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This submission Has three parts, which are

[1]. The Main Document: Recommendation to Establish Neuronology as a Foundational Scientific Field for Applied Research in AI & AGI.

Brief Summary of Contents in File: [ProposingNeuronology.pdf](#)

This document proposes Neuronology as a new foundational scientific discipline to provide the missing theoretical and scientific framework for advancing Artificial General Intelligence (AGI) and related fields. It argues that, just as Componentology (see reference below) addressed foundational misconceptions in software engineering, Neuronology is necessary to systematically study and replicate the mechanisms of natural intelligence. By focusing on the study of biological neurons and their information-processing functions, Neuronology aims to bridge the gap between narrow AI and AGI, offering transformative applications across AI, cognitive science, neural interfaces, and beyond.

[2]. Supporting Document-1: Why It Is Essential to Create and Utilize Neuronology (Summary of Contents in File: [WhyNeuronologyIsVital.pdf](#)):

This document presents a detailed rationale for prioritizing the creation and advancement of Neuronology as a scientific discipline, emphasizing its role in establishing a valid, testable theoretical foundation for AGI research. Drawing on parallels with the transformative impacts of Germ Theory and Quantum Theory, it explains how Neuronology can correct critical misconceptions in AI's foundational knowledge, preventing inefficiency and misdirection in AGI development. The paper highlights the vital symbiotic relationship between basic and applied research, stressing the urgent need for early investment to secure first-mover advantages and unlock paradigm-shifting innovations across multiple disciplines.

[3]. Supporting Document-2: Potential Unjustifiable Opposition to Neuronology (Brief Summary of Contents in File: [OppositionToNeurologyIsUnjustifiable.pdf](#)):

This document anticipates and addresses potential resistance to Neuronology by drawing historical parallels with opposition faced by Germ Theory and Quantum Theory. It explains that opposition is likely not due to scientific shortcomings but because Neuronology challenges entrenched misconceptions about neurons and neural networks, much like Componentology challenged misconceptions in software engineering. The paper argues that scientific progress has always depended on confronting and replacing false beliefs with valid,

evidence-based knowledge, and asserts that unjustifiable opposition must not hinder the establishment of a robust scientific foundation for AGI through Neuronology.

Reference: <http://componentology.org/>

Componentology is a pioneering scientific discipline created to provide a rigorous, objective, and testable theoretical foundation for software engineering by uncovering the true nature, essential properties, and intrinsic mechanisms of physical components and Component-Based Products (CBPs). Developed to address foundational misconceptions that have long hindered progress in software engineering, Componentology establishes the scientific principles, frameworks, and tools necessary for creating, validating, and utilizing real software components analogous to physical components in engineering. Its insights have enabled breakthrough patented innovations that have effectively addressed the infamous software crisis and now serve as an essential blueprint and framework for creating—and especially for utilizing—Neuronology as the theoretical foundation for advancing AI and AGI. A Booklet about Componentology: <http://componentology.org/Fly/Booklet2.pdf>

Contact Information

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Attachments

ProposingNeuronology

WhyNeuronologyIsVital

OppositionToNeurologyIsUnjustifiable

Potential Unjustifiable Opposition to Neuronology

We have encountered—and continue to encounter—extraordinary hostility, humiliation, and opposition to our sufficiently completed basic research on Componentology (<http://Componentology.org>)—as though it were heresy to pursue a scientific understanding of the objective reality of physical components and parts, including their nature, essential properties, and intrinsic characteristics. Our research encompasses the anatomy, structure, design, and construction of physical Component-Based Products (CBPs), as well as the methods and mechanisms that form the foundation of true Component-Based Engineering (CBE).

Even assuming that such insights were to not immediately benefit every practitioner, there is no evidence that acquiring scientific knowledge, and understanding of physical entities—whether physical components or biological neurons—and the objective mechanisms governing them has ever been detrimental to the advancement of science or engineering.

What has provoked discomfort and hostility among software researchers and practitioners is not the pursuit of knowledge itself, but rather the scientific facts and valid evidence we have accumulated through Componentology, which directly challenge their entrenched misconceptions and dogmatic beliefs about so-called components and the purported methods and mechanisms of CBE.

Similarly, we can expect resistance to Neuronology, because the scientific facts, objective insights, and verifiable evidence accumulated through Neuronology will inevitably challenge entrenched misconceptions and dogmatic beliefs about so-

called neurons and the supposed methods or mechanisms of neural networks for AI and AGI.

Indeed, a defining hallmark of nearly every great scientific discovery in history is that it exposed and overturned deeply entrenched false beliefs. Componentology has already made such profound contributions, which have been instrumental in enabling our breakthrough patented inventions—and we strongly believe that Neuronology will achieve the same transformative impact.

What do we have to lose by scientifically studying and understanding biological neurons and the mechanisms governing neural networks from a computational perspective—especially if it helps us uncover how nature solved cognitive functions and intelligence? Based on my two decades of experience in Componentology, I have found that such a process not only exposes false beliefs but also reveals critical gaps in our existing knowledge. Moreover, it enables the creation of powerful tools, technologies, methods, and frameworks for systematically testing, validating, and falsifying each concept within the Body of Knowledge (BoK)—including theories, descriptions, and explanations.

Our experience in developing Componentology has shown that a valid hard scientific paradigm depends on the development of robust tools, technologies, methods, and frameworks for the rigorous testing and validation of each concept within our body of knowledge and understanding. The capacity to test, validate, and falsify each concept is indispensable—not only for deepening insight, but also for refining and perfecting the concepts themselves, thereby progressively aligning our understanding and perception with objective reality. This process embodies the symbiotic relationship between basic research and applied research, enabling mutual

advancement through iterative refinement—where better tools and technologies enhance knowledge, and improved knowledge, in turn, drives innovation.

Throughout history, nearly every transformative scientific knowledge has faced unjustifiable opposition. It is imperative to recognize that scientific understanding has never impeded progress; instead, it is the persistence of undetected misconceptions or false beliefs that has consistently posed the greatest risk of causing irreparable harm.

What kinds of scientists are likely to feel offended—or resort to ad hominem attacks or false insinuations—because of my efforts to raise awareness of the scientific knowledge and understanding of objective reality represented by Componentology (or Neuronology), through my presentation of the scientific facts and evidence uncovered through objective investigation?

Based on our ongoing experience with Componentology, we expect Neuronology to encounter similarly fierce resistance—not because of any deficiency in scientific rigor, but because its scientific facts and valid, verifiable, and reproducible evidence directly challenge deeply entrenched dogmatic misconceptions, as exemplified by the historical opposition to Germ theory and Quantum theory:

Is there any opposition to Germ Theory?

Give few examples from documented history.

ChatGPT said: Great question! While **germ theory of disease** is widely accepted today, it faced significant opposition historically—especially in the 19th century when it was first proposed. There are indeed **documented histories of opposition**

from both scientists and practitioners of the time, rooted in competing medical theories, professional inertia, and philosophical objections.

Here's a **summary of the main types of opposition** to germ theory, with historical examples:

1. Miasma theory as the dominant paradigm

Before germ theory, the prevailing explanation for disease was the **miasma theory**, which held that diseases were caused by "bad air" or noxious vapors from decomposing organic matter.

- Many physicians and public health officials were deeply invested in miasma theory because it aligned with sanitation reforms and urban planning efforts.
- For example, **Florence Nightingale** promoted sanitary reforms but rejected germ theory during her lifetime, attributing disease to foul air rather than microbes.

Opposition type: Paradigm entrenchment; belief in environmental causation rather than microbial.

2. Resistance from the medical establishment

Some physicians viewed germ theory as a threat to their authority or as too simplistic.

- **Max von Pettenkofer**, a prominent German hygienist, famously **drank a glass of cholera bacteria** (sent by Robert Koch) to "prove" that germs alone did not cause disease; he didn't develop cholera (possibly due to natural immunity or insufficient dose), which he claimed as proof against germ theory.
- Pettenkofer argued that environmental factors (soil, groundwater) were required for germs to become pathogenic.

Opposition type: Scientific skepticism; belief in multifactorial causation over microbial monocausation.

3. Skepticism of laboratory methods

Some critics doubted whether lab-based findings about microbes could be generalized to real-world conditions.

- Surgeons and physicians questioned whether laboratory bacteria were the same as those causing disease in humans.
- There was distrust about the **microscope as a "black box" technology**, requiring interpretation by specialists.

Opposition type: Epistemological skepticism; distrust in novel scientific instruments and experimental methods.

4. Philosophical and vitalist objections

Some thinkers objected to germ theory because it conflicted with **vitalist** or **holistic views of disease**, which saw illness as an imbalance in bodily forces rather than an invasion by external agents.

- Practitioners of homeopathy, naturopathy, and similar schools resisted germ theory because it undermined their models of health.

Opposition type: Philosophical incompatibility with reductionist or mechanistic explanations.

5. Religious objections

In some communities, disease was still interpreted as divine punishment or a moral failing.

- While not widespread among scientists, religious framings of illness delayed acceptance of germ theory in certain cultural settings.

Opposition type: Theological resistance; belief in moral/spiritual causes over physical pathogens.

Documented historical sources

Here are key references if you're interested in scholarly accounts:

"The Germ Theory and Its Critics" by Michael Worboys (History of Science journal) – an excellent overview of scientific opposition.

"The Fall of the House of Miasma" by Christopher Hamlin – explores the transition from miasma to germ theory.

"The History of Germ Theory" by Louis Pasteur, Robert Koch, and others in their original writings.

Max von Pettenkofer's famous cholera challenge is discussed in **"The Gospel of Germs"** by Nancy Tomes.

Important note

Opposition to germ theory wasn't always *anti-science*; much of it came from legitimate **scientific debate** and competing interpretations of evidence. It took decades of research, experiments, and public health successes (e.g., antiseptic surgery, vaccination) to **build consensus** around germ theory.

Is there any opposition to Quantum Theory?

Give few examples from documented history.

ChatGPT said: Excellent follow-up question! Yes—just like germ theory, **quantum theory** (or quantum mechanics) has faced opposition, both historically and even today, though in different forms and for different reasons.

Documented opposition to quantum theory falls into several categories:

1. Early opposition: Philosophical discomfort (Einstein & others)

Probably the most famous critic of quantum theory was **Albert Einstein**. While he helped *found* quantum theory (with his work on the photoelectric effect), he never accepted its **probabilistic interpretation** (as formalized by Niels Bohr and the Copenhagen interpretation).

- Einstein's famous quote:

"God does not play dice with the universe."

- He believed quantum mechanics was incomplete and that there must be underlying "hidden variables" restoring determinism.
- Einstein, Podolsky, and Rosen (EPR) published the **EPR paradox (1935)** to argue that quantum mechanics could not provide a complete description of physical reality.

Opposition type: Philosophical → objection to indeterminacy, lack of realism.

2. Alternative interpretations & theoretical disagreements

Other physicists also objected to the dominant **Copenhagen interpretation**, which posited that physical systems don't have definite properties until measured. Alternative interpretations were proposed, including:

- **Pilot-wave theory (Bohmian mechanics)** → David Bohm (1952) revived Louis de Broglie's earlier deterministic theory.
- **Many-worlds interpretation** → Hugh Everett III (1957) rejected collapse of the wavefunction in favor of branching universes.

- **Objective collapse theories** → such as GRW theory (Ghirardi–Rimini–Weber).

While these are now recognized interpretations within physics, they initially faced **resistance from the mainstream**.

Opposition type: Competing theoretical frameworks; no consensus on philosophical implications.

3. Experimental challenges & skepticism (early 20th century)

In the early decades, some physicists resisted quantum theory because:

- It **violated classical intuition** (wave-particle duality, uncertainty).
- Predictions seemed mathematically strange and hard to visualize.
- Its probabilistic nature appeared anti-realist or epistemologically problematic.

For example, **Erwin Schrödinger** (despite creating wave mechanics) disliked the Copenhagen view:

- Schrödinger’s “**cat paradox**” (1935) was intended as a critique, illustrating absurdity of superposition at macroscopic scales.

Opposition type: Conceptual and interpretive discomfort.

4. Later critiques: Ontological & metaphysical objections

Even after experimental validation (e.g., Bell test experiments), critics from philosophy and outside physics have objected to:

- **The loss of determinism.**
- **Measurement problem (observer's role in reality).**
- **Nonlocality ("spooky action at a distance").**

Some critics view quantum theory as incomplete or in need of deeper explanatory foundations.

Opposition type: Philosophical realism vs. instrumentalism.

5. Fringe opposition & pseudoscience

Outside mainstream science, some **non-physicists** and **philosophical skeptics** claim quantum theory is incoherent, mystical, or flawed.

Examples include:

- Anti-quantum conspiracy theories.
- Overuse/misuse of quantum jargon in pseudoscience ("quantum healing", "quantum consciousness").
- Critics who reject both relativity and quantum mechanics as ideological.

Opposition type: Non-scientific or conspiratorial; no academic legitimacy.

Key historical moments of opposition:

- **1927 Solvay Conference** → heated debates between Einstein, Bohr, Heisenberg.
- **EPR paper (1935)** → key philosophical challenge.
- **Bell's theorem (1964)** → experimentally tested hidden variables, constraining alternatives to quantum mechanics.
- **Decades of dismissal of Bohm's pilot-wave theory** until its recent revival.

Important insight:

Unlike germ theory or heliocentrism, quantum theory was never widely rejected as a whole once its predictions were experimentally validated—it was more the interpretations (how to *understand* it) that remained contested.

Today, the mathematical formalism is universally accepted in physics because it works spectacularly well in practice, but debates about what it *means* still continue.

Research Challenges and Strategic Questions

Neuronology will address several high-priority research challenges:

- **Fundamental mechanisms:** What are the basic principles by which biological neurons encode, process, and transmit information?
- **Formal models:** How can these biological principles be abstracted into formal, computable models?
- **Continual learning:** What architectures can support lifelong learning, self-organization, and cross-task adaptation?
- **Beyond deep learning:** How can we go beyond current artificial neural networks to develop systems with genuine reasoning, abstraction, and generalization capabilities?
- **Separation of concerns:** How do we distinguish between the scientific search for truth and the engineering pursuit of practical applications, ensuring that applied research is grounded in validated theory?

Importantly, **Neuronology** promises numerous **low-hanging fruits**—early-stage discoveries that can deliver tangible returns within a few years, giving the United States a critical competitive advantage and setting up barriers to entry for international rivals.

Why It Is Essential to Create and Utilize Neuronology

1. Introduction

Artificial General Intelligence (AGI)—the development of machines that match or exceed human capabilities across a broad range of cognitive tasks—represents one of the most ambitious and high-stakes goals of artificial intelligence research. While narrow AI has produced remarkable breakthroughs, the path to AGI remains blocked by the absence of a rigorous scientific foundation.

To address this critical gap, I recommend that the federal government prioritize the creation and advancement of **Neuronology**, a new scientific discipline that focuses on understanding the structure, function, and dynamics of biological neurons and their networks as a foundation for advancing AI and AGI research.

Neuronology holds potential far beyond computing, with transformative applications in mental health, cognitive science, neural interfaces (such as Neuralink), bio-cellular computing, and other domains we have yet to imagine. This makes it a foundational research priority fully aligned with the 2025 National AI R&D Strategic Plan.

2. The research ecosystem consists of two vital and interdependent layers:

- i. **Layer-1: Basic (or pure) scientific research** — This layer focuses on acquiring and accumulating scientific or theoretical knowledge to create and expand the pure scientific Body of Knowledge (BoK). Its primary goal is to deepen our understanding of natural phenomena and generate scientific insights that are essential for addressing complex, unresolved problems in science and engineering. The BoK developed in Layer-1 provides the theoretical foundation

upon which Layer-2 depends. Importantly, the knowledge produced in Layer-1 must be **objective, testable, falsifiable**, and grounded in valid empirical evidence to ensure its reliability and scientific value.

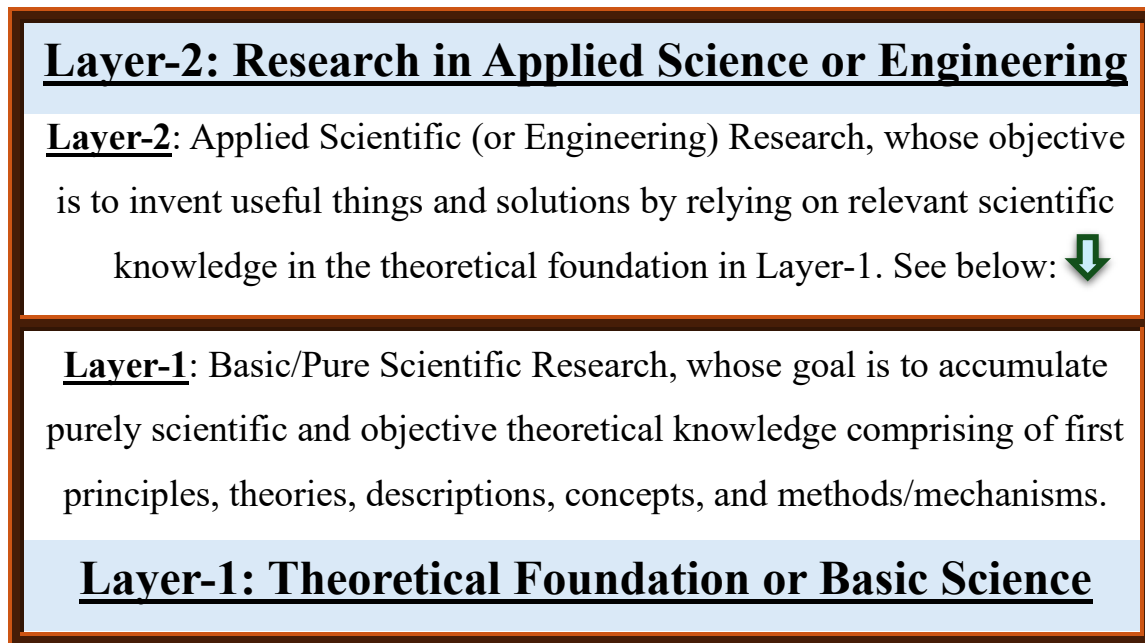


Figure-1: *The Two Vital Parts of the Research Ecosystem*

- ii. **Layer-2: Applied scientific (or engineering) research** — This layer draws upon the validated BoK from Layer-1 to design, develop, and implement practical applications, inventions, and solutions to real-world problems. Applied research relies on the soundness of the underlying scientific foundation; if the BoK in Layer-1 is flawed, incomplete, or invalid—filled with false beliefs, descriptions, or misconceptions—then the research in Layer-2 will inevitably struggle or fail to produce effective or reliable outcomes.

3. Our Experience with Creating & Utilizing Componentology

Nearly two decades ago, we realized that much of what is currently accepted about the true nature and essential properties of components, the anatomy and structure of Component-Based Products (CBPs), and the methods and mechanisms

of Component-Based Engineering (CBE) is grounded in a fundamentally flawed paradigm riddled with pseudoscientific misconceptions and entrenched dogma.

The knowledge about components, CBPs and CBE in the theoretical foundation (i.e., in layer-1) for conducting software engineering research (in layer-2) is not based on scientific or objective understanding of real-world counterparts such as physical components, CBPs and CBE. Hence, we made the decision to establish **Componentology** as a rigorous scientific discipline and to use it as the theoretical foundation for conducting applied research in software engineering.

The BoK (See reference [2] at the end) and understanding gained through Componentology—as a theoretical foundation—have proven invaluable in conducting applied research to develop tools, technologies, and solutions aimed at addressing the infamous software crisis, which we believe represents only the tip of the iceberg.

We see tremendous opportunities for further innovation; however, many of these lies in areas where we currently lack sufficient expertise or capacity, such as compiler development, AI agents, and advanced CASE tools for automation. Unfortunately, our ability to pursue these promising directions is currently constrained by limited resources and depleted funding.

Building on this two-decade journey of creating and applying scientific knowledge, we came to recognize that **Neuronology** represents the similarly essential and currently missing scientific and theoretical foundation needed to guide applied research in Artificial General Intelligence (AGI). Just as Componentology was necessary to overcome foundational misconceptions in software engineering, Neuronology is critical for uncovering and addressing the hidden limitations, misconceptions, and challenges impeding progress toward true AGI.

4. Why It Is Urgent to Create & Utilize Neuronology

More than seven years ago, we realized that the knowledge about neurons and neural networks underlying the theoretical foundation of applied AI research was not grounded in a scientific or objective understanding of their real-world biological counterparts—including neurons, neural networks, and the synapses that connect them.

Although most of our resources have been dedicated to advancing Componentology—and we currently lack the specialized expertise and tools needed to study neurons in depth—our investigations have led us to the clear conclusion that the creation and advancement of Neuronology as a formal scientific discipline is both necessary and urgent.

The vital role of knowledge in the theoretical foundation: The knowledge embedded in the theoretical foundation layer serves as the essential raw material for the applied research layer, enabling the development of practical solutions and innovations. In the context of science and engineering, understanding is a foundational and profoundly transformative force. The knowledge and understanding we possess within the theoretical foundation layer exert a powerful influence on our actions, shape our decisions, and drive our innovations. Therefore, it is imperative that this knowledge and understanding be valid, testable, and falsifiable—ensuring that our insights are continuously refined and that the collective body of knowledge advances in a rigorous and reliable manner.

5. The Symbiotic Relationship Between Basic Science & Applied Research

Basic science and applied research exist in a dynamic and mutually enriching relationship. Basic science seeks to uncover the underlying principles of nature,

often without immediate application, while applied research translates this knowledge into practical solutions for real-world challenges.

Critically, the insights gained from applied research often feed back into basic science, generating new questions and discoveries. For example, applied breakthroughs in software engineering have not only validated theory but have also exposed knowledge gaps that sparked fresh basic research. This iterative cycle of discovery and application fuels sustained innovation.

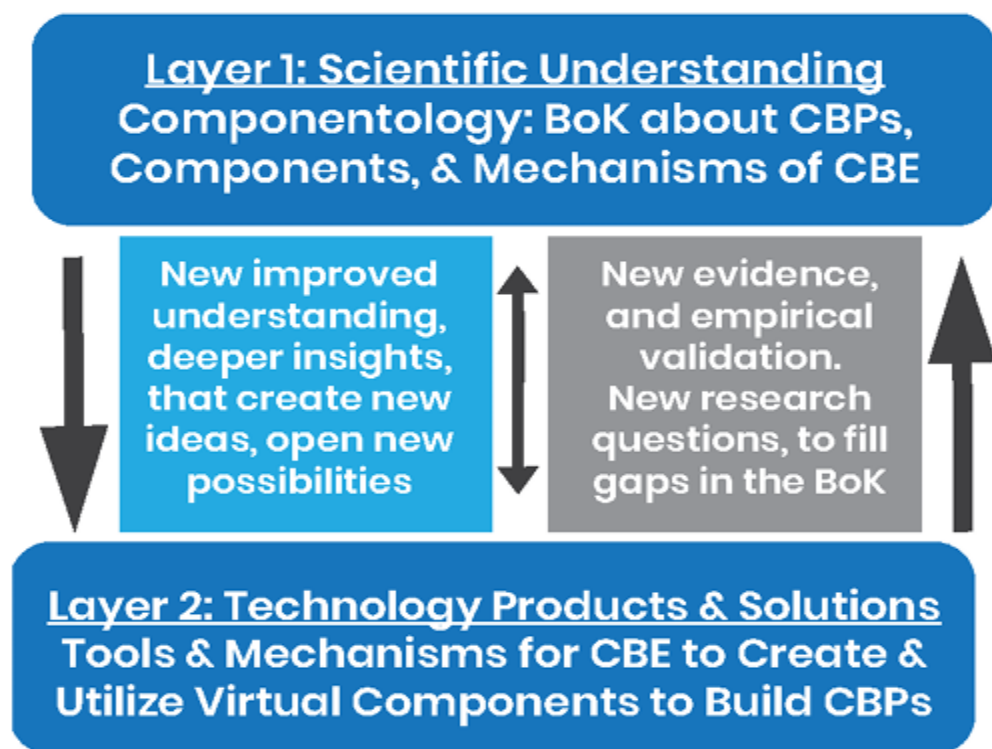


Figure-2: *The Symbiotic Relationship Between Basic & Applied Research*

In the context of Neuronology, creating a robust scientific foundation (basic science) is essential for conducting effective applied research in AI and AGI. Without a solid theoretical base, applied research risks being guided by flawed assumptions (e.g., received beliefs or misconceptions formed decades ago), leading to inefficiency, limited progress, and missed opportunities. Conversely, empirical

findings from applied AI research can help refine biological models, further advancing Neuronology.

In short, the advancement of both basic science and applied research is not a linear sequence, but an ongoing and dynamic exchange. Applied research benefits from the conceptual insights of basic research and contributes back by identifying gaps, formulating new questions (or hypothesis), and developing tools to address (or test) them. Together, they form a continuous cycle of innovation and advancement.

However, when critical foundational knowledge in Layer-1 is flawed or invalid, this cycle is disrupted, risking stagnation or collapse of innovation. This breakdown has been a key factor behind the infamous software crisis, driven by misconceptions about the nature of components, CBPs, and CBE.

We are now witnessing similarly troubling foundational misconceptions in AI research, especially regarding neurons and neural networks. Componentology provided powerful tools to test, validate, and falsify concepts about software components. Neuronology can provide similarly powerful investigative tools, grounded in the scientific method and formal sciences, to rigorously test, validate, and, if necessary, falsify the theoretical foundations of AI and AGI.

6. Summary & Conclusion based on the Clarity of Hindsight

We now possess the clarity of hindsight to appreciate the revolutionary and profoundly transformative role played by scientific fields founded on Germ Theory and Quantum Theory. Today, it is self-evident that the knowledge and understanding accumulated through the scientific paradigms built on Germ Theory fundamentally transformed our understanding of diseases, health, and medicine.

Likewise, the knowledge and understanding generated from scientific paradigms rooted in Quantum Theory revolutionized our understanding of quantum mechanics and enabled countless transformative applications across physics, chemistry, and technology.

I am confident that, a hundred years from now, Neuronology will be viewed with the same reverence and recognition—as a revolutionary scientific field that redefined our understanding of intelligence and catalyzed breakthroughs across diverse domains far beyond artificial intelligence.

Having devoted more than 25 years to research in Componentology, I speak from a place of deep insight and accumulated wisdom. Through this journey, I have acquired an equivalent clarity of hindsight regarding the revolutionary role of Componentology in software engineering. It is neither feasible nor my intention to attempt to fully explain the depth of knowledge and understanding accumulated over nearly 90 man-years of research and development in a brief document. But it is clear that Componentology has enabled us to identify and overcome entrenched misconceptions that had long hindered meaningful progress in software engineering.

Creating and using a scientific paradigm based on Germ Theory was not a simple endeavor in the late 19th century, but it was an essential one. Creating and using a scientific paradigm based on Quantum Theory was not a simple endeavor 120 years ago, but it was likewise essential. Similarly, creating and using the scientific paradigm of Neuronology is not a simple endeavor—even in the 21st century—but it is an essential one. Its potential applications extend far beyond computing, offering transformative possibilities in mental health, cognitive science, neural interfaces, bio-cellular computing, and many other fields we may not yet even imagine.

Historically, with every new paradigm, the first movers have gained a substantial advantage because they were the ones able to harvest the “low-hanging fruits” in Layer-1—those early fundamental insights that quickly translated into innovations in Layer-2. This, in turn, set into motion a powerful cycle of innovation and knowledge advancement, driven by the symbiotic relationship between Layer-1 (basic science) and Layer-2 (applied research).

We now stand at a similar inflection point. By creating and utilizing Neuronology as the missing scientific foundation for Artificial General Intelligence, we can ignite this virtuous cycle of discovery and innovation for a new century—positioning the United States as the leader in this critical frontier, while laying the intellectual and technological groundwork for generations to come.

7. Early Investment in Neuronology Is Critical for First-Mover Advantage

If formidable competitors like China secure a first-mover advantage, they will be able to effectively leverage the low-hanging fruits of foundational discoveries to initiate the powerful cycle of symbiotic interaction between basic science and applied research—gaining a substantial and potentially insurmountable lead. In the interest of safeguarding national competitiveness, I am offering my expertise and services in integrating scientific knowledge with software solutions, free of cost, to serve my country. While my contributions may be modest in scale, they could prove crucial in the early stages of establishing this new scientific field.

Drawing on more than 25 years of experience in Componentology and in creating virtual counterparts for physical entities, I am confident that my expertise can play a pivotal role in building a solid framework for Neuronology. Over the past

25 years, my team and I have made countless mistakes and gained invaluable lessons from them—experience that can help avoid repeating similar mistakes and accelerate the successful formulation of protocols, testable and falsifiable foundational principles, and rules necessary to establish this critical pre-paradigmatic foundation for conducting Neuronology research.

8. Neuronology: Opening New Pathways for High-Impact Scholarly Discovery

Neuronology represents a rare and valuable opportunity for academic universities and students to explore an uncharted scientific frontier rich with low-hanging fruits—early foundational discoveries that can quickly lead to high-impact innovations. As a nascent, pre-paradigmatic field, it offers abundant, accessible research questions that are both intellectually stimulating and practically transformative, making it an ideal domain for research scholars and Ph.D. students seeking meaningful and groundbreaking work. New scientific fields often offer far greater returns than highly mature fields, precisely because few have explored their uncharted territory—unlike established disciplines where thousands have already walked the well-trodden paths.

By engaging early, universities can position themselves as pioneering centers in this emerging discipline, attracting top talent and research funding, including from the private sector and philanthropic organizations, while students gain the unique opportunity to contribute original insights and help shape the foundational knowledge of a field poised to revolutionize artificial intelligence, cognitive science, neural interfaces, and beyond.

We believe Neuronology will emerge as one of the most fascinating scientific fields of our time—capturing the public imagination on a scale comparable to the Big Bang Theory, Black Holes, or Space Exploration. The United States cannot afford to overlook or underinvest in such a galvanizing and transformative scientific frontier, whose potential may be beyond anything we can currently imagine.

9. The Motivation Behind This Submission

Although I have recognized from the beginning that Neuronology exceeds our present knowledge, expertise, and resources, it has nevertheless been a hobby and intellectual passion of mine for nearly a decade—pursued in the limited free time that I, my son, my daughter, and others have each month, driven by an irresistible curiosity. Just as Componentology enabled us to build complex software products as ideal Component-Based Products (CBPs) by understanding how other engineering disciplines succeed in building complex products as CBPs, I believe Neuronology can provide the essential understanding of how natural intelligence works—allowing us to replicate it artificially by identifying gaps and eliminating misconceptions in AGI research. This ongoing exploration has helped us recognize Neuronology’s immense transformative potential across multiple fields.

References For Componentology:

- [1]. The website for Componentology: <http://componentology.org/>
- [2]. A Booklet: <http://componentology.org/Fly/Booklet2.pdf>

**Submission for the 2025 National Artificial Intelligence R&D Strategic
Plan**

Submitted by: Raju Chiluvuri, Pioneer-Soft Inc. **Website:** <http://neuronology.org> & <http://Componentolgy.org>

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**Recommendation to Establish Neuronology as a Foundational
Scientific Field for Applied Research in AI & AGI**

The objective of this submission is to recommend the creation of a new scientific field called **Neuronology**, which can provide a rigorous scientific and theoretical foundation for applied research in Artificial Intelligence (AI), particularly Artificial General Intelligence (AGI), as well as other related fields. The potential applications of Neuronology extend far beyond computing, offering transformative possibilities in areas such as mental health, cognitive science, neural interfaces (e.g., Elon Musk's Neuralink), bio-cellular computing, and many other domains we have yet to imagine.

Neuronology for AGI refers to the study of neurons and their function in the context of creating artificial general intelligence. AGI aspires to develop intelligent machines capable of performing a wide range of tasks in a human-like manner, and achieving this goal requires a deep understanding of how the human brain processes information, learns, adapts, and performs complex computations.

Neuronology for AGI involves studying the structure and function of biological neurons, as well as how they are organized into networks that give rise to cognition, learning, memory, and reasoning. This body of knowledge can be used to develop advanced artificial neural networks—computational models designed to simulate the behaviour of biological neurons and synapses.

Researchers in the emerging field of Neuronology for AGI are focused on understanding how the brain processes information, learns from experience, and adapts to new and dynamic environments. By replicating these processes in artificial systems, researchers aim to create intelligent machines that can not only perform specialized tasks but also generalize, reason, and learn in ways comparable to human cognition.

Overall, Neuronology for AGI has the potential to profoundly transform our understanding of intelligence—both biological and artificial—and drive breakthroughs in the development of intelligent machines. As such, it represents a promising, high-impact, and foundational research area that the United States should prioritize to maintain leadership in the global AI landscape.

2. Why Neuronology Is Critical for AGI & National Leadership

Historically, every major scientific breakthrough has emerged by exposing and replacing false assumptions with rigorous, testable, and validated knowledge. The **Heliocentric paradigm, Quantum Theory, and Germ Theory** each transformed their respective fields by breaking free from prevailing misconceptions. Today, Neuronology holds the same potential to transform AI, bridging the gap between narrow AI and AGI.

Nature has already solved the problem of general intelligence in the brain's humans and other life forms. It is basic scientific common sense to focus on understanding how nature achieved this. Neuronology provides the framework to systematically study how biological neurons process, learn, adapt, and reason—insights that can be translated into artificial systems to unlock the next generation of intelligent machines.

Without such a foundational framework, attempts to build AGI risk being misdirected, inefficient, and ultimately limited in their transformative potential. Just as medicine could not advance beyond superstition without Germ Theory, AI will struggle to achieve general intelligence without the scientific paradigm that Neuronology can provide.

3. Intellectual Merit and Transformative Potential

The NSF defines intellectual merit as advancing knowledge and understanding within or across fields. Neuronology fulfills this definition by:

- Providing a rigorous, testable framework for understanding intelligence.
- Integrating insights from neuroscience, cognitive science, computer science, and software engineering.
- Enabling breakthroughs not only in AI, but also in mental health, bio-computing, neural interfaces, and more.

Our two decades of pioneering research in <http://Componentology.org> taught us that the best way to expose misconceptions and refine understanding is through the creation of frameworks, tools, and technologies that allow concepts to be objectively tested, validated, and if necessary, falsified. Neuronology offers the opportunity to establish such a framework for AGI research, preventing decades of wasted effort and unlocking paradigm-shifting innovations across disciplines.

By providing the vital scientific foundation for applied research in software engineering, Componentology enabled us to invent the tools and frameworks necessary to effectively address the infamous software crisis. Drawing on two decades of experience in creating and applying scientific knowledge to solve complex, previously unsolved software challenges, we recognized years ago that Neuronology represents the essential and currently missing scientific and theoretical foundation needed to guide applied research in AGI.

4. Research Challenges and Strategic Questions

Neuronology will address several high-priority research challenges:

- **Fundamental mechanisms:** What are the basic principles by which biological neurons encode, process, and transmit information?
- **Formal models:** How can these biological principles be abstracted into formal, computable models?
- **Continual learning:** What architectures can support lifelong learning, self-organization, and cross-task adaptation?
- **Beyond deep learning:** How can we go beyond current artificial neural networks to develop systems with genuine reasoning, abstraction, and generalization capabilities?
- **Separation of concerns:** How do we distinguish between the scientific search for truth and the engineering pursuit of practical applications, ensuring that applied research is grounded in validated theory?

Importantly, **Neuronology** promises numerous **low-hanging fruits**—early-stage discoveries that can deliver tangible returns within a few years, giving the United States a critical competitive advantage and setting up barriers to entry for international rivals.

Attachments:

- [1]. **Why It Is Essential to Create and Utilize Neuronology**
- [2]. **Potential Unjustifiable Opposition to Neuronology**

Contact Information

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