

Ultrasound Neuromodulation of The Pineal Gland

A Rigorous Investigation of Subjective Effects



Introduction Deck for Potential Donors
Institute for Advanced Consciousness Studies

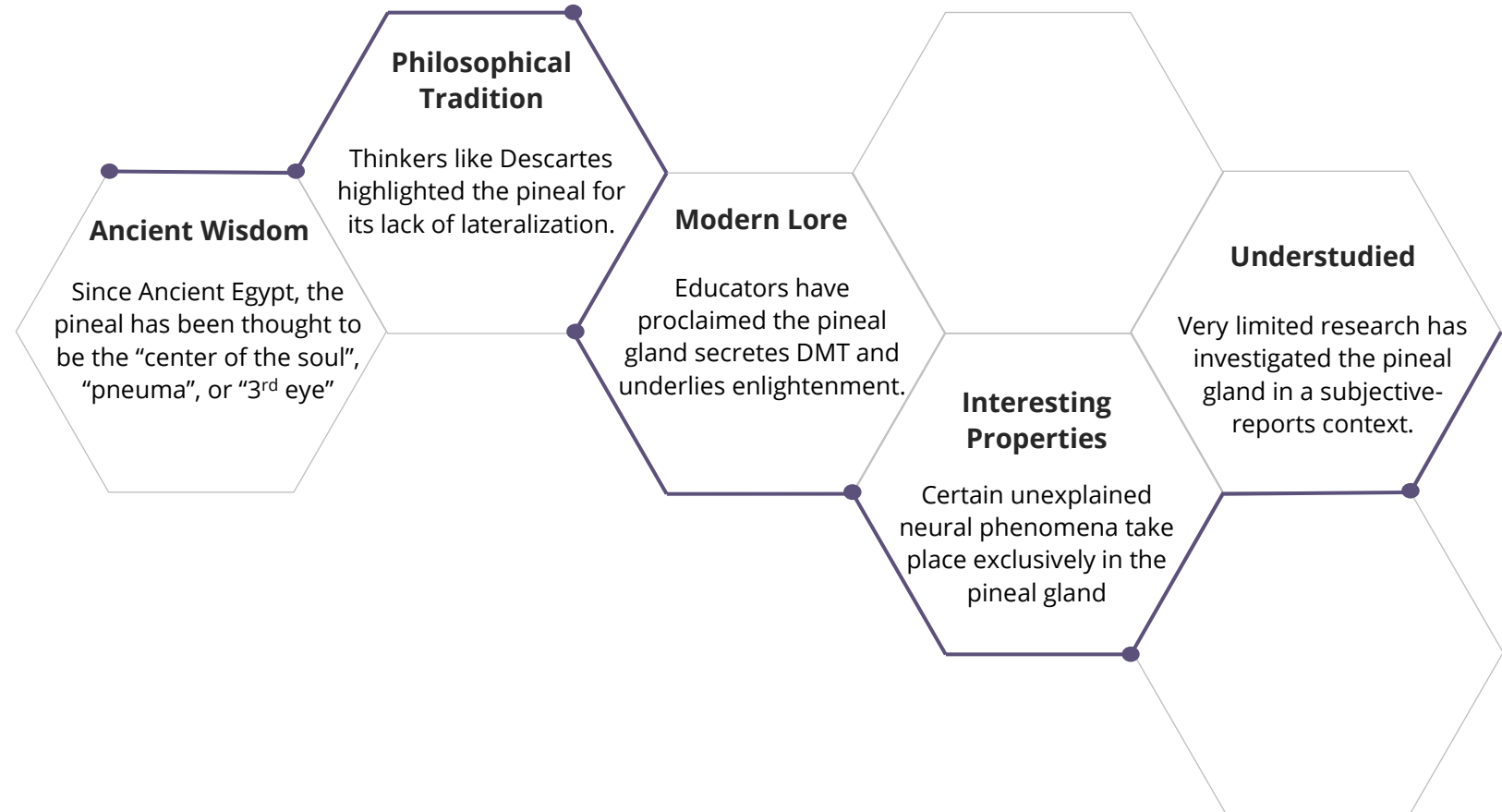


Why The Pineal Gland?

There has been a collective surge in “spiritual yearning”, with practices like meditation, breathwork, and kundalini yoga confidently crediting the pineal gland with supporting transcendent experiences—despite a lack of scientific support.

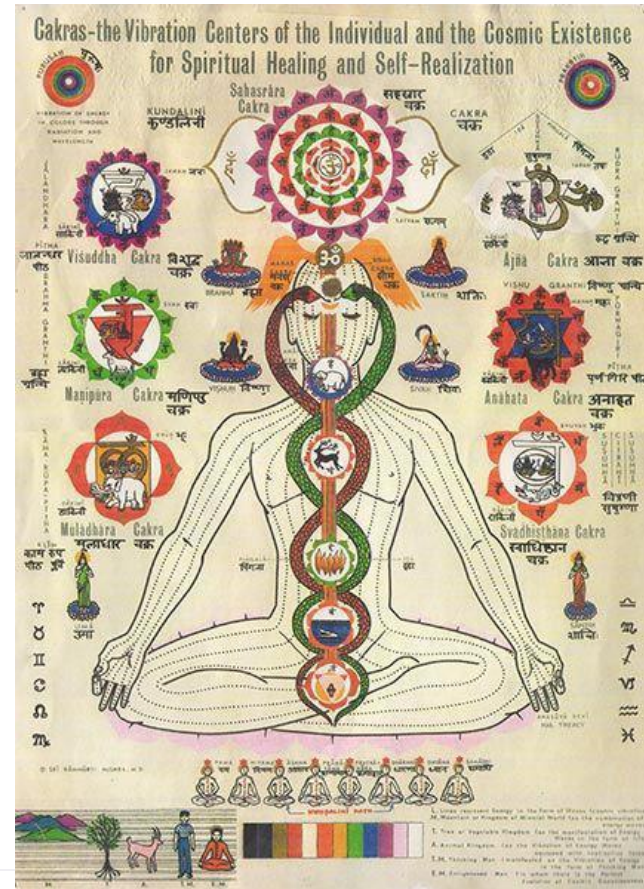
This stems from ancient and modern beliefs about the role of the pineal gland in supporting (changes in) consciousness at large.

For the first time in history, the intersection of technology and neuroscience permits for rigorous investigation into the contribution of the pineal gland to conscious experiences.

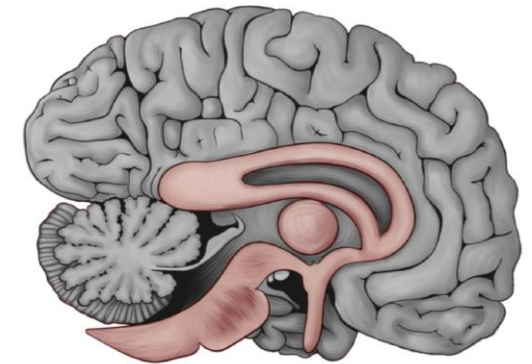


Ancient Wisdom

- Ancient cultures, including the Egyptian (Horus), Greek (Hermes), and Hindu (Shiva) civilizations refer to a “third eye” that, throughout time, has been said to see into higher realms of consciousness.
- In the Hindu-Yogic tradition, the pineal gland is associated with the Ajna chakra (third-eye) and an interface between the “spiritual” and physical realms. This has a clear parallel to Cartesian interpretations of the pineal gland as the connection between the soul and body, described more on the next page.
- While ancient texts and drawings (e.g., Eye of Horus, pinecones) seem to suggest the centrally-located pineal gland as the anatomical structure of intended reference, this translation is purely speculative.



The Hermes Staff includes a pinecone at its apex



Eye of Horus overlaid on a sagittal slice of the brain

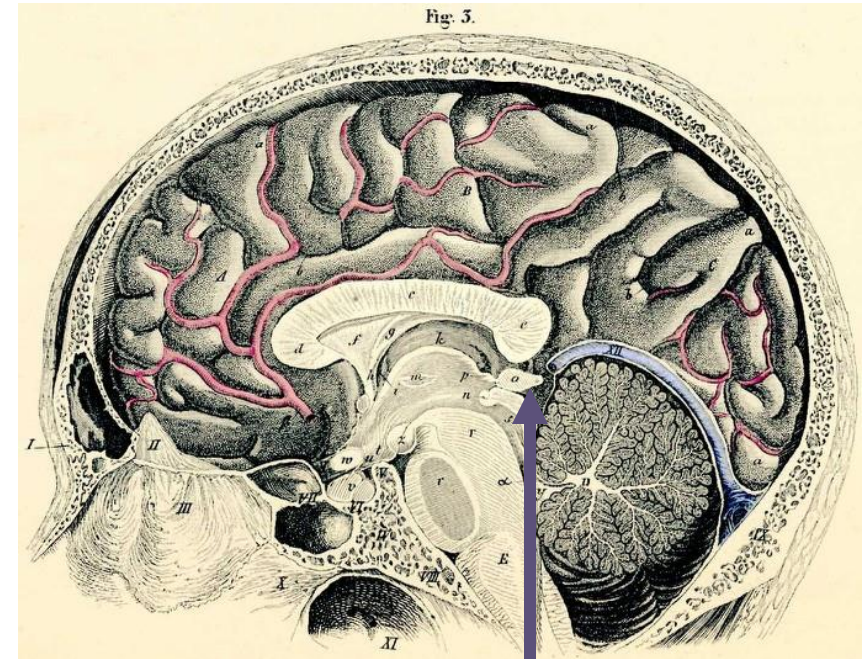
Philosophical Tradition

In his search for “the first instrument of the soul” or “sensus communis”, Rene Descartes pointed to the pineal gland as a likely seat of consciousness due to its physical properties that mirrored the experience of subjectivity:

- It is located in the center of the head
- It is not discretized (i.e. did not have lateralization* like the rest of the brain).

The reason I believe this is that I cannot find any part of the brain, except this, which is not double. Since we see only one thing with two eyes, and hear only one voice with two ears, and in short have never more than one thought at a time, it must necessarily be the case that the impressions which enter by the two eyes or by the two ears, and so on, unite with each other in some part of the body before being considered by the soul.

- Rene Descartes (Treatise of Man)



Pineal Gland

* Modern investigations have indeed shown the pineal gland has L and R subregions.

Modern Lore

- A plethora of media prescribe a set of pay-gated practices (e.g., yogic breathwork, guided meditation, pure tone listening) to “activate” the pineal gland to reach transcendence and/or astral travel.
- It has been suggested that the mystical experiences evoked by DMT are, in part, due to pineal gland upregulation.
- Calcification of the pineal gland has been linked to conspiracies of mind control through fluoride in public drinking water.
- These beliefs are supported (if at all) by scant, unreliable evidence.



963Hz + 852Hz + 639Hz | Miracle Tones | Activate Pineal Gland | Open Third Eye | Heal Heart Chakra

17M views · 4 years ago

Meditative Mind

963Hz + 852Hz + 639Hz | Miracle Tones | Activate Pineal Gland | Open Third Eye | Heal Heart Chakra Copyright c 2018 ...



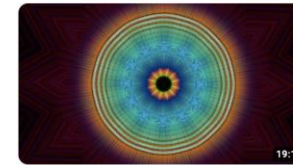
Instant Third Eye Stimulation - M1 (Warning: Very Powerful!)

12M views · 6 years ago

Transcending Vibrations

DIRECTIONS: Pineal stimulation occurs instantly with each meditation. Take steps to decalcify the pineal gland for best results.

CC

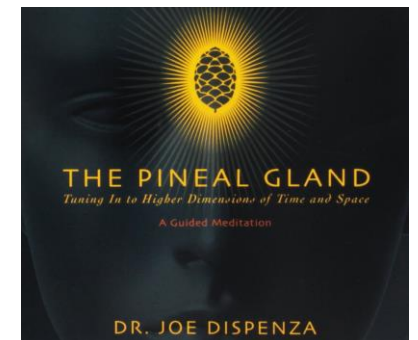
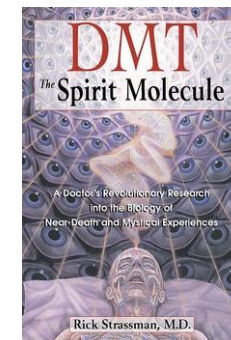


Instant Pineal Activation • Pure Tones • (Warning Extremely Powerful!)

11M views · 5 years ago

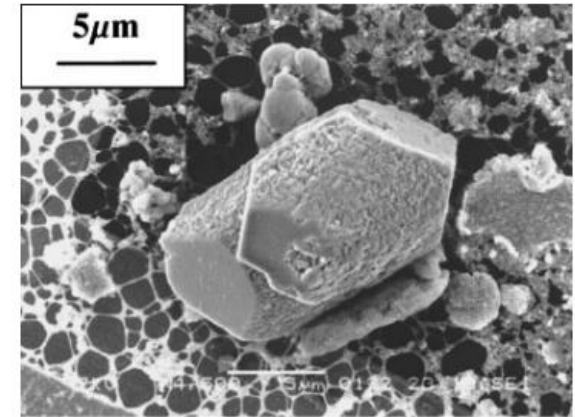
Transcending Vibrations

Delta, Theta, and Alpha Monaural Brainwave Entrainment Complete Schumann Resonances Complete Solfeggio Frequencies ...



Interesting Properties

- There are crystalline structures located in the pineal gland that appear to have piezoelectric properties. That is, the structure of the pineal gland seems capable of generating electricity from mechanical pressure. No other location in the brain has these. Piezoelectricity is the mechanism by which ultrasound is generated and the impact of ultrasonic waves onto a true piezoelectric substance will generate electricity.
- Neurons in the pineal gland are photoreceptor derived (i.e., descended from light sensitive neurons), suggesting the pineal may be an “atrophied photoreceptor” that was formerly an evagination of the brain, like the “parietal eye” seen in some vertebrates.
- The pineal gland is isolated from the blood-brain-barrier with highly permeable capillaries and is thus in more direct contact with both blood and CSF. This widens the category of compounds that may reach the pineal gland from the blood or vice versa.



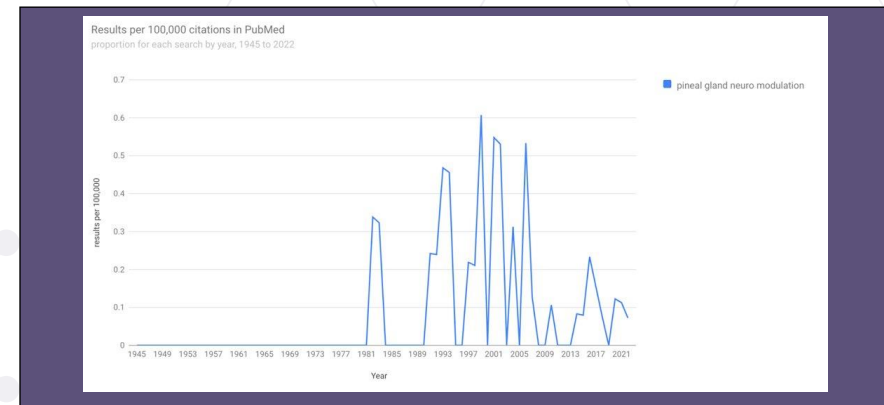
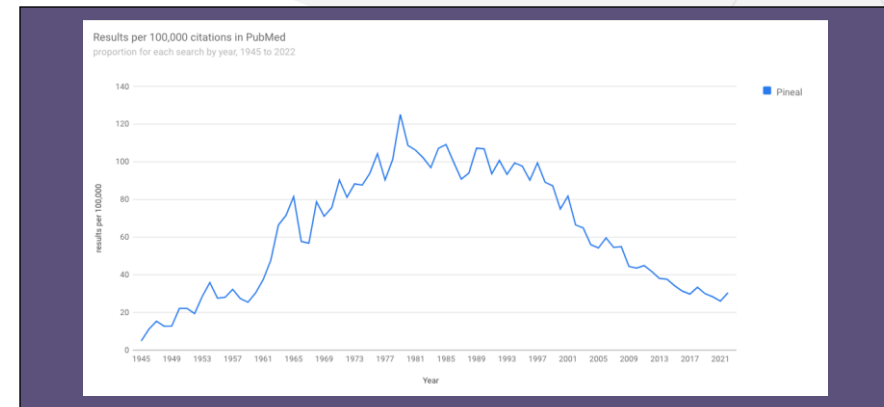
Potentially piezoelectric crystalline structures in the pineal gland



A “parietal eye” is part of the epithalamus of some vertebrates

Understudied

- Before the late 1970s, scientific interest in the pineal gland was growing rapidly.
- In the last 50 years however, interest has slowed, due to an association with pseudoscience and a community-wide acceptance of its limited function in circadian rhythms.
- At its peak in the late 90's, research on Pineal Gland modulation remained extremely sparse (~6 articles in every 1 million published).
- **A study that directly modulates the activity of the human pineal gland has *never* been conducted.**



Why Study The Pineal Gland?

Specifically, why should we probe the subjective phenomena associated with direct, non-invasive pineal gland modulation?



Maybe they were on to something?

Ancient Wisdom Can Spur Modern Insight

Ancient medicinal practices have inspired the development of highly effective and scientifically proven medicines (Aspirin, Morphine), procedures (cataract surgery), and pharmacokinetics (DMT + MAOIs).



Is this snake oil?

Modern Lore Can Be Misleading and Dangerous

Hundreds of thousands of people make great sacrifices to pay millions of dollars to attend retreats focused on pineal activation that promise to relieve them of serious illness and psychiatric conditions.



Why so mysterious?

The Pineal Gland's Unique Properties are Understudied

Avoidance of pineal gland research, due to its pseudoscientific associations, presents a rich opportunity for scientists to potentially make ground-breaking discoveries about the brain and consciousness.

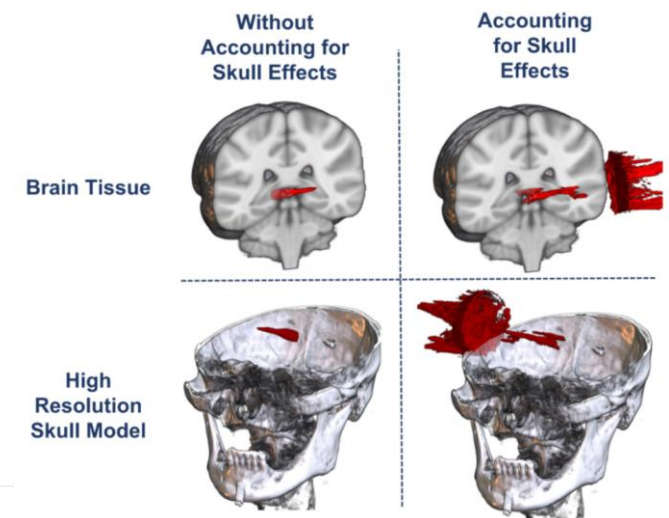
Without scientific data, we cannot separate potentially useful fact from potentially dangerous fiction

How To Do It: Ultrasound

- Transcranial Focused Ultrasound Stimulation (tFUS) is a breakthrough technology that allows researchers to use images from an MRI to precisely target and modulate the activity of practically any region in the brain, with a high degree of precision.
- A leading theory of the mechanisms supporting tFUS is that it applies mechanical pressure to its target regions, which is particularly serendipitous with regards to the potentially piezoelectric crystals in the pineal gland. Ultrasonic pressure waves applied to piezoelectric crystals will produce electricity, which may facilitate stimulation of this region in particular.
- Ultrasound is highly effective, safe and has already been used to help wake up individuals from comatose states.



IACS uses sophisticated ultrasound procedures to target deep-brain structures



We have already modeled a lateral trajectory to safely and precisely target the pineal gland

How To Do It: Study Design

30 Subjects in a 4-Week Crossover Intervention

MRI, Baseline

**Pineal Gland
Neuromodulation**

**Active Control
Neuromodulation**

**Sham
Neuromodulation**

**the order of sites receiving neuromodulation will be counter-balanced across subjects*

Week 1

- MRI to support precise targeting
- Obtain baseline trait measures to capture changes + account for individual differences

Week 2

- Ultrasound stimulation to Target 1.
- Collect state-sensitive measures of micro-phenomenology and mindfulness.

Week 3

- Ultrasound stimulation to Target 2.
- Collect state-sensitive measures of micro-phenomenology and mindfulness.

Week 4

- Ultrasound stimulation to Target 3.
- Collect state-sensitive measures of micro-phenomenology and mindfulness.

Why Us?

- IACS is a 501(c)(3) non-profit that conducts innovative research at the interface of academic rigor and startup flexibility. Our network of collaborators and university appointments (e.g., UCLA, USC, MIT) positions us as a top-tier private research institute with minimal bureaucracy.
- Our team consists of world-leading experts in tFUS, neuroimaging, and experimental design; we are already using tFUS to induce deep meditative states.
- Our team is uniquely positioned to conduct a thorough, unbiased scientific investigation, despite this topic's association with pseudoscience and controversy.
- Our laboratory has extremely low overhead costs due to other sources of funding, so we can conduct this novel research on a remarkably low budget.

Jezabel May



Nicco Reggente, Ph.D.



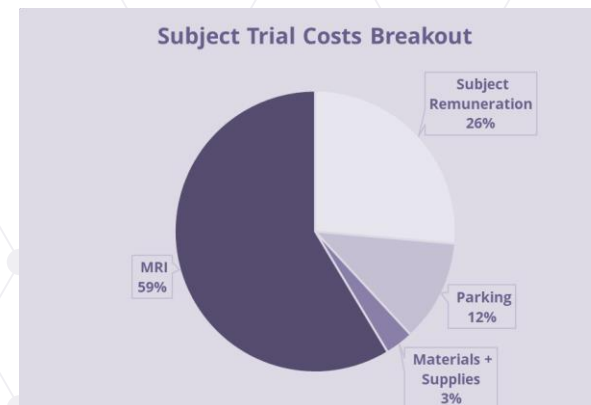
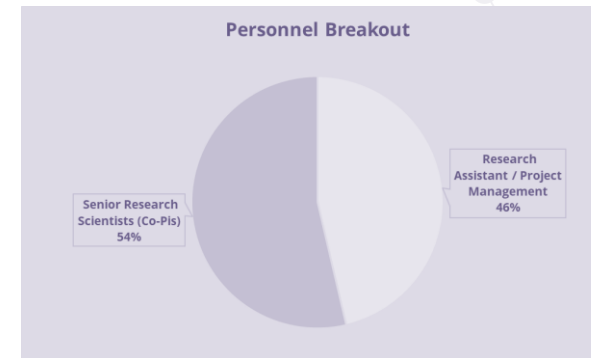
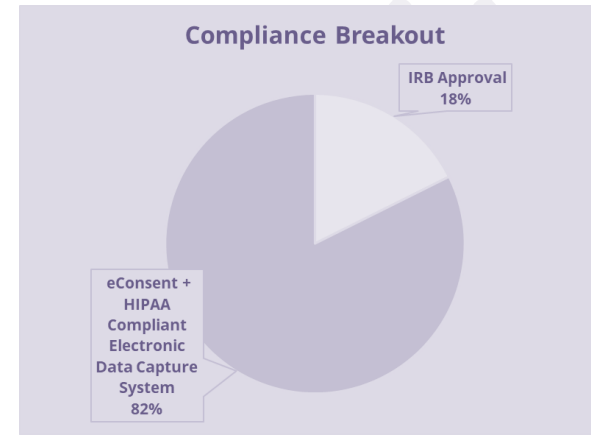
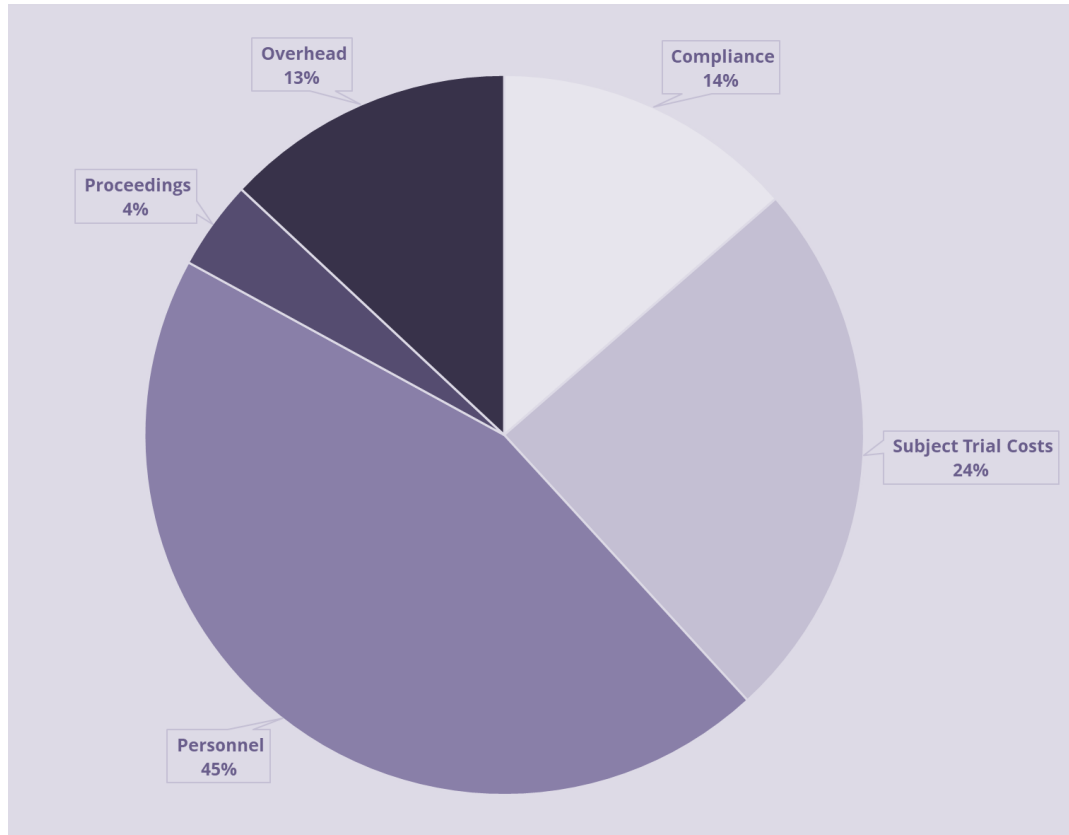
Reed Bender



Joshua Cain, Ph.D.



Budget: \$125k



What That Gets Us

By making a tax-deductible donation to support this research you are:

- Helping make known the unknown by injecting information into a domain of science that is criminally understudied yet over-zealously touted.
- Funding personnel that are genuinely committed to conducting this first-of-a-kind research endeavor.
- Positioning yourself at the new frontier of exploring esotericism with scientific rigor and open-minds to separate signal from noise.

01

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03

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