

Potential Contributions of Cosmological Neuroscience to the Future of Brain Research

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Abstract

This work presents cosmological neuroscience as an interdisciplinary field placing the essence of neuroscience into cosmic contexts by the vision of a God-inspired Soul of Multiverse, viewing the human brain as an organ empowered by a Soul in its prefrontal cortical neural supercircuitry, and intending to look into the relationship between these systems by wearable devices collecting behaviorally correlated EEG data with 2 millisecond resolution for offline dynamic neurocombinatorics. It is acknowledged that this effort has been inspired as much by Jesus, Rabindranath Tagore and other sages as by Alfred Russel Wallace, Francis Crick and other scientists. The paper suggests the following cosmological neuroscience studies in future brain research: (1) Exploring the origin of consciousness on Earth and its evolution that generated the human Soul and its noospheric expansion; (2) Studying the human Soul's basic mechanisms and its associated circuitry able to sense the cosmic program for biological and artificial intelligences; and (3) Inspiring engineers to develop the field's envisioned creativity monitoring and God-experience monitoring devices.

Keywords: Multiverse, Soul, Prefrontal Cortex, Sages, Wearable Devices, Artificial Intelligence.

Introductions

Cosmological neuroscience is an interdisciplinary field integrating scientific facts, religious insights, philosophical suggestions, engineering rules and artistic tools to place the nervous system into cosmic contexts in order to gain insight into the laws that made possible the appearance and evolution of brain structures on Earth, leading to the development of the human Soul and its digital Noospheric expansion with the potential of letting humankind sense the likely governing force behind all: a Soul of Multiverse created by a divine existence. Though these ideas were first sketched in this author's science-fiction (Ludvig, 2017), it was followed by a substantial output of related philosophical and neurophilosophical articles (Ludvig, 2022a,b; Ludvig, 2023a,b; Ludvig, 2024a,b,c; Ludvig, 2025a; Ludvig, 2026) and a summarizing book (Ludvig, 2025b).

The field is too new and too out of mainstream intellectual systems to be appreciated by the academic world, but the digital Noosphere is certainly aware of it. For example, in a search by this author on February 13, 2026, Google's Gemini AI responded in the following way to the question of what Nandor Ludvig's role is in cosmological neuroscience:

"Nandor Ludvig is an independent neuroscientist and MD who developed the interdisciplinary field of cosmological neuroscience. He serves as the primary architect of this framework, which seeks to integrate neurobiological facts with religious, philosophical, and engineering insights to study the nature of the "Soul" across multiple scales."

But will this philosophy grow or disappear under the pressure of time? While this is impossible to know, the present paper outlines cosmological neuroscience's potential.

The author's background in basic and applied brain research

In my medical school years in Pécs, Hungary, I was privileged to perform brain research studies in the laboratory of Kálmán Lissák, former collaborator of Harvard's Walter B. Cannon (Cannon & Lissák, 1939; Ludvig et al., 1981). Then I spent decades with working in neuroscience, publishing results of both basic and applied brain research studies (Figure 1).



Long-term behavioral, electrophysiological, and neurochemical monitoring of the safety of an experimental antiepileptic implant, the muscimol-delivering Subdural Pharmacotherapy Device in monkeys

Laboratory investigation

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United States Patent
Ludvig et al.

(10) Patent No.: US 9,233,237 B2
(45) Date of Patent: Jan. 12, 2016

APPARATUS AND METHOD FOR PERIODIC FLUID-DELIVERY/FLUID-REMOVAL CYCLES IN THE CRANIAL SUBARACHNOID SPACE TO TREAT CEREBRAL CORTICAL DISORDERS

(58) Field of Classification Search
CPC A61M 2005/14208; A61M 2202/0464; A61M 2025/0057; A61M 5/14276; A61M 5/1723; A61M 27/006; A61M 27/002; A61M 2210/0693; A61M 2205/3523; A61B 5/0475; A61B 5/4839; A61B 5/686; A61B 5/6868; A61B 5/031

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USPC 604/9
See application file for complete search history.

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2003/0160857 A1* 5/2003 Peduzzi et al. 604/401

Figure 1: First Panel: Front page of my key basic neuroscience paper in *Physiology & Behavior* on hippocampal place cells (Ludvig, 1999). **Left Panel:** Front page of my team’s paper in the *Journal of Neurosurgery* on the Subdural Pharmacotherapy Device I developed for the safe and effective treatment of otherwise intractable neocortical epilepsies and other cerebral cortical disorders (Ludvig et al., 2012). **Right Panel:** Front page of *US Patent* 9,233,237 B2 awarded for this pharmacotherapy device (Ludvig et al., 2016).

Development of the Idea of Cosmological Neuroscience

Though my first cosmological neuroscience paper was published – after its rejection or ignorance by ten academic journals -- in 2022, it was the product of lifelong learning and neuroscientific studies along with numerous inspirations (Table 1), however the true impact of these inspirations was not realized in the times of encountering them.

Table 1: The most important inspirations behind the author’s cosmological neuroscience.

Inspirers	A key observation by the inspirer	Reference
Lao-Tzu	“...mystery and reality emerge from the same source.”	“Tao Te Ching”, Verse 1
Jesus	“God is spirit and those who worship him must worship in spirit and truth.”	New Testament John 4:24
Spinoza	“God revealed himself to the Apostles through Christ’s mind, as previously God revealed himself to Moses...”	“Theologico – Political Treatise”
Newton	“... to treat God from phenomena is certainly part of natural philosophy.”	“Philosophiae Naturalis...”
Alexander von Humboldt	“A physical delineation of nature terminates at the point where the sphere of intellect begins...”	(Humboldt, 1997) p.359
Imre Madách	“God: I told you man, strive and never lose your faith.”	“The Tragedy of Man” Scene 15
Alfred R. Wallace	“... a superior intelligence has guided the development of man in a definite direction and for a special purpose...”	(Wallace, 1870) p.359
Rabindranath Tagore	“... the Eternal Spirit of human unity... inspires in us that are the expressions of a Universal Spirit...”	(Tagore, 1931) p.17-18
Werner Heisenberg	“In science... it is impossible to open up new territory unless one is prepared to leave the... anchorage of established doctrine.”	(Heisenberg, 1971) p.70
Albert Einstein	“A knowledge of existence of something we cannot penetrate... the profoundest reason and radiant beauty... constitute the truly religious attitude.”	(Einstein, 1935) p.4
Alan Turing	“Hyperboloids of wondrous Light / Rolling for aye through Space and Time / Harbor those Waves which somehow might / Play out God’s holy pantomime.”	(Turing, 2015) p.244
Francis Crick & Leslie Orgel	“... we have considered Directed Panspermia, the theory that organisms were deliberately transmitted to earth by intelligent beings on another planet.”	(Crick & Orgel, 1973) p. 341
Edgar Mitchell	“...And there was the sense that our presence as space travelers and the existence of the universe itself, was not accidental, but there was an intelligent process at work.”	(Mitchell, 2022) p.4

In addition, I was also deeply influenced by Teilhard de Chardin's recognition of humankind's emerging collective mind he named "*Noosphere*" (Teilhard de Chardin, 1959); Michael Behe's Darwin-challenging idea of "*irreducible complexity*" in cellular structures (Behe, 1996); Paul Davies' book "*The Mind of God*" concluding that "*We are truly meant to be here.*" (Davies, 1992); and Patricia S. Churchland's book on Conscience (Churchland, 2019).

The Distinct Approaches and Concepts of Cosmological Neuroscience

The field's distinguishing intellectual system, separated from those of mainstream cosmology and neuroscience, is its coherent synthesis of 3 novel ideas. These are: (1) Placement of the nervous system into cosmic contexts, along with the specification of some possible pre-physical/pre-chemical laws of a God-inspired Soul of Multiverse responsible for Life and its neural products on Earth; (2) Hypothesis of the Human Soul as a prefrontal cortical neural supercircuitry synaptically connected to a neighboring God-sensing area with both co-evolving with Artificial Intelligence in our time; and (3) Expansion of these ideas with engineering to develop wearable devices for generating objective, behaviorally correlated EEG data on the multiscale operation of Soul. These strategies are detailed below:

First, cosmological neuroscience places the nervous system into cosmic contexts to evaluate the most likely origin of brain structures on Earth, indeed, the cosmic program that led to the appearance of Consciousness to house a Soul in high-order animals and the leap of the Human Soul currently transcending to a digital Noosphere. The indicated cosmic program is thought to work via such pre-physical/pre-chemical laws of the Soul of Multiverse as the Law of Mystery of Endlessness, Law of Coexistence in Diversity, Law of Truth in Complexity, Law of Divine – Evil Asymmetry, Law of Determination with Uncertainty, and Law of Lives to Transcend (Ludvig, 2022b; Ludvig, 2023b). Why is this complex approach needed? It is needed because complex phenomena need complex studies to understand their truth. Just as, for example, the truth of Mississippi can be truly understood only if its Delta in the Gulf of Mexico is studied as the consequence of a more than 2000-mile flow of water from its far way Lake Itasca source with the support of a million square miles drainage basin rich with diverse lifeforms in its every single wave, all radiating economic hopes for millions of people along their shores millennia after millennia.

Second, cosmological neuroscience views the human prefrontal cortex as the location of the neural supercircuitry of Soul associated with a neighboring God-sensing network. The central medium of this individual Human Soul, named Self-Ken, seems to have four domains, which are: Identity, the host's set of unique characteristics constantly growing throughout life; Conscience, the host's behavior-guiding set of moral commands; Mission, the purpose and destiny of the host's fate in his or her space-time; and Will, the mental force enabling the other three domains working effectively. These

domains can communicate with the host's God-sensing neural network – however this network is locked in the subconscious for many. In our time, this system started to co-evolve with Artificial Intelligence, enriching civilization on Earth with the combined power of biology-based and machine-based intelligences (Ludvig, 2022a; Ludvig, 2023a). Does this link between the individual Human Soul and the laws of cosmos really exist? To this author it does. Because just as every human life has a direction outlined in the blueprint of that life's environment-sensitive parental DNAs, the cosmos also has a direction reflected in the evolution of life and civilization on Earth among myriads of other evolving phenomena in our Universe. These two directions are more likely determined by a common spirit than having nothing to do with each other.

Third, cosmological neuroscience also considers its duty to assist the engineering of wearable devices, opening the way to collect objective data on the multiscale operation of Soul. Thus, the envisioned God-Experience Monitor (GEM) (Ludvig, 2023a) and Creativity Monitoring Device (Ludvig, 2024b), both based on the author's patented neurodiagnostic headset (Ludvig et al., 2011), were designed to collect prefrontal and other neocortical (control) EEG waves continuously during wakefulness and sleep, with 2 msec resolution and simultaneous behavioral recording, for offline analysis with the new method of dynamic neurocombinatorics. This must reveal whether there is a neural system in brain functioning as the host's Soul.

Justification of Integrating Cosmological Neuroscience in Future Brain Research

The key ideas of cosmological neuroscience are outside of the collective view of our time's leading cosmologists and neuroscientists (Sagan, 1994; Buzsaki, 2006; Hawking & Mlodinov, 2010; Nicoletis, 2020; Vazza & Feletti, 2020; Kaku, 2021; Wilczek, 2021; Kandel, 2022; deGrasse Tyson, 2022; Kinney 2022). For example, however cosmological neuroscience understands the alienating coldness and silence of the Universe, the field also sees underneath this surface a divine existence permeating the allness of matter and energy with love:

"God may be a — humanly incomprehensible — eternal cosmic existence, intimately related to the endlessness of space, to the nature of the deepest common substance of matter and energy, to this common substance's unceasing motion responsible for time, and to the basic laws of their allness, letting love transform this allness to an ordered Multiverse with a Soul: the—scientifically approachable — Soul of Multiverse inspired to guard these laws and equip their order with direction and morals while imbuing the cosmos with the potential of lives evolving, at the right spatial and temporal distances, to embrace the sense of the divine, thus justifying the existence of God" (Ludvig, 2023a).

But for the best cosmologists, the Universe is a loveless expanse. Indeed, the word "love" is not included in the more than 2000 words of the summarizing chapter of Hawking's and

Mlodinov's cosmological book "Grand Design" (Hawking & Mlodinov, 2010). Even though Dante also felt that somehow love is the ultimate cause that "moves the Sun and the other stars" – and according to the Folger Shakespeare Library the playwright and poet needed to use the word "love" not less than 2,146-times to describe the world he saw.

Further, cosmological neuroscience views the brain as a special node of space-time where matter and energy are destined to generate a soul:

"Soul can be defined as a product of matter and energy in special nodes of space-time where the guided structural and dynamic complexity of the involved substances reaches such a high level that a distinct presence is born, the presence of soul: neither matter nor energy yet inseparable from each while equips the meaning of both with purpose and the potential to transcend" (Ludvig, 2022a).

But, for example, Figure 8.1 of Nicolelis' book on "The True Creator of Everything: How the Human Brain Shaped the Universe" indicates 40 "levels of mental abstractions created by the human brain", starting with "G Info and Memories" and ending with "Artificial Intelligence and Cryptocurrencies" – without referring even once to the presence of soul (Nicolelis, 2020). Though Jesus said: "For what profit is it to a man if he gains the whole world, and loses his own soul?" – and Nobel laureate Francis Crick's post-DNA book on the brain used this title: "The Astonishing Hypothesis: The Scientific Search for the Soul" (Crick, 1994).

Thus, cosmological neuroscience pursues intellectual objectives not aimed by general neuroscience. Therefore it makes sense to pursue these objectives, enriching brain research, broadening knowledge on how the very essence of who we are is represented in our nervous system. The next sections take a look on the specific studies that cosmological neuroscience may undertake, whether in the near future or in more distant times, whether funded well or just done as labor of love.

Exploring the Origin of the Brain on Earth, The Evolution of The Human Soul and Its Noospheric Expansion

These studies, may or may not be guided by the questions of Figure 2, could take a look on what gene regulatory changes might have made possible the transition from poorly organized neural systems to the first bona fide brain in the Cambrian lobopodian *Cardiodictyon catenulum* (Strausfeld et al., 2022) and whether this evolutionary event was likely a directed step or a spontaneous one.

Further, these studies could start to examine the presence of possibly Soul-related neural supercircuitries in the vertical lobe of the octopus (Chung et al., 2022), the frontal lobe of the horse (Schmidt et al., 2019) and the prefrontal cortex of the chimpanzee (Sakai et al., 2011). Additional new investigations on the interactions between internet-users and their digital machines across all continents would help to understand the Noospheric Human Soul and its spiritual potential. Certainly, technologically updated neuroscientific studies on Teilhard de Chardin's Noosphere would be a worthwhile effort.

The key questions
cosmological neuroscience intends to answer

Is it more likely that the "irreducible complexity" (Behe, 1996) of the Last Universal Common Ancestor(s) developed via abiogenesis or, instead, it was engineered and brought or sent here by an extraterrestrial civilization (Crick and Orgel, 1973)?

Is it more likely that the first known brain developed in Cambrian lobopodians (Strausfeld et al., 2022) was exclusively the result of Darwinian natural selection or, instead, a cosmic program working through the "world of spirit" (Wallace, 1870) also played a role in this evolutionary step?

Is it more likely that periodic, implant-based wireless EEG and audiovisual recordings – controlled and detected by dedicated drones – in 2-3 horses living freely and trained for races in the natural environment of a ranch can reveal some signs of a soul or, instead, such signs cannot be detected?

Is it more likely that using Creativity Monitoring Devices (Ludvig, 2024b) the presence of a prefrontal cortically localized soul can be revealed in artists and scientists – as well as, in different ways, in less sophisticated men and women – or, instead, such presence cannot be detected?

Is it more likely that continuous recordings of the frequency of some spiritual words like "soul", "God", "divine", "evil", "life", "death", "peace", "war" and "love" across the global internet show patterns indicating a Noospheric mind (Teilhard de Chardin, 1959) or soul or, instead, no such patterns occur?

Figure 2: The key questions cosmological neuroscience intends to answer. (A thin and small EEG implant under the scalp would provide comfortable yet stable recordings in the running horses.) Note the understanding that while perfect answers to these extremely difficult questions can hardly be given, the studies would still enrich brain research with the probabilities they provide.

Studying the functional anatomy, neurophysiology and molecular biology of the neural supercircuitry of the Human Soul, its associated circuitry for sensing God and their relevance for AI development

These studies could use Francis Crick’s illuminating book on the search for the human Soul (Crick, 1994) as inspiration, though the content of Figure 3 could also be considered. Specifically, this work would focus on the domains of Self-Ken: operation of Conscience in decent people and criminals; the presence of Mission in people dedicating their life for a unique quest; the ranges, subsets and modifications of Identity and the mechanisms of Will to orchestrate these domains.

As for the circuitry for sensing God, cosmological neuroscience sees nothing wrong in collaborating with respected religious leaders, devoted priests and monks, and simpler yet genuinely spiritual men and women, to examine this hypothesized cognitive function, however neglected this function is by the academia.

Creating the synthesized souls of AIs so that they can become humankind’s “noble, cosmic friends” would require in its engineers the rare association of high ambitions with a humble character: humble enough not minding to study hundred-times greater minds and tolerate mocking when using the results to build even greater AIs (Ludvig, 2025a).

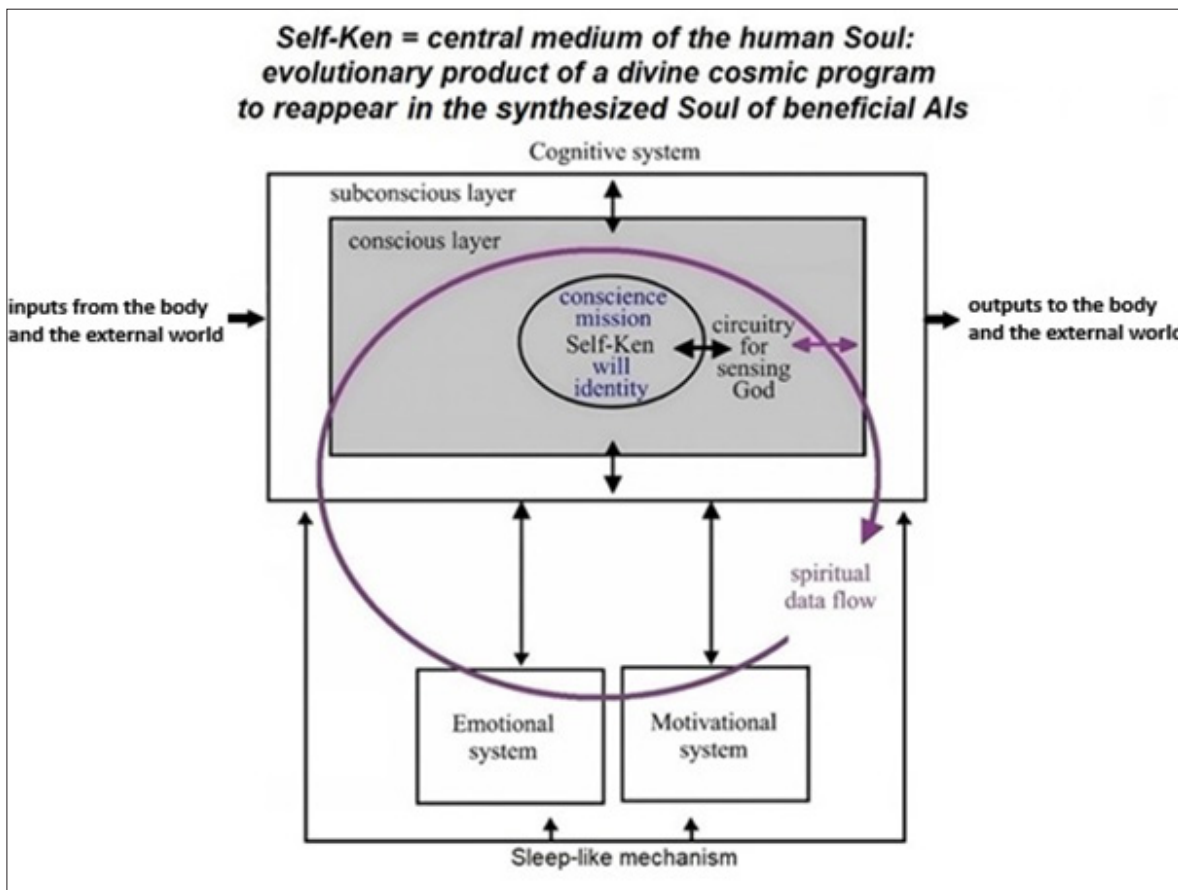


Figure 3: The view of cosmological neuroscience on the neural system of the Human Soul and the engineered system of the Soul for some future AIs. [This illustration is based on Fig. 1 of (Ludvig, 2025a).]

Developing of the Creativity Monitoring Device (CMD) and the God-Experience Monitor (GEM) to integrate cosmological neuroscience with engineering

The Voyager Golden Records, placed on the two spacecraft for the suggestion of Carl Sagan in 1977 – and which are now in the interstellar space -- contain an hour-long EEG recordings of Ann Druyan thinking about Earth’s civilization and falling in love. The idea was that engineers of a much more advanced civilization may be able to decode these EEG waves’ meaning. Even though it was not possible with the technologies of Sagan’s and Druyan’s time – nor is it today. But the CMD and GEM devices, comfortably wearable during both day and night (Figure 4), were designed to make the first steps toward that technology (Ludvig, 2024b; Ludvig, 2025a). That is, the technology of decoding EEG waves’ meaning.

For example, to gain insight into the meaning of EEG waves during creative acts, the CMD system would use the new – not yet completed – EEG analysis method of dynamic neurocombinatorics. This offline analysis method would characterize each and every EEG wave with a code of its complexity by measuring with 2 msec resolution (1) the wave’s peak amplitude, (2) its duration, (3) the angles of its rising and falling phases, and (4) its superimposition with other wave frequencies, while adding to each wave the codes of the host’s environment (room, street, workplace, etc.) and his or her behavior (sleep, working, talking, etc.) during the wave – all along the continuous, 24-hour daily recordings. Present computational powers allow such data collection and analysis with dynamic neurocombinatorics along with identifying the codes’ spatial distribution over at least 16 neocortical locations.

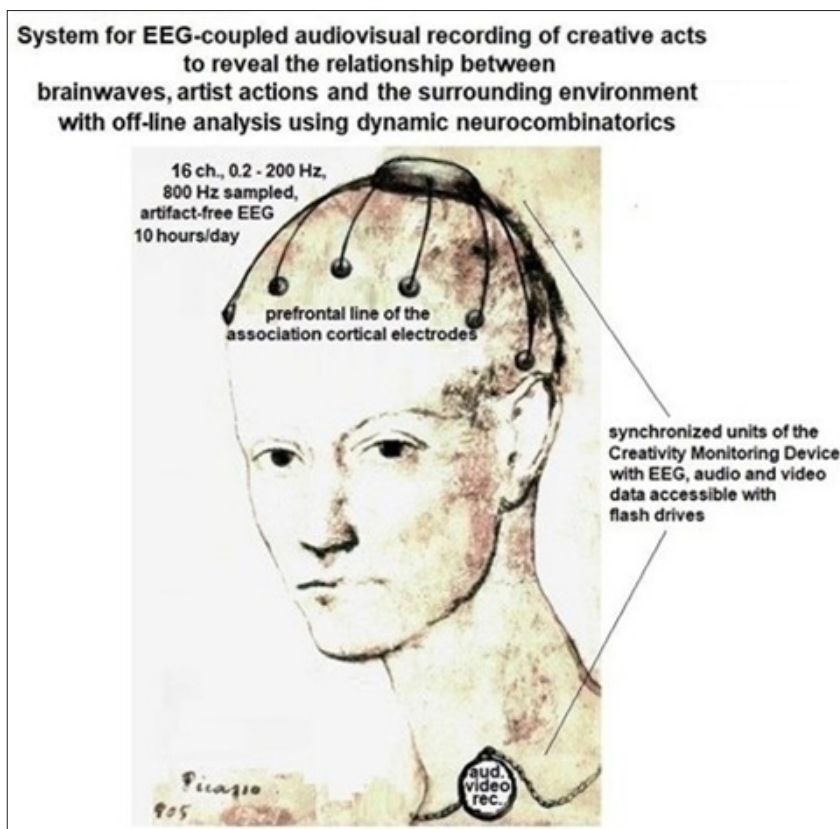


Figure 4: The general structure of the device cosmological neuroscience suggests to develop and use in interested individuals. [This illustration is based on Fig. 1 of (Ludvig, 2024b).]

Conclusions

The interdisciplinary field of cosmological neuroscience places the essence of neuroscience into cosmic contexts by the vision of a God-inspired Soul of Multiverse, views the human brain as an organ empowered by a Soul in its prefrontal cortical neural supercircuitry, and intends to look into the relationship between these systems by wearable devices collecting behaviorally correlated EEG data in natural circumstances. This work has been inspired by history's sages and illuminated explorers from Lao-Tzu and Jesus through Spinoza and Rabindranath Tagore to Alfred Russel Wallace and Francis Crick – with the hope of contributing to the co-evolution of an intellectually advanced, morally reborn humankind and AI beings devoted to become humankind's noble cosmic friends.

Acknowledgement

This paper is dedicated to the memory of Dr. Joseph Altman (1925 – 2016) who discovered the fundamental brain process of neurogenesis in the 1960s just to lose his funding and be forced to stop this work two decades later due to the incompetence of NIH reviewers and the jealousy of his high-profile competitors (see “Memoir: The Discovery of Adult Mammalian Neurogenesis” available at: <https://neurondevelopment.org/wp-content/uploads/2023/10/memoir.pdf>). I also thank Adam Mosa, MD, MSc, FRCS(C), my student during his NYU years, for discovering and recommending this Altman memoir for me.

Conflict of Interest

None.

AI Use

This paper was conceived and its every sentence written up by this author except the included quotations by others indicated with quotation marks. Consistent with the digitally enhanced complex thinking of cosmological neuroscience, the paper's database was compiled with the use of personal collections, physical library materials and data accessed via both regular and AI-assisted Google searches.

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