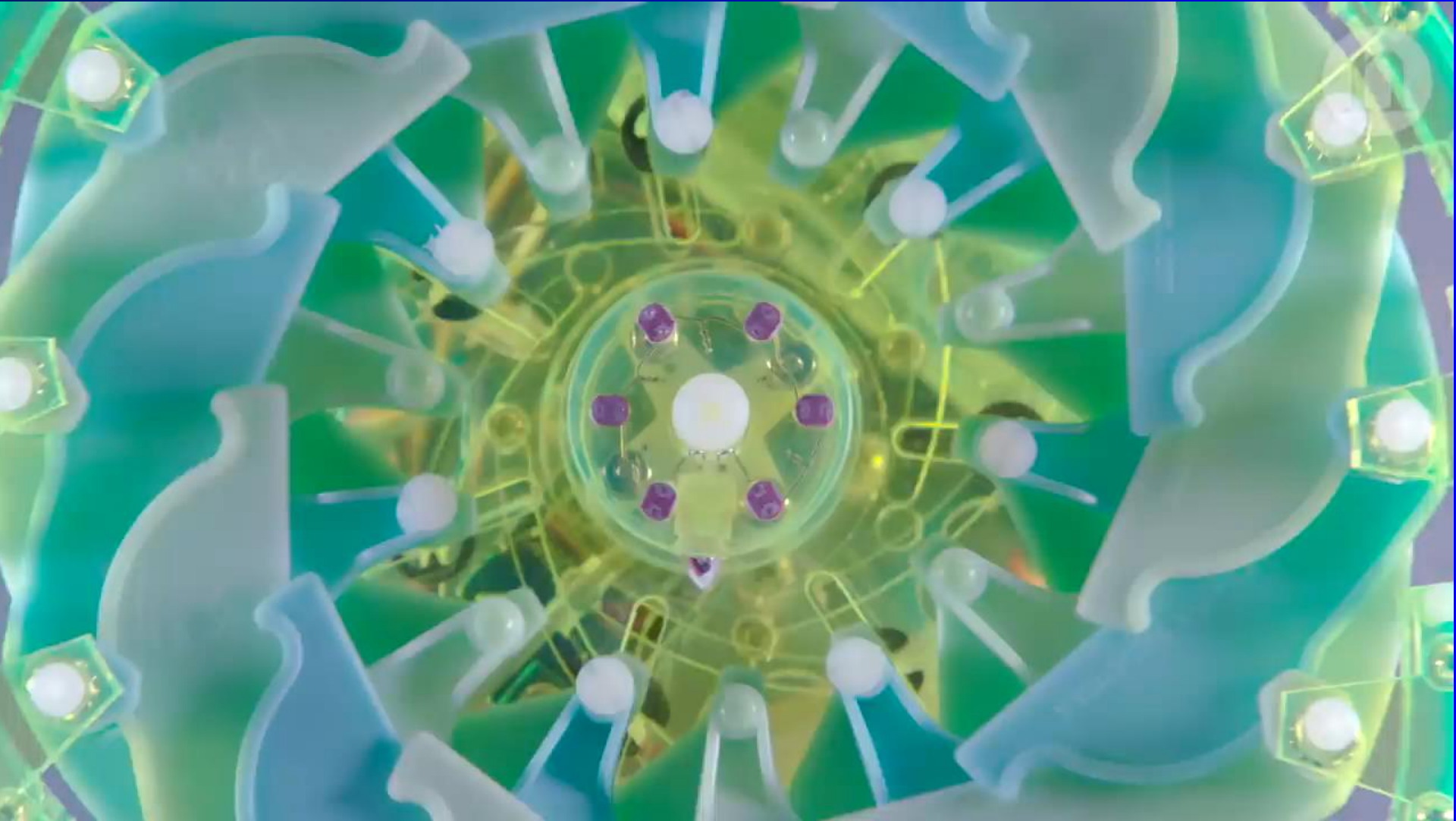
---

In systems theory, physical (and biological?) sciences; and in philosophy and art; “emergence” refers to a condition when a system displays properties or capabilities that are not possessed by any of its individual components.

- In the vernacular, emergence is when the “whole is other than the sum of its parts”
  - A time piece that can accurately mark the passage of time clearly has a capability that exceeds that of the individual gears, springs and bearings inside. But the “function” of timekeeping is a intentional objective of the design (and designer) of the timepiece from the outset.
  - Higher life forms clearly display emergence when they do things that individual cells cannot do... and those capabilities of higher life-forms, raise the distinction between “designed for function” or “emergence”
- Concepts of emergence can be further divided into weak and strong
  - Weak emergence occurs when individual elements remain unchanged and retain their independence.
  - Strong emergence occurs when the emergent capabilities can affect the individual elements producing irreducible change at the element level.

**To illustrate what emergent behavior might look like:**

---



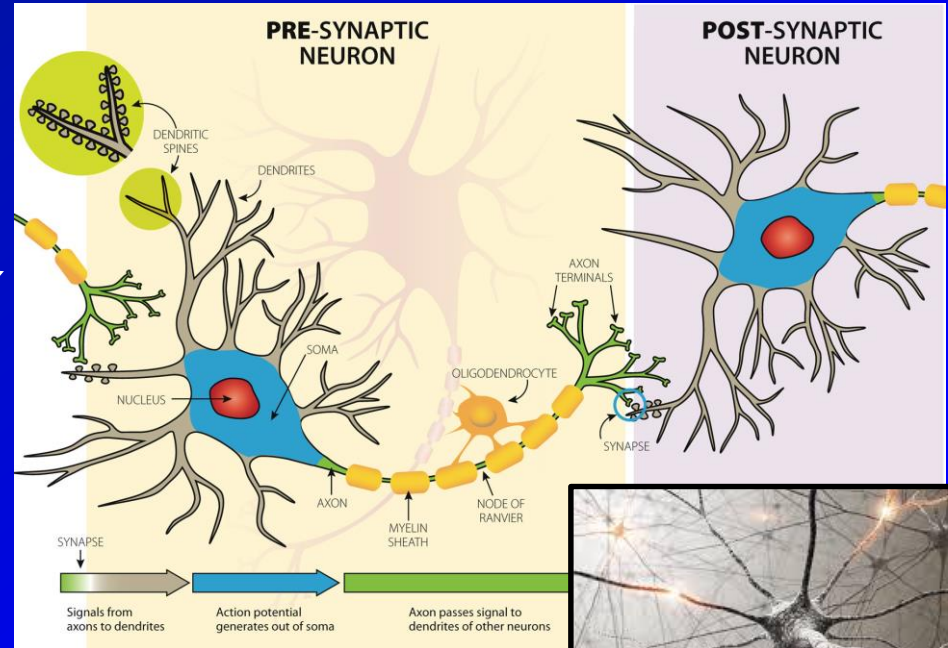
# Big Question #4: Is “MIND” nothing more than a (weakly) emergent property of complex (biological) neural networks.

Combine enough very simple particle robots (a few dozen) allow simple interactions and collective capabilities “emerge”

The BRAIN combines a huge number of neurons, and allows complex interactions between them.... and “mental” activity emerges.

**IF the “mind” simply an emergent property of complex (biological) neural networks is there any such capacity as Free-Will, ?**

**Relatedly could a similarly complex (non-biological) neural network display something like consciousness (mind)?**



# This Summer's Big Questions

---

1. Is this world -- the one we perceive around us, real – or is all this inside my head?
2. What do advances in robotic technology, machine learning, massive computational capability imply about the nature of the human Brain, Mind and Soul?
3. How distinct are Brain, Mind and Soul as components of “Consciousness”
4. Is “MIND” nothing more than a (weakly) emergent property of complex (biological) neural networks.... If so what are the prospects for Free-Will or for non-biological systems having, or developing a MIND – or a SOUL?



## Lecture II

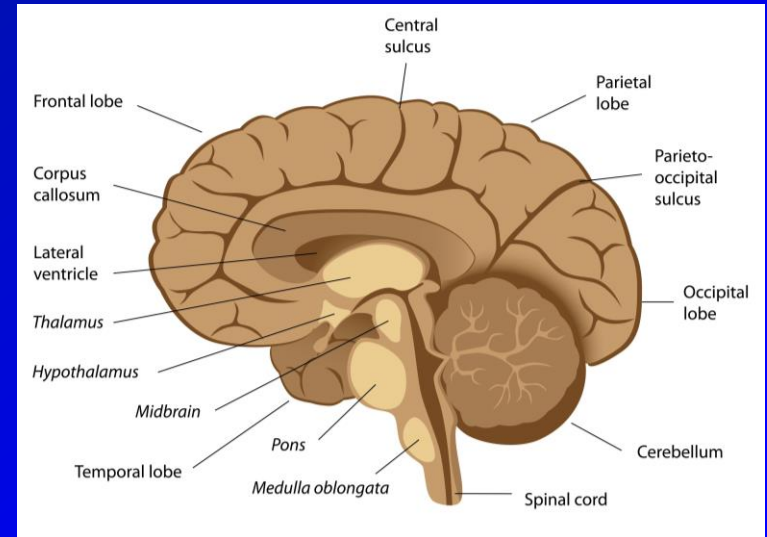
# Consciousness, Mind and Free-Will

June 12, 2019

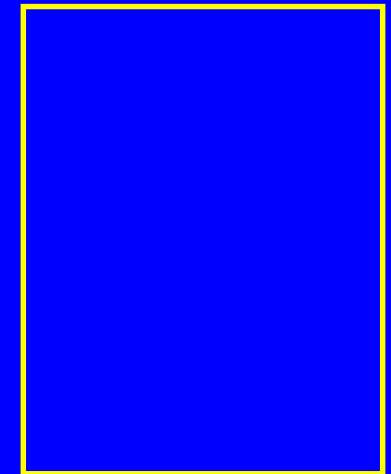
Chick will discuss issues of Mind and Free-Will reviewing some of the history of discourse on the topic

His talk will include a brief description of the structure of the brain, and how the brain operates to separate conscious from unconscious.

...and address a new theory of consciousness that can be simulated.



**Is the MIND separate from the Brain? If the Brain, a material object, produces all our thoughts, do we really have free will?**



Charles (Chick)  
Keller

# Lecture III

## Neuroplasticity: How the Mind Changes the Brain

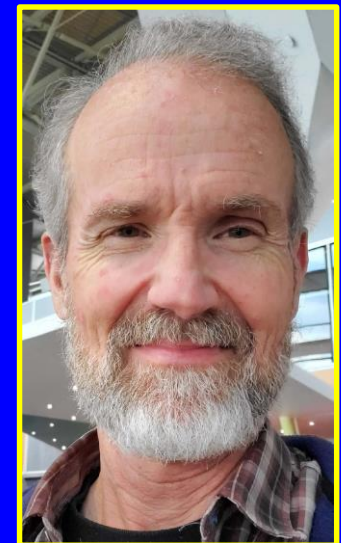
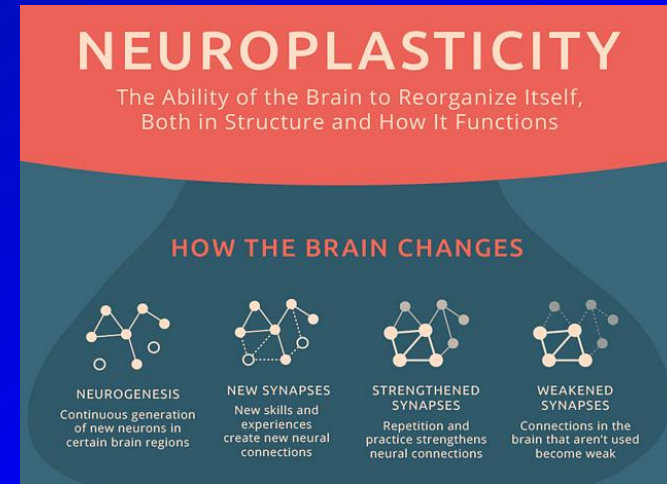
June 19, 2019

Neuroplasticity is the capability of our brains to undergo demonstrable changes in neurological structural – rewiring- in response to our environment, experiences and even our thoughts.

Nels will discuss some of the structure and neurological functioning of the brain and review some of the evidence for how that functioning can be altered – and by what conditions and agencies.

**Can we show that neuroplasticity gives evidence for:**

- **Top-down causality (“free will)**
- **Mind over matter (belief creates reality)**
- **Importance of controlling thoughts (mindfulness)**
- **Knowledge is written in flesh**
- **Value of anecdotes (power of a story)**



Nels Hoffman

# Lecture IV

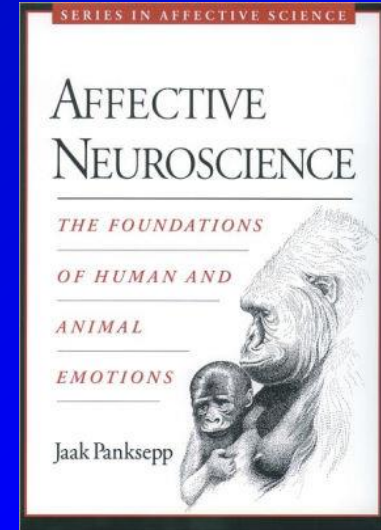
## Neuroscience and Emotion

June 26, 2019

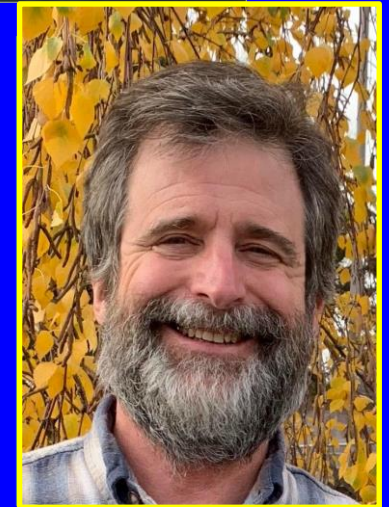
---

In his book, *Affective Neuroscience, the Foundation of Human and Animal Emotions*, Jaak Panksepp argues that major emotional systems are relatively fixed, and are common across animal species

Bob will discuss how the neural basis of these emotional systems dictate much of our behavior, emphasizing the risk of ignoring these systems



**If our emotional systems, the neural systems we share with most animals control much of our behavior and thought, how much “free-will” do we actually have?**



Bob Fuselier

## Lecture V - Keynote

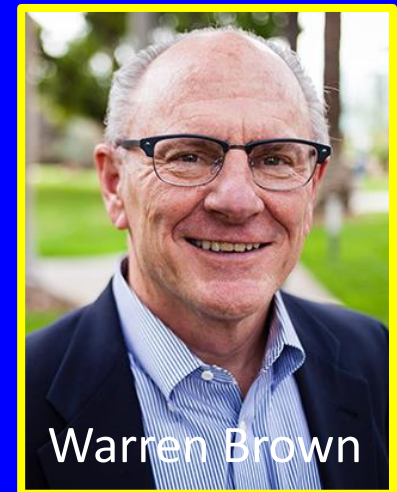
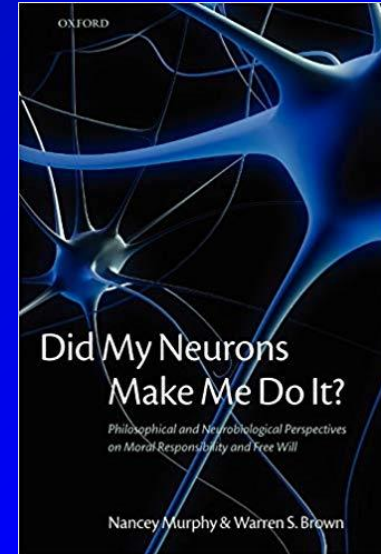
# Did My Neurons Make Me Do it?

July 10, 2019

Some approaches in modern neuroscience suggests that all mental life can be reduced to the activity of neurons implying that behavioral and moral “decisions” are by-products of neurological processes

This lecture explores philosophical options in understanding human nature, and argues for the possibility that genuine self-determination emerges in the functioning of complex neural systems.

**Can all of our mental life – our apparent choices and actions be ascribed to materialistic, deterministic neural processes, or can neurological process interact to produce “emergent” capability.**



# Lecture VI- Keynote

## Contextualizing Neuroscience: The Boundaries of Human Intelligence

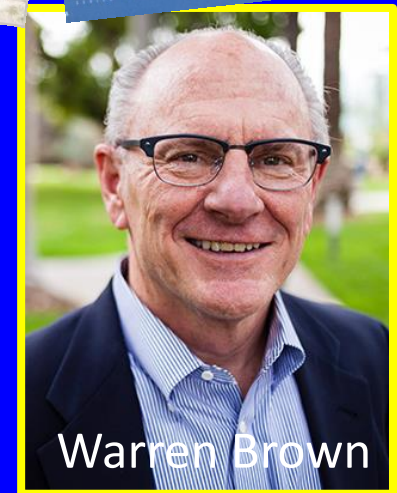
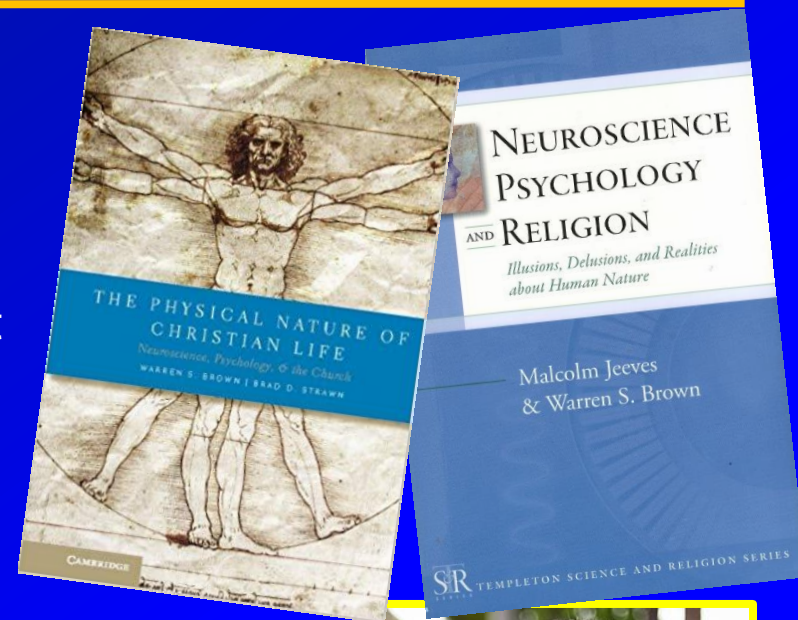
July 11 2019

Can the neurology (science) of brain function completely describe human intelligence?

This lecture will argue that body and extra-body context are not only implicated, but are inherent in the functioning of the networks that lead to intelligence.

Mind is a contextually extended process, and humans are distinctive as ready-and-willing cyborgs.

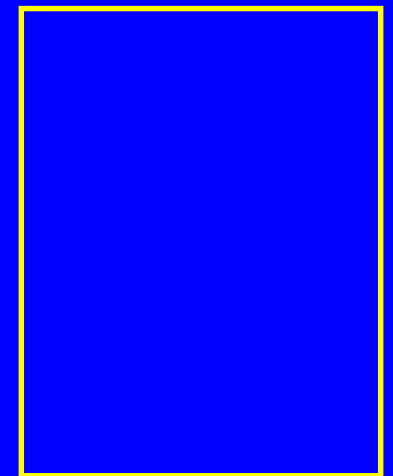
**Can all of our mental life – our apparent choices and actions be ascribed to materialistic, deterministic neural processes, or can neurological process interact to produce “emergent” capability.**



The term “deep learning” and its various synonyms have become a shorthand for the looming “singularity” when machine intelligence rivals-- and eventually supersedes – human intelligence.

While Hollywood’s maintains its “reflexively dystopian” vision, many serious writers also herald the coming technological apocalypse. Such authors take it for granted that the singularity is nigh and that the triumph of machine intelligence is not a matter of “if”, but of “how soon?”.

**Is there any credible evidence that machines have yet to take even rudimentary steps toward anything we would recognize as intelligence.**

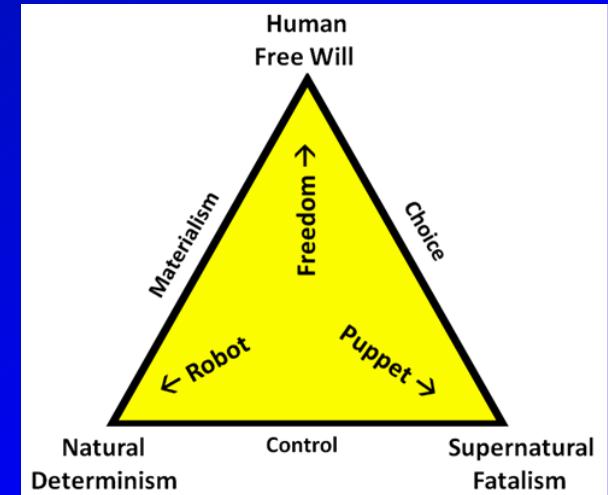


# Lecture VIII

## Evil and Responsibility

July 24, 2019

Evil – “I know it when I see it and I shudder when I think of it.” But, can we agree on how to define evil, its extent, and cause? Over the ages philosophers and theologians have tried to characterize evil.



The responsibility for evil has been assigned to many agents

- no one (natural determinism)
  - to evil spirits (Satan, demons, gods)
    - to free-willed humans
      - to the all-good God.

**Who is to blame for evil that you have experienced or heard of?**



## Lecture IX

# Miracles: Divine Free Will -- What, How and Why

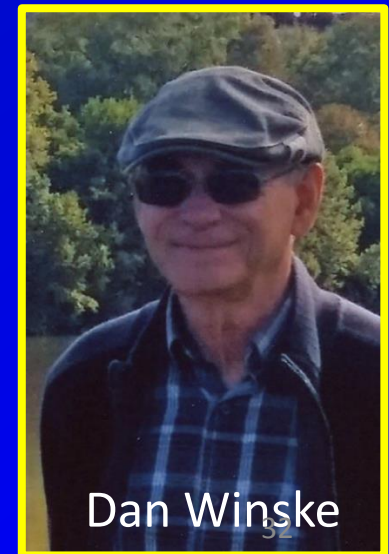
July 31, 2019

---

Dan Winske will address the nature of miracles; defining them more precisely, through a few familiar examples, and discuss how, and why, do miracles occur.



**Having considered the role of Free Will in human consciousness (brain-mind and soul), what do miracles tell us about how and why God interacts with the world?**





# This Summer's Series

---

- June 5      **The Questions**      **Bob Reinovsky**
- June 12     **Consciousness: Material of Immaterial**      **Chick Keller**
- June 19     **Neuroplasticity: How the Mind Changes the Brain**      **Nels Hoffmann**
- June 26     **Neuroscience and Emotions**      **Bob Fusilier**
- July 3      **Holiday Week – No meeting**
- July 10     **Keynote: Did My Neurons Make Me Do It?**      **Warren Brown**
- July 11     **Keynote: Contextualizing Neuroscience:  
The Boundaries of Human intelligence**      **Warren Brown**
- July 17     **The Emperor Has No Brain:  
The Reality of AI and the Illusion of Intelligence**      **Garrett Kenyon**
- July 24     **Evil: Is anyone Responsible**      **Gerry Wood**
- July 31     **Miracles, Divine Free Will**      **Dan Winske**

Thanks for indulging  
me!

# This Summer's Big Questions

---

1. Is this world -- the one we perceive around us, real – or is all this inside my head?
2. What do advances in robotic technology, machine learning, massive computational capability imply about the nature of the human Brain, Mind and Soul?
3. How distinct are Brain, Mind and Soul as components of “Consciousness”
4. Is “MIND” nothing more than a (weakly) emergent property of complex (biological) neural networks.... If so what are the prospects for Free-Will or for non-biological systems having, or developing a MIND – or a SOUL?

# Backup