

**About the Author of The American Education Bridge
,Paul Stephen Prueitt, PhD,
A short autobiography; January 12, 2011**

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The AI decades

At some point in the future, one might find extensive discussions about the AI decades. These discussions will be characterized as being part of a time in which Artificial Intelligence domination over natural science stretched into an ancient past. Looking back to the present from this point in the future, we will see clearly what the problem was. The nature of private ownership and the development of formal systems were entangled. We had not as yet separated the two natures.

A number of errors developed due to this entanglement. Formal systems were being developed primarily for the purpose of owning rather than for understanding. Understanding the nature of life became the same as making a living within a system that too often had a narrow social focus and ultimately was not as fulfilling as the individual might wish. The false concept of Artificial Intelligence was consistent with this narrow focus. In particular, AI is something that might be owned, whereas human intelligence is not something that is owned, except perhaps in some sense by a single self. These are complex ideas. Part of the present common understanding does not allow the depth that is required. What will be clear in the future is now not clear at all. We live in a time not so informed about the nature of the world or about human perception.

In 1988, the year that I earned a PhD in mathematics¹, there was very little to indicate an emerging problem. While scholarship about natural intelligence was there, it was obscured. I believe that over time this problem will be overcome. My own struggle has been to shine a light on something that few had really considered. If natural intelligence is understood we stand on the threshold of a new era in which the collective social expression is enhanced not with AI but with community intelligence supported by mechanisms that are similar to those in an individual brain. Looking back on my life I see humanity approaching a tipping point.

During the same period, scholarship on education was about protecting the integrity of educational institutions. The processes involved in school and in higher education

¹ Prueitt, Paul Stephen (1988). "Mathematical Models of Learning in Biological Systems", is a PhD Thesis, from The University of Texas at Arlington.

herded young scholars into intellectual boxes. Those raising certain issues were discriminated against in very subtle ways. Often these means to discriminate were unconsciously expressed but at other times the discrimination was direct, intentional and seemly justified by what is often perceived to be a moral justification, such as racism or membership in a church group. The social dynamics were exquisitely complex and evolved. Education came to be about conformance and then standardization. Individual were encouraged to follow prescribed viewpoints. Not following these viewpoints meant that the individual would not be selected for appointments as graduate student or as professor. It is true that some independent viewpoints were to develop, but all too often these are defined as a counter point and thus shaped by conformance.

Let us look at this selection process a bit deeper. The climate in education is a reflection of cultural histories, and some of these histories induce positive outcomes and some do not. Perhaps one might agree that some negative outcomes from education were part of a process that created economic over consumption and a blind eye to certain categories of moral consequences. The inference one came to, as expressed in *The American Education Bridge*, is that a primary force in education was to deny any problem with educational methods, while the trend in society was to recognize a deepening crisis. Ultimately everyone started to cope with an impossible misunderstanding. Because the underlying issues were hopelessly entangled as knots, the institutions coped by denying any aspect of the larger issues.

As recognized in 2008 by President Obama, the crisis in education was the most difficult cultural crisis faced by his administration. He made public comments that stated that without fixing the processes by which the American citizen is educated, it would be exceedingly difficult to alter the root causes of political and economic instabilities. My view of this crisis in education is addressed in *The American Education Bridge*, where a conjecture and a proposal are made². The conjecture is that our educational philosophy is purely supply side with little appreciation of the nature of individual or cultural needs. I trace this view to John Dewey and Charles Darwin. The substance of the conjecture suggests that a different philosophy of education might be centered on the learner rather than on the educational institutions. The sense of who owns this problem is then

² Prueitt, Paul Stephen (in manuscript form on the Internet). "The Education Bridge, a Proposal to the American President", is at www.secondSchool.net/bridge.pdf. Accessed January 11, 2011.

required to shift from institutions to individuals.

Over my life time science has advanced while educational theory has not. The case made in the *Bridge* is that the forces influencing education, and also science, have had some negative consequences. The proposal starts from this case. The justification for a revolution is indicated. We may take corrective action using democratic practices and a form of social network. Not the types of social networks supported by facebook and Twitter, but one that has advanced knowledge management tools. The difference is profound and understanding this difference requires some advanced thought.

We need some of the general systems theory that has been a part of my study over these decades. In particular the notion of a utility function, partially, governing the evolution of a system. The required general system understanding is that there are several classes of causes, one class of which is non-local and which involves more than one organization scale. Non-locality is seen only when complex systems are viewed at more than one time scale. Given any natural system the shaping forces may be modeled by utility functions and by principles found in general systems theory. By supporting community-based discussion about these forces, and mediated exercise of community intention, we may measure improvements in governance outcomes.

In simple terms, the central purpose of the current system is to support consumerism, and less as support for an informed citizenry. Again, we merely point out that those who “own” have taken, partial, control over a very large part of social activity. This cannot be complete control, and thus the evolution of the system is more chaotic then would be in the ideal case. From this and other factors, the ideals we properly associate with education have lost relevance. There are consequences.

Part of the consequence is that a vast majority of students have developed an acquired learning disability. Freshmen students reject the notion of learning college algebra, for example. The rejection of training about the true natures of mathematics is then a focus of my work and is central to the particulars of the Bridge proposal. This rejection may be legitimized based on any of a large number of considerations, including the fact that the curriculum is not the correct curriculum. The foundation to probability and statistics is likely a far better curriculum. We do not teach this for reasons that have to do with the dysfunction of the system. The system resists solutions.

All many parts of the system cooperate in creating a problem, because the motivation is distorted by the false concept of ownership. Specific social forces also negatively influence the evolution of science, even while certain types of gains continue to be made. Scientific reductionism is powerful but does not explain the nature of life, for example. The question here is, again, about the extent to which some inquiries about nature are not advancing while other inquiries receive abundant economic support. Separating the notion of ownership from the notion of understanding seems necessary. However, without a political crisis the entanglement seems unlikely.

The reader may see a thesis suggesting that new lines of thought in education and in natural science have been under supported and that there are specific reasons for this absence of support. Implicit in this suggestion is a proposal to support and develop certain specific alternatives. In particular we address, in *The American Education Bridge*, the potential full remediation of acquired learning disability using a stratified representation of mathematics curriculum. The methods developed and explicated in the Bridge could release a large proportion of the current population from a fear of mathematics, in particular confusion about the principles of arithmetic and set theory.

The learning strategy developed and exploited leads to new capacity involving the representation of human knowledge in a computational form, the so-called ontological modeling with data standards. Having ontological representation available in a digital medium allows an individual student to take responsibility for learning and gives that individual an ability to demonstrate learning outcomes for purposes of accreditation. This turns the educational process on its head. The student him or herself is freed from a system that all too often is involved in owning imaginary problems which are substituted for real learning. At least this is in theory.

The conjecture about acquired learning disability is grounded, in limited but suggestive fashion, in research literatures on learning mechanisms in neural and immune systems. Empirical evidence regarding better learning outcomes has been gathered. A method for remediation was developed over the period 1984-2010 and grounded in these same literatures. The proposal is to instantiate this remediation method within a pure public sector controlled infrastructure based on immersive virtual world technology. The first target is the transition between high school and college. Any sixteen, seventeen or

eighteen year old American citizen would have the right to enroll within one of fifty statewide systems. Each of these systems is envisioned as a public private partnership having a specific mission chartered by either the state or federal government.

The challenge has been to explain the proposal. One avenue to this explanation is to suggest that opportunity exists.

Three-dimensional Virtual World Simulation

A three-dimensional virtual world simulation technology exists. However, many current implementations are in an under-developed form. The Bridge proposal to the President asserts that this technology might be easily reconstituted in a proper form. This is the same technology that kids know from computer-based games.

A central problem is again a misuse of the notion of private ownership. The language required to define and implement a 3D Internet is one that some individuals claim a right to own. This claim is not justified by an objective look at the history of software ownership. A certain kind of confusion may be caused in part so that the absurdity of software ownership practices is not effectively challenged. The *Bridge* technology is open source. We started with Open Sim open source C code, and have been adding methods for semantic extraction and ontology representation of human know that we feel is conceptual in nature. The materials in Prueitt's autobiography are designed to give the history of specific conceptual formations for semantic extract to ontology in a provable secure and ultra stable non-ownable communications medium. Ownership, if one must use this term here, is hold in common must like the public ownership over the meanings of words and sentences. Our specifications of the next generation of virtual simulation technology go to some length to work only with foundational concepts from computing theory so that all elements will have no intellectual property rightly claimed by private interests.

We make the case that a non-ownable 3D Internet is possible by spelling out eight innovations in terms of pure computing theory. However, the more difficult argument is made that current private interests in information technology make impossible the goals of the *Bridge*, unless these private interests are excluded from ownership in the core elements within the *Bridge's* technical foundations. The argument is at several levels.

The first point is that the notion of private ownership is not an absolute, which can be or should be applied to everything. Not everything is a business process. The notion is a useful convention that when overused creates a type of totalitarianism. Usefulness might be measured in terms of the qualities of an advancing civilization, but without a high quality sense of private ownership, the society is generally in some difficulty. Our point is merely that ownership of intellectual property has been over done, and has been improperly applied to foundational concepts such as the concept of a database, or the concept of a word processor. At the very minimum these concepts, once they have aged and become part of common use, should be stripped of private ownership. This is what patent law is supposed to do; e.g., protect for some period of time and then make available as property held publicly.

The social network is seen as both the enabling factor and that which needs cognitive enhancement.

In the theory we advance, reductionism is practiced within a framework where organizational stratification is used to account for this “whole” and “parts” issue. In other words, reductionism is seen as an efficient method for investigation only within the reified behavioral rules of an organization. The theory hinges on the notion that organizational stratum shapes reality through a reification of category, in much the same way as human cognition is shaped through natural language.

So we see a science that has evolved while denying certain specific natures, including the nature of life. The reasons for this are complex and rooted in history and in human nature. Part of this complex might be seen in the rise of fundamentalism, or what came to be called “mono-coherence”. As suggested, the alternative to fundamentalism is found in the new theory.

In *The Bridge*, mono-coherence is contrasted with the notion of multi-coherence. As part of this new language, we reveal a linkage between fundamentalism, certain business practices, AI, and federal funding. These are all mono-coherent, since one set of assertions is used to judge a crisp notion of correctness. As a bottom line, federal funding has been causing a distortion of natural science, placing the strongest assertions of pure scientific reductionism in the drivers seat. Science has become exceedingly narrow as a consequence. It is more of a religion and less of a clear

minded cultural investigation about natural reality. Diversity is limited in practical ways.

The solution path is to create a public sector communications medium, to be used in education, health information management and public governance. This is the nature of the *Bridge*. The medium's data processing architecture is stratified in such a fashion that advanced knowledge management tools are made available to social networks. In essence, the social network creates a common form of knowledge representation that then acts like the biological mechanisms in individual human memory and in individual human decision-making. Science might then become less elitist and more fully enriched by common use.

The distortion of one school of thought by others is not merely of a political and philosophical nature. Individual systems of thinking; from which viewpoints arise, are dependent on the formation and use of natural language. In fact, some distortion is a natural and essential part of how the mind works. The human mind seeks coherence in how the parts of our world view fit together. This sense of coherence often leads to rejection of information that would create challenges to the viewpoint. In simple words, we filter our experience to fit our worldview. This is done via the formation of categories, what we call "reification" of the particular as category. Language can and does deceive us, and in the case of fundamentalisms, we become trapped in a specific system of words.

Schools of thought influence each other as inconsistency arising from individual experience is managed by neural mechanisms seeking coherence³. Let us look at an illustration. A young scientist might face the following dilemma. He or she holds a viewpoint. It is good that the company that he or she works for does make profit. Consistent with this viewpoint are a lot of facts that have to do with employment. A specific dilemma arises. AI is vague regarding certain issues on the nature of natural intelligence and program management demands precision in predicting the value of our funding proposal. The consequence of this dilemma is natural to predict. It becomes easier to distort the results expected from AI than to square the difficulties with short sighted demands of funding agencies.

³ Pribram, Karl (1991) "Brain and Perception", Erlbaum Publishers

The Education Bridge talks about how various conceptual distortions are shaped and continues to shape educational practice in the United States. The *Bridge* asserts that the orchestration of a spectrum of current views on psychological and social life may be traced to a common set of distortions. These distortions are a natural part of the human cognitive process. Conceptual distortion is seen as a naturally occurring by-product of natural language use. Because this is not commonly understood, negative historical forces are allowed to manipulate our common social understanding. The nature of AI is seen as an illustration of something far more common.

There are practical aspects. The language used within the AI paradigm allowed very little appreciation by federal government agencies regarding the means by which biological intelligence is achieved. Both industry and government agencies had dissenting opinions, yet funding decisions were primarily motivated by business consideration; e.g., how to sell what to whom. This motivation by purely business processes is observed to be factual by almost everyone. Our work has explained why. The utter domination of AI in its sphere of influence could not have occurred were it not for a larger orchestration of our beliefs about human nature. The nature of the orchestration may be seen as an absence of correct understanding about the multi-coherent nature of physical reality.

Stratified theory is part of new language where the notion of orchestration is seen as illustrative of how individual or group intention is expressed. The *Bridge* technology recognizes that orchestration is through a set of mechanisms. Of course, the nature of mechanisms may have positive or negative results. The mechanism itself may become used in various ways. Our thesis about AI, specifically, has been that political and business processes amplified conceptual distortion caused by human language. The result is simple to state and to observe; e.g., the AI paradigm fostered a business process designed to obtain money from the federal government. Mechanisms arose that served purposes other than those claimed to be served.

The lessons learned include our appreciation of the need for the public to be aware of the knowledge from science. We are hopeful. This awareness now, shared via social networks, could change our political processes. The development of support mechanisms might serve to undo the social damage from AI as well as develop and

communicate new and better science to the public. Social networks might develop new political power. Capital formation and responsible entrepreneurship might be freed from confused and dysfunctional regulation as a new process infrastructure replaces the current Internet. Health informatics might serve to decrease health costs and improve health services. Software might be for public use as opposed to a cause of economic dependency and wasted time. The value developed from the AI discipline, and there are many values that were developed, might be combined with new thinking about human and social intelligence for the purpose of serving democratic institutions around the world.

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An explanation as to why ownership over concepts must be limited is needed. This requires a general systems view of generic processes involved in social and biological evolution. But where do we begin the explanation? We might take only a small part of the larger realities and show that in that small part we have established the validity of a more general theory about social and biological evolution. Starting with an assertion about the small part, we use evidence to show the viability of this assertion in the context of the entire system. Our selected assertion is about the nature of AI. The evolution of the academic discipline of AI is part of a complex of processes. We claim that it has a role in our cultural crisis. A narrow focus on this one process is then illustrative of what general systems theory provides to us. So this is where we begin.

The steps are as follows. In 2011 we live in an intellectual regime where AI is considered to be consistent with the best scholarship. However, AI is easily challenged using science developed over the past decades. The limitations and misrepresentations of AI have also been increasingly demonstrated. Phenomena not explained by the assertions of AI have become well known. For example, facts are emerging regarding the nature of community intelligence. So what is the problem with AI? AI has been firmly rooted in a mechanistic view of processes where inference is reduced to deduction and induction is regarded as fictional. The paradigm cannot explain natural intelligence.

What we suggest is that induction is not reducible to deduction and that the natural world is not purely deterministic. The best science would attempt to account for observed phenomenon such as the Bell inequality in physics, and other non-Newtonian behavior

in physical systems. This cannot be done with AI, because no AI program has experienced physical reality in a complete way in real time. At least the proponents of AI cannot demonstrate that this has occurred. So why has federal funding not followed a better line of investigation? The answer maybe framed in an understanding of group intelligence, and group thinking as seen in the national intelligence failures of the past several decades.

Ancient prohibitions against science directing an inquiry into induction and related phenomenon are persistent. But new science may be used to show that intention involves the exercise of an induction that is not Newtonian in nature. Living intention is not resolved only as local interactions. The intentional process involves the directed emergence of consequences. There are elements of memory and anticipation as well as the element of awareness within a present moment. The collective intention of business processes has power because this intent is coupled with powerful social forces. These processes express as a type of group intention in order to achieve “its” purposes. Effective opposition requires clear scientific thought and social clarity.

Important scholars, like mathematician Sir Roger Penrose, have addressed the issue of AI using the best knowledge about the foundations of logic and mathematics⁴. But, in response, a certain type of social ugliness is found. A school of thought, centered on AI but often rooted in ignorance, has arisen where ridicule counters proper mention of work on biological intelligence. The sense of anti-intellectualism found in the public media is one common manifestation of this ignorance. This engrained anti-intellectualism is both a consequence of social forces as well as a future cause of the continuation of the various fundamentalisms associated with consumerism. Our observations about AI and federal funding practices is that an inferior paradigm about natural intelligence is not funded largely because science itself is set aside by the intention of business processes.

So our claim is that a type of arrogance and self-centeredness drives distortion. Behind this drive are others, including the profit motive and a narrowly crafted idealization of entrepreneurial capitalism. Given these engrained root causes our society embraces fundamentalistic thought. We seek the comfort of the herd where a single viewpoint

⁴ Penrose, Roger (1989) “The Emperor’s New Mind”, Basic Books

creates uniformity. Commercial interests play on this comfort, and control our economic behavior. A particular brand of fundamentalism is adopted and propagated as the “best” science when it is not. In general the views of scholars contrary to the uniformity are mischaracterized. Scientific reductionism becomes a blind dogma that is applied to the science of living systems, when clearly there are practical problems with cutting up living systems and suggesting that this fully uncovers the nature of life.

Let us look again at our lessons learned. This specific instance regarding AI is one of several illustrations of the nature of orchestrated human intention. For example, it is possible that an individual AI worker may simply believe that the work he or she is doing is good science. With very little cross pollution between AI and natural science, this is entirely possible. However, in other instances the orchestrated intention may be simply bad human behavior. Some types of mechanisms may be claimed to serve one purpose, and yet serve another purpose. Collectively we have allowed these bad human behaviors to become dominate in our mainstream. We all feel damaged.

Social Networks with Knowledge Management Tools

The solution path involves a separation of social narratives into lines of thought, and proper reference to scholarly literatures. The *Bridge* technology has the means to represent human knowledge as computable ontology and to move this representation back and forth between text or symbolic representation. This is done through stratification of topic descriptions, expositions of knowledge in symbolic, audio or textual form, and associative mechanisms. As is discussed in detail in *The Education Bridge*. the “stratified” architecture maps to our understanding of the neural architecture involved in human cognition. Access to the technology is made available within the educational infrastructure, as a public service not encumbered by any commercial activities.

This solution requires the availability of social networks equipped with knowledge management tools. The social networks might then develop ontological representations about purposes and outcomes. We, the People, take charge of our democratic processes so that we produce the solutions to the many crises we now face. The issues we face are like layers of an onion. Each issue reveals another version of underlying mechanism. An example may be given. The social need for college education often serves the professional goals of individuals stuck as employees in a dysfunctional

system. Coping mechanisms develop and are linked together to create a self-governing community whose intention is to protect jobs. The task of education is over whelming and so is set aside. The stated purpose of college is undermined by a practical need to work thirty years and retire. The example is illustrative of what might be overcome, given the existence of the *Bridge*.

Once the knowledge management capacity of the *Bridge* is available, stakeholders may undertake cultural remediation. We may look to ourselves to create and implement a better world. The new directions will come from social networks whose ability to develop knowledge representation is used to make corrective actions. New direction will also come from the young people, who now feel alienated by schools and colleges.

Underlying themes in *The Bridge* are seen in our proposed development and use of mechanism. Mechanisms in the biology of the individual, and in the sociology of communities, are mimicked to the degree possible in a computing architecture for three-dimensional simulated internet-type social network environments. The computing architecture is deemed "purely public", so that private interests do not invade or control public sector function.

This new communications architecture is based on a theory in science; called stratified theory. In reading *The Education Bridge*, we find that the new science is foundational to specific methods and practices in teaching. The pedagogy is called "demand side". It is contrasted with the current educational philosophy, the one that is clearly failing to serve the nation. We argue in *The Bridge* that young people are showing profound intelligence in rejecting much of their experiences from school and college. They are looking for a new path, and the *Bridge* presents this path to them.

The *Bridge* has a specific implementation plan. For-profit corporations are to be established in each state with a compelling charter that requires specific support of associated public sector infrastructure. The plan for the *Bridge* uses a notion of a pure public sector, having no private sector hidden powers. We suggest a private sector hand in causing public sector dysfunction. We note also that the means through which the private sector causes difficulties is aligned with the fallacy of the AI paradigm and the incorrectness of our educational paradigm.

Ultimately we find complex mechanism and a complete understanding of how and why there is, and has been, a crisis in American education. The mission is then defined as the design and implementation of a “virtual real world,” composed of fifty pure public state and pure private sector partnerships. Virtual world technologies will to be re-factored, deconstructed, and re-created based on stratification theory, to produce ultra stable and provably secure human communication mediums.

If the *Bridge* is created, these virtual-real-worlds will connect natural science to real world applications that are NOT driven and designed by and for business processes. The notion of a pure public sector is then realized as supportive of democratic governance, and is done so in a way that capitalizes on private ownership over some part, but not all parts, of the products available to an advancing human civilization ⁵.

Inquiry about Intelligence

The inquiry about intelligence has been difficult. We may agree that it is ranked among the most difficult ever faced by human scholars. Much of the foundations to the inquiry into intelligence came before we understood the psychology of the brain, or the neurological processes at the cellular, molecular and quantum levels. And yet much of these older foundations have been held onto, for reasons that must be explained outside of science.

Change in the foundations of science is over due. As the last century came to a close, science itself reached the end of certainty, to quote Nobel laureate Ilya Prigogine⁶. We have also reached the end of a materialist and reductionistic view of the physical world. This is the view that AI is consistent with. In our historical circumstance, a materialist entrenchment helped maintain non-sensual principles deep within the common perceptions about the nature of self. These principles are mixed and confused with Western philosophical traditions centering on the mind body problem. The layers of the onion are not even this simple, as business processes for purposes that had little to do with anything other than profits.

During Bush II (2000- 2008), there were two primary considerations, (1) DARPA

⁵ For more reading on this work, see the home page of www.educationWorlds.com

⁶ Prigogine, Ilya (1998) *The End of Certainty*. The Free Press

institutional interest in continuing significant funding for AI and (2) narrowly focused federal economic benefit for classified information products. Government support of software industry was seen in our national interests. Reasonable steps that could have been taken regarding failures in multi-million and multi-billion dollar software projects were not taken. These considerations were inhibitory of the type of deep interdisciplinary research on biological intelligence I had, while in ten years of full time graduate school, prepared to conduct.

I was given a welcomed advantage in 1988. After earning the PhD in pure and applied mathematics, I served for a year and a half as assistant professor in mathematics at Hampton University. During this period I developed a teaching style that challenged students with writing across the discipline and with a modification of the R L Moore teaching methods, topics that I will return to in later chapters. My wife and our three young daughters lived in a small apartment thirty miles north of Hampton University. We struggled with the typical salary for starting assistant professors. The family was; however, a cohesive unit. We all felt the promise of life.

This first blessing came with some deep challenges. At Hampton University I struggled with established faculty whose belief was fixed by their own private experience. The deep resentment they had for people of my color was mixed with low expectations they had for themselves and the students. As a white person I did not have the cultural experience to teach at a historical black university, or so they said. This issue was side stepped with my appointment to Georgetown University. This was a second professional blessing. The first was to be shelved for over a decade. How the two are related will be developed as part of the narrative formative to my concept of an *Education Bridge*.

My childhood experience and my early familiarity with world religions had given to me a deep appreciation of multi-culturalism. This experience also created a blind naïveté about the nature of society. I lived in a perceived illusion. This bubble was to last until the late 1990s. I could see the fraying along the edges of my world, and of the dreams I had for me, and the family. My wife and three daughters created a loving presence around me. I had a strong sense that God's creation here on Earth was in a transition, and that part of my responsibility was to assist in that transition. This may or may not be part of the bubble I am still in. However, the reality that surrounded me was to dissolve as my naïveté lead into greater and greater private difficulties.

In spite of the deep and non-removable private loss suffered, the period from 2000 to 2010 was to give birth to a new theory. This theory is a synthesis of the decades of interdisciplinary studies I have been graced to engage in. The intellectual and emotional bubble created a unique place from which to study scientific and formal works supporting what I now call “demand theory”. Looking back over this history, the concepts seem very clear and natural. But it was not until 2006 that the synthesis occurred.

The understanding of natural science does not have to start off with a denial that no thing other than what may be observed might possibly exist. My background was from the Bahai Faith, and then Buddhism, so my sense of the Divine nature is quite different from most Christians. The fact is that I have not been a religious man. Perhaps I have been spiritual; at least this has been my goal. My sense of being spiritual is associated with a strong desire to be an active part of an advancing human civilization. Over these decades I came to believe that civilization’s advance was blocked by materialism. A few other things block our progress. Materialism has been a blessing and a hindrance. Over time I became absorbed in the task of understanding how and why materialism has a strong hold over our American heritage.

Clearly what might be observed is not all that exists, in some sense of existing. The synthesis was about being open to new possibilities. However one might conceive of the nature of self, science should not be closed regarding any ultimate conclusions regarding the nature of self. I choose to see openness as an indicator of what I see to be my soul, or in more general terms the nature of living. I am careful to define this nature in a vague way, as might be proper to something that is not knowable in any complete and final fashion. What this buys is an ability to talk about intention. From this ability comes the need to talk about coherence, and the limitations that come from expecting the world to be always and completely coherent with one point of view.

These notions of intention and coherence had been grounded in my studies in advanced mathematics, cognitive neuroscience and theoretical immunology. I had first hand experience with the failures of information technology as a support for governance function. What I was now looking for was the synthesis that leads to a new foundation to information theory. This theory might then be used to advance and ever-advancing civilization. Intention expressed is seen in the economic terms as demand. Demand is part of **how** the individual soul expresses intention, and is thus not a Newtonian type

physical phenomenon. Our materialistic science had created an ideological foundation for social forces to control markets and concentrate wealth. The new theory is designed to release this control and return the American nation to the practice of democracy.

Using the current theory, nature is described by deterministic causation only up to a certain point, and then our understanding dissipates. Demand theory suggests, at least to me, how science is to now evolve, over the next centuries. The critical element is the notion of organizational stratification of physics processes. Organizational stratification in nature is to be seen as the key to shifting the current paradigm of science. The reason is due to how the three great open questions of science are addressed. But I am moving too fast. Stratification and demand theory takes most of the over 450 pages of *The Education Bridge* to introduce. So I will suspend this narrative, until later in the book.

We return to the years I was blessed to be at Georgetown University as a Research Assistant Professor of Physics. My deeply felt viewpoint regarding human natural intelligence was advanced during academic years, 1990 -1994. My appointment evolved quickly to the status of Co-Director of the Neural Network Research Facility at Georgetown University. This was a prestigious position having important responsibilities. The Chair of the Department of Physics, Edward Finn, had somehow recognized the value of my interests and was kind enough to provide the position and a salary. During these three years I was able to advance a number of relationships with some of the leading minds in the area of neural networks and genetic algorithms. I was also to begin to understand the entrenchment of AI and the undue influence it had.

The field of neural networks, and related disciplines, was fractured. Our funding agency was interested in some unification process. Some high level political influences were attempting to get a handle on the differences between established AI and the new fields of artificial neural networks and genetic algorithms. The world was as it was, and this unification process in science was not on the minds of most of those controlling federal funding. It was, however, on some of these minds.

I was able to observe funding practices. In 1990, the battle over AI verses NI (natural intelligence) were already four decades old. My preparations in pure mathematics, topology, real analysis and stochastic theory; and bio-formalism had

provided me a unique view into the natures of natural intelligence. I had a growing suspicion of the popular notion that intelligence could be generated by a computer program. This just seemed to be “made up out of whole cloth”, e.g., completely fictional in nature. The AI notion is suspect even to the unlearned. It was; however, funded at a high level; thus causing, at least partially, what we now see as a distortion of the natural science. Observing this was frustrating because the observation had no efficient means to address a corrective mechanism. I was faced with something that appeared silly, and unworthy of attention.

Because of the nature of academic positions at Georgetown, my postdoctoral work (1990 - 1994) allowed extensive interaction with leading neuroscientists and leading technologists. These three years allowed continuing advancement of my private theories, even though these theories were not consistent with funded work. With George Bush’s loss of the Presidential elections of 1994, the funding instrument to Georgetown for unification of artificial neural network modeling and AI was severed. Even before my three-year term ran out, we lost income. The final period was not paid for. The family filed for bankruptcy and I took a low paying teaching position in rural Virginia. Just for the record, I was offered 31,000 dollars per year, and negotiated this up to 33,500 dollar per year. The amount is less than what an assistant manager at Burger King [™] makes.

The illusion I was caught in carried us through the personal bankruptcy and into one more step towards my goals. At the end of my three years at Georgetown University, in the fall of 1994, I sought teaching experiences at Saint Paul’s College, an under served college in Southern Virginia. My optimism was in full bloom. I felt that I might apply new theories to our understanding of the human learning processes. We might come to understand how to undo the damage done to young children from experiences in K-12 mathematics classes. Since these months in Southern Virginia, I have been perplexed at the difficulty of getting an audience regarding a solution path. Slowly, over the years, I became to see the cause.

A National Science Foundation grant proposal was written and then not submitted by the college, without my knowing. The difficulty in getting cooperation with HBCU college administration should have been anticipated, given the nature of rural colleges in the South. Since 1984 I had developed several hypothesis regarding acquired learning

disabilities. My 1988 PhD thesis was “Mathematical Models of Learning in Biological Systems”. The intent was to understand the crisis in American education, and to build new platforms supporting self-guided learning in the science and in mathematics. The educational system has been and is non-responsive to this intent. This non-responsiveness is systemic. The cause was systemic, but the root cause of this systemic nature was still not revealed.

Since 1984 my goal has been to create a hybrid human-computing system that facilitated individualized learning of arithmetic, set theory and theory of functions. Since the college and university system was non-responsive in 1995 I turned to IT consulting and to intelligence technology. The family returned to Northern Virginia after a nine-month stay in Southern Virginia. We had reasonable income for the next six years. I was introduced, in 1994, to Soviet area applied semiotics and began publishing a new theory on information theory based on this work, and on axiomatic theory. The applied semiotics discipline is a theory of sign systems, as applied to the construction of models of facts and consequences. From applied semiotic I designed several important intelligence systems (1995-2001). By 2001, my salary was 109,000 dollars per year.

Was this earned? My understanding of computer science and mathematics was enhanced from three years of postdoctoral experience in biochemistry, protein folding and conformation dynamics, neuro-psychology and quantum theory. Looking back, I now see that these are areas of scholarship where one must specialize if one is to find an academic home. My path was into intelligence technology consulting, since no doors were open to me within the educational systems. Here one makes six figure incomes easily.

My own deep understandings of the natures of mathematics lead me into a long discussion with those who were receiving most of the AI funding. Many important scholars felt that federal funding was going in the wrong direction. I agreed with those individuals. The realities, particularly after the 9-11 attacks, were un-relenting. This history is well understood now. But in the early 1990s we were in a kind of intellectual trap. If an individual scientist did not agree with the tenets of AI then he or she must not understand all elements of this favored paradigm.

It was clear that a distortion existed, but the root causes were very difficult to address.

Individuals who had very little understanding of anything except the procurement process controlled federal purse strings. They held the purse strings because that was what the “system” wanted. The system wanted someone who had no clue about anything in science. They knew how to pay out the money to the corporations. This was a root cause and revealing this lead essentially to my being un-employable in this industry.

Federal Funding as a Utility Function

This systemic ignorance created an effective utility function over the evolution, 1950-the present, of the natural and artificial science. Many popular books were published in which one mind or the other was glorified, for example Francis Crick’s book “The Amazing Hypothesis”, a book that asserted that physical reality is all that there is. The book is really about Professor Crick’s over inflated ego. The alternative hypothesis is that we do not yet know enough to make such assertions. “The Amazing Hypothesis” was just a popular book, written for money and as a show of pure selfish egotism. Meanwhile, over time, the funding system was strongly selecting against those of us that do not see the tenets of AI as constant with peer-reviewed scholarship in Natural Intelligence (NI). Some of us did; however, have a mastery over these tenets of AI, as shown in my published work.

John Sowa reminded me many times that AI had been useful, and I agreed on many of his points. His work was as good as it gets on inter-component languages. John’s position was that he understood, and that I did not. He started out with this view of me, and no matter what he could not give up this view. His “common logic” was deeply insightful to a specific problem in human computer interface research. The work is called “common” logic because the logic used in computing must not be too exotic, as are the ontology inference layer (OIL) logics produced through DARPA funding.

But the feasibility of intermediate languages between human language and computing programs was asserted, and jet not ever demonstrated. In my work, particularly in the pages of *The Education Bridge*, we start with the position established by Robert Rosen’s work in category theory. Stated in the simplest fashion, the computing devices are non-complex, in the sense that the devices halt when given true uncertainty. Natural intelligence resolves uncertainty through several means; one of these means is to, perhaps, make a mistake based on the past evidence. The second means to resolve

uncertainty is to orient towards the uncertainty and produce a cognitive induction. This induction, as I point out in an unpublished paper “The Open Questions”, involves non-locality, emergence and physical induction mechanisms not available to the computing device.

There is a consequence that flows from the science I was pointing to. A computing device must be made to halt in the face of uncertainty or incomplete information, and receive instructions from a human. This would mean; however, that an individual human would then become responsible for the decision. This was not a result that anyone in the government wanted to hear. A formal means to manage this, halting in the face of uncertainty, was the core investigation of the applied semioticians; a problem for which I advanced a solution for in 1997 in Moscow⁷.

Sowa’s intellectual position about intermediate languages between human language and computing programs allowed me to see into the distortion within which he and I had our discussions. I saw how a strong assertion regarding the tenets of AI disallowed even any discussion, at all, about NI. The discussion could not begin. My desire to begin such a discussion must mean that I did not know the basic principles of AI. The AI position was absolutely incorrect in asserting that the computer could, given sufficient funding and time, reach out and resolve the gap between AI and NI. But the alternative assertion was just not allowed.

The alternative to allowing AI to control important processes are that computing devices be designed to halt any inferences when a measure of uncertainty existed. This alternative sets aside, as not feasible, the intent of military agencies and agencies that market products on a worldwide basis. The alternative is not based on a philosophical principle, but on a deep study of natural science. There are non-removable limitations on computing truth, and yet the government program managers insisted on this mythology that truth could be computed. The assertion even goes so far as to demand that human thinking be reducible to “computing”.

Sowa’s position may be seen as a particular manifestation of the over whelming

⁷ Prueitt, P. (1997). Quasi Axiomatic Theory, represented in the simplest form as a Voting Procedure. Presented in Moscow at a conference held at VINITI, and published in All Russian Workshop in Applied Semiotics, Moscow, Russia. (Translated into Russian and published in VINITI Conference Proceedings.)

intellectual elitism existing ubiquitously within the community of scholars. It is an elitism that I felt in every aspect of my intellectual life. I felt this as a young boy, an a young man, and even today as an old man close to the end of his years. The elitism hides a specific type of ignorance cultivated by federal funding practice. The distortion is felt not only in what is funded, but what types of minds are advanced by the college and university system. We see influence on decisions of those potential scholars who were forming their own views. Those who formed views in line with feasible models of natural intelligence were cast aside, and those who gave up independent thought and aligned to blind following were promoted. Of course, this selection is not isolated to one scholarly discipline.

All too often, intelligence scientists like myself, were faced with a choice between employment and acceptance of the false AI paradigm. This seems an esoteric issue, perhaps not of much social relevance. However, this was what has shaped my adult life.

My analysis is not about me, but rather about the nature of the American culture, and the nature of the crisis in American education. My work has been directed at this very difficult analysis, from the perceptive gained by background experiences and learning. The analysis might be approached from other backgrounds and other disciplines, and I ask that readers of *The Education Bridge* consider creating supporting analysis. I am but one person. The insights that I offer seem very much larger than me.

So what is the other damage done by AI funding? There are many. The foundation and assertions from the AI camp reduce our collective understanding of natural intelligence. But is there more to this? The answer comes by looking at the broad issue of public knowledge, as shaped by education and by the media. Federal funding has created technology and methods that were then treated as if intelligent. These systems were then used politically to justify national actions such as declarations of war. Meanwhile the public media lays out the case that Artificial Intelligence is a good thing, something to buy.

As a point of fact, a series of systemic failures in national intelligence might be traced to misused evolutionary psychology and cognitive engineering scholarly disciplines. Any one pointing this out was effectively removed from the science community. My own experience was of someone who had a clear view about the nature of so called cognitive

engineering and national intelligence methods.

The Distortion of Evolutionary Systems, by Design

There have been many discussions. Eminent scholars; Stephen Grossberg and Lofta Zahed, and I talked on this very issue during the years 1991-1994, in particular one late night at a conference hotel in 1994, in North Carolina. We each saw a science community as coping with funding requirements, when these requirements came too often from purposes other than advancement of natural science. During these years, Professor Zahed was lecturing about the failure of his own program in seeking a *computing with words* technology. Often making two conference presentations per week, he was admired and yet his message regarding the failure of *computing with word* programs was ignored.

Lofta is the father of fuzz logic; and yet his message was not consistent with funding desires and the artificial stimulation created by DARPA funding. Professor Zahed is now professor emeritus at Berkeley and has examined my work on quasi-axiomatic logics. It is my belief that, if asked, he would confirm the sense of historical distortion over natural science that fuzzy logic and AI created. Likely he would agree with the sense that “computing with words” funding was part of the cause of this distortion. He would also agree that formative axiomatics of the type I had examined from the Soviet school of semiotics was a necessary element in interfacing computing devices with human intelligence.

That a distortion existed was not part of his public message regarding “generalized methods” during the years in the mid 1990s. However, in private we saw a deep concern over hundreds of journals and thousands of PhDs in the emerging discipline of fuzzy logics. Given some additional years of life to reflect, I might be able to outline some of the history I experienced. This reflection would include discussions about operations research and Pawlak’s theory of rough sets, and my work on measure theory⁸. Underlying this reflection is the notion that conceptual systems carry us along, often establishing a momentum linked also to egotism or self-centeredness, or to cultural flaws such as sexism and racism.

⁸ Rough sets were developed form the work of Polish logician Zdzilaw I, Pawlak: see wiki, http://en.wikipedia.org/wiki/Rough_set. My work on measure using convolutions is unpublished.

Cohesiveness and momentum links this nature of conceptual systems to how we as a species are evolving. By conceptual systems, I mean mathematics, fuzzy logic, or belief in specific political or religious dogma. I also mean the narrative carried by an individual when reading a novel.

Stephen Grossberg at Boston University is the giant in the field of neural networks. His founding work in bio-mathematics and biologically feasible models of neural networks is un-paralleled. His center at Boston University has produced over two hundred PhDs in models of neural function. I may write about Stephen's private discussions with me at a later date, only noting here that his early work suffered greatly due to consistent struggles regarding peer review for publication and peer review for funding. He suffered deeply from this struggle. Looking into his eyes and face, one could see that the struggle had honed a stubborn persistence. I asked him about this issue of modeling biological systems only with first order differential equations. I also asked he and Zahed about the relationship between chance and determinism.

In many of the "national intelligence" systems the decision made by a logical system gave up its computing tasks and used fuzzy logic tools. This was like flipping a coin. The result was a shift from an early Grossberg thesis regarding "embedding field theory", which conjectured that all biological process could be measured using only first order differential equations. The shift eventually leads to fuzzy adaptive resonance theory, which I see as a mistake. When national intelligence is based on this technology, the computer's answer might deceive an individual analyst. This was the concern I was to eventually be sacrificed on. My analysis about national intelligence methods was showing a general weakness.

Where is the mistake made? The mistake is essentially already made in how one treats real physical "non-locality" as found in human cognition. Stephen had to reject the notion that some causes are *not* deterministic. In his work, cognition arises from Newtonian like local interactions. His leadership of the biologically feasible part of the massive "artificial neural network" academic discipline was finally corrupted by the need to follow the funding. The cumulative effect on the evolution of science has been noted. The extended field of neural network research often included models that stretched the notion that the model had anything to do with biological systems. These models were developed largely to be in line with funding expectations. The biologically feasible

models developed by Grossberg, his colleagues and students tell us about the biology but suffer also from deep constraints consistent ultimately with the AI paradigm.

In computer simulations of human intelligence, memory, for example is treated as if it must be persisted continuously; a property that I feel is incorrect. Memory is emergent, as noted by modern memory research. There are no look-up tables. On this topic I had many days of private conversation with Professor Emeritus at Sanford and Georgetown, Karl Pribram. These conversations may one day be developed into an extended biography.

Overall Preparations for Deep R&D

My three years (1990-1994) at Georgetown as co-director (with Professor of Physics Edward Finn) of the Neural Network Research Facility allowed me to attend over 40 conferences in neural computing and related areas. I also had a dedicated UNIX based super computer, costing several hundreds of thousands of dollars, in my office. I programmed in parallel C, and OCCAM, as well as FORTRAN and within UNIX. The years between 1995 and 1998 allowed additional conference attendances and presentations as well as classified correspondence and communications. I read extensively in the natural sciences and in computing theory. In spite of my listing of over thirty scholarly publications, the bulk of my work is unpublished. A history regarding this unpublished work is outlined in the paragraphs below. I am suggesting that a new theory is necessary if we are collectively to move from scientific materialism to a deeper understanding of biological intention.

There has been, in the opinion of some, deep harm from our incomplete understanding of neuroscience. Underlying a series of errors is the common folk-wisdom that "there is nothing new under the sun". This might be called the Bayesian error. Bayesian inference may be seen as a classical representative of the tenants found in scientific materialism. It is essentially similar to the Markovian nature, without a means to represent non-locality of causation. The differences might also be discussed. In both cases there are strong epistemological and ontological assertions **not** consistent with current natural science.

The Markovian model is that no cause may come directly into the present moment without acting through the immediate past moment. Of course the first problem is in

defining what is the immediate past. This problem is resolved conceptually by appealing to Newtonian mechanics, and to the laws of thermodynamics. All interactions are considered as if interacting elements are billiard balls. This model is not complex in the sense that the elements might have an interior not necessarily affected by interaction with other elements. Organizational stratification would model the “simple” interactions in a Markovian fashion, but would also account for possible expression from the element’s interior. The elements become “complex” in a formal sense. Interactions also have what might be seen as “field” constraints that shape individual responses to interactions.

Natural science has limitations that are noted in the scholarship over Gödel’s results, as pointed out by Sir Roger Penrose and others. Penrose is merely carried forward an analysis that is reflected in A. H Whitehead’s and others work on the foundations of logic and mathematics. The language developed in a stratification theory is integrated into a stratified technology supporting what I have called a *clopen mechanism*. This mechanism is not locally resolved.

How to Open the Closed Machine

The *clopen mechanism* is observed to occur across natural organizational scales. In terms discussed by Prigogine and Edelman separately, the assembly of a biological expression in living cells involves an enslavement of the parts, atoms or precursor compounds, into a collective organization. The consequent organization is modeled as being strongly caused by properties of elements of nature, but as stated by Penrose, not represented in Newtonian type mechanics.

Assembly of atoms into compounds must follow strongly determinist “laws”. These laws have been to object of scholarship and have become well understood. However, in some cases the assembly mechanism opens epistemic determinates. The epic, or situation, has determinates not accounted for by the set of determinist laws. These determinates contextually shift the laws operating in that organizational scale. New sets of modified laws become localized for a specific time period. The expression is realized as an intention of a living phenomenon and acts in ways that non-living phenomenon (such as computing devices) cannot act. Of course, the details of how intention is expressed may only be speculated on.

Current forms of scientific materialism will guide this speculation because intention, whatever its true nature is, is operating within natural law. The issue of how to advance is exceedingly difficult for many reasons. My own search was often not even well informed by what I see as the clear analysis just presented. But one does find in the biological sciences some suggestions about the new theory. As a specific example, I come to see Edelman's notion of response degeneracy as informative to the new stratified theory. In summary, response degeneracy occurs whenever a good Newtonian formalism would suggest a route to mathematical chaos. That is the point precisely. Chaos exists nowhere in nature. We have been led into an error regarding this notion of chaos. Some playwright or so-called philosopher asserts chaos, and rejects all notions of a design element to evolutionary systems. Darwinism asserts this chaos in nature, and neo-Darwinism takes an additional step. But these steps are not steps in science, but rather are attempts to square something that is round.

Scientific materialism has asserted that evolutionary pressure does not exist alongside a pre-structuring of the present moment. In other words, in scientific reductionism, all cause is local and deterministically arising from pure randomness. We can find where these assertions cause non-removable problems within our sciences. There are deterministic models of biological routes, such as cell signal pathways and gene expressions, to response degeneracy but following a formal route to chaotic "tipping points" is the same, I have argued, as following Zero's paradox. Using fuzzy adaptive resonance theory. Zahed and Grossberg, and many others, developed fuzzy ART in various papers and books published around 1993-1994). One gets caught not understanding the potential illusion of formal language. This is where the historical distortion of natural science by scientific materialism is seen to be most harmful.

What are the parts to past experience and how does natural intelligence use memory elements and mechanisms that are not described by Markovian or Bayesian formalism? This question has an answer and this answer is produced, in part, in *The Education Bridge*. To see this answer one has to look at scientific materialism in a new light. But no one was listening in the last three decades, except in the pure neuroscience. Even here, the AI and computational neuroscience disciplines have had a distorting affect. To see into a new future, we must understand what from the past is causing us problems.

DARPA's now fully matured OWL (Web Ontology Language) standard is the final proof

that something important is missing in the AI paradigm. A number of scholars have concluded that there are specific deep flaws in the discipline and best practices of knowledge engineering. DARPA's supported Description Logics and OIL, Ontology Inference Layer, failed to elevated AI to the status of mathematics. I must be very clear, least I be mis-understood. There is value in this work, but there is a historical need to contextualize what might be expected from the best use of computing machines as a cognitive aid. This contextualization is found in *The Education Bridge* within the concept of e-governance using aided community intelligence.

As has been suggested, the struggle to advance natural science beyond scientific materials is coupled to the nature of individual human intention. The current paradigm has persisted, we claim, because the current paradigm serves the interests of big business and established governments. The paradigm has roots in history and all along this history individual minds have been struggling to advance using a single paradigm, in spite of demonstrated limitations.

The next section of my brief autobiography begins to express a technical argument. The common foundation shared between logic and mathematics has brought into question. The limitations are noted not to sit aside these foundations, but to see them as incomplete in a very specific way. Mathematics itself has been historically seen as Hilbert mathematics. This is the mathematics that my PhD work was informed about. My work attempts to extend the Hilbert program so as to account for what Prigogine calls "The End of Certainty" in natural science. The key to this extension is to lift processes from a modified AI-type base to support formalism for enhanced human intelligence by requiring that a human check the results of a AI base. So natural intelligence will then supply whatever is missing from AI, on a case-by-case basis.

When technical support is made for social network use of this class of cognitive aids, we have e-governance supporting community intelligence (CI). This is new in the evolution of human communities, and yet mirrors closely how natural language is used and maintained.

The Computing Backplate

Two innovations are merged in Prueitt's specification for a computing backplate. The additional of Ribs (Referential Information bases) lead to the addition of Prueitt's Orbs

(Ontological referential base). These are data specifications that when used by a computer produces situational models of complex natural reality. Much of my effort will be to give a conceptual understanding of how these data specification are used in simulating social and biological interactions. The nature of machine-readable ontological modeling requires an extensive background, and yet in *The Education Bridge* I will work hard at simplification.

Ontological modeling might be compared with calculus models of surfaces and forces on particles constrained to surfaces. In both cases we have a model of abstract concepts that are combined to produce models of real world entities or phenomena. This comparison might not be useful to those without an understanding of calculus. A contrast may also be made between scientific materialism's current models of phenomenon like cell signal pathway expression and formative models of expression using an ontological referential base. The similarities and differences between current theory and a stratified theory with stratified ontological modeling may open the reader's interest into extensive literatures. This is a good thing.

The persistence of ontology in light of "hidden" formative constructions creates a new computing paradigm. Complex ontological primitives mediate the model of a situation as these primitives are combined in real time and reviewed in real time by direct human introspection. To this we may now add ontological model processing at very fast speeds.

Ultimately, the stratified technology is simple to understand and use. The substrate to computing processes defined by a generalized framework (Prueitt, 1996 – 2000) is re-proposed in Prueitt's Notation Paper in Four Parts (2010: posted at www.reverseTwitter.com). Other innovations are added to specify a complete eighteen-month federal project. A cubistic framework; e.g., a six dimensional framework is proposed by Klausner (www.coretalk.net) is an essential part of our proposal. This framework is combined with stratified service oriented computing, having thoughtful and minimal underlying semantic framework formalism.

A completely separate work by Gruenwald ([www.hilbertcompany.com /index.php?id=9](http://www.hilbertcompany.com/index.php?id=9)) provides pure numerical computations for all computing kernel requirements. The product developed by his company, HilbertEngine™, is able to demonstrate two orders

of magnitude faster operational throughput, while cleaning any fractured relational database management system, in seconds.

Super-Distribution of Value and Internet Shut-Off Button

The principle of super-Distribution, as discussed in Brad Cox's 1992 book of the same name, gives the refresh-time of the entire computing infrastructure a value less than 3 nano-seconds, plus propagation time. Backplate propagation time can be shown to be determined at near speed of light; e.g., under a nanosecond. This reveals a theoretical result.

Because the distributed computing kernel is less than 47 K in size, the compete Internet infrastructure may be turned off and then back on if instrumented with a backplate. If not, there is no effect. The current Internet should not be able to detect the flicker. In essence this gives a functional capability that does not now exist.

OWL is built to be compatible with multi-agent agency technology (the technology of intelligent agents). So the existing intelligence systems might be used both as a source of information and as repositories for ontological computing.

The Gödel issue and Hilbert Space Computing

We must be clear. The Gödel result is not resolved, except through ignoring even Cantor, as well as Russell, Whitehead etc. The fact that scientific materialism must ignore the Gödel result is a fact that we account for and disciplines such as AI do not. In embracing the notion that formal systems have specific limitations we open the door to a necessary solution. This solution must come from the individual human, in the exercise of natural intelligence.

The Gödel result is at the center of the foundation of classical mathematics. This is where the Internet off button might be placed. Using suggested innovations, we also get small footprint optimal stratified service architecture; provable secure, ultra stable distributed peer-to-peer operating system. If one follows the technical descriptions one sees that an expression of intention is a corrective feature of a complex system involving humans and computing media. Since intelligence is only supplied by the human side of the system, the other side must halt in the face of uncertainty.

We now turn to the HilbertEngine™. Some personal history will provide context for discussion about the limitations of Hilbert mathematics, and thus to the HilbertEngine™, as currently used. My own experience with these issues is not un-substantial. I was aware of the work by Russell and Whitehead, their joint work in *The Mathematic Principia*, as a young boy of sixteen years. I was primarily interested in pure mathematics and foundations during my graduate training. As a consultant to several different innovators, I was involved in various discussions in computing theory and in foundations. In particular, I have original work on the concept of a countable index. This is related to category theory, and encodes ontological models.

Alex Zenkin gave a proof regarding the Cantor diagonalization theorem to me personally in 1997. Zenkin's theorem shows that the famous Cantor result; e.g.,

the size of the set of integers and not the same size as the size of the set of real numbers,

is incorrect on two accounts.

This and other life's event made me aware of the natures of the foundations of set theory and number theory, as well as topology and real analysis. The work is not; it turns out, merely formal theory. Quasi-axiomatic theory (QAT) is formalism for the very fast construction of an ontological model. Extensive use of QAT in the former USSR is found in the works by the USSR government agency called VINITI. It is a little known fact that much of the pure science, biology, chemistry and physics, classified within the USSR, 1945-1994, was grounded in both Hilbert mathematics and QAT. All of this was revealed in five ARL conferences (1994 – 1998) , as discussed below.

Axiomatic Theory

My background in pure mathematics prepared me for a mastery of the formalism of QAT. I specialized in abstract algebra for my Masters in Pure Mathematics from Southern Methodist University, in Texas. I was a student, at University of North Texas, of John Neuberger and Dan Mauldin, in numerical analysis and measure theory, a generalization of the theory of integrals, and vector space transformations. In 1984, I moved having achieved all but dissertation status at UNT, to The University of Texas at Arlington, to work under MIT PhD and leader in the ANN, artificial neural network,

community; Daniel Levine. I am able to follow presentations in many areas of pure and applied mathematics, and to make contributions that are purely mathematical in nature.

However, I also see the formal proofs regarding the non-removable limitations of Hilbert-like formalism. This has led me to look to the foundations of logic and mathematics at an even deeper level; e.g., that exposed by quasi-axiomatics. I made a 1998 private report to Mr. Tom Reader, Army Research Lab in New Mexico, on QAT and related Soviet theory and formalism. Dr Alex Zenkin lived in my basement in Chantilly Virginia for four months in 1997. Because of my work on four ARL funded conferences 1994 – 1998, I was provided an unclassified contract from Army Research Lab in New Mexico. The ARL contract allowed funds to bring this Soviet mathematician to Chantilly.

QAT and Zenkin's separate formalism in pure mathematics has a category of very deep results, not commonly known in college mathematics departments. Zenkin was to unexpectedly show me a theorem that countered the famous Cantor theorem. Once the Zenkin result is understood, there is a question that arises regarding the consistency argument developed by Kurt Gödel. The full proof was shown to me on my chalkboard in Zenkin's downstairs living quarters only after I was startled by his statement regarding the diagonalization argument. It was a result that he had not told anyone about outside of Russia. Following the second time he mentioned the result, I reflected for a week on this statement. I then gave Dr Zenkin permission to present the proof to me.

Zenkin on Cantor and Gödel

Alexander Zenkin's proof is correct. Cantor's diagonalization of a listing of the positive integers does not prove the existence of multiple types of transfinite categorical abstractions. A determined Internet search will find this particular proof, with the precise detail. It was to lead me to look at the formalism of description logics and knowledge representation languages. My reading in various publications, and my taking part in various discussions, was part of a long look, taking the period from 1998 to 2000. As the SAIC-Ontologystream Inc proposal on Novelty Detection from Massive Data Sources (reference withheld –see "Lenat's (failed) program") showed, this work was very nearly funded.

We know that mathematicians have shown an accepted result from logic that there is a clear logical error in depending on any theory about logical error. This statement just

made is a summary of the “Gödel results”. The summary may be also stated as follows:

“We just cannot know if a computed result is correct.”

This is an absolute consequence from formalism, as A. H. Whitehead has shown in the early part of the twentieth century. The error shines light on results that British logical positivist B. Russell, and A. N. Whitehead had regarding their *Mathematical Principia* in the early part of the twentieth century. The Russell paradox is stated;

“The set of all sets is a set.” *Of course, the set of all sets cannot be included in the set of all sets.*

There was also a separate and distinct error that is purely mathematical formalism in nature. My version of this second error is:

“One does not have a right to create an *index on a set that is empty.*”

This is precisely what my original intellectual property does. We create an index when one did not formerly exist. We create deductive formalism out of an inductive process. This creation; however, follows QAT guidelines.

Creating Indexes on Empty Sets

Ontology computing may produce reasonable results that are simply not true. This is the final danger from the paradigm of AI; e.g., that we forget that computers do not form, by nature, a living system. We mean in the sense that biological systems are living. The capacity to experience reality in real time is the single property that separates the two. This is the same distinction seen in Zenkin’s result, as shown on the chalkboard with his result. This distinction has consequences.

My point is that a record must be made at each interrupt point, so that humans may examine a log file, otherwise the system is not properly checked. Systemic errors in computing processes cannot be predicted with 100% certainty. When there is an error, there is no efficient formal means to check, and thus a human must, so as to reduce a vital risk, be in the loop. The human must be called on to create the initial judgment as to what the meaning of the data is.

Returning to the topic of category theory over ontology models. I call this the *emptiness*

property of sets, perhaps due to private conversations before and after Zenkin's given of the proof to me. The well-recognized *Axiom of Choice* directly contradicts the *emptiness property of sets*, but only for empty sets.

One cannot select one element out of a category for which there is no particular instance. The category is empty. The Axiom of Emptiness is evoked.

One finds that the *Axiom of Emptiness* is not evoked in computing theory, creating errors in inference engines and knowledge bases. The question is regarding how an index might be created without prior form. I have asserted that the creation of instances to populate an empty category is not possible using deduction, by itself. Induction is necessary, but a natural induction; e.g., as in electromagnetic induction, that is not the same type of induction as in mathematical induction; e.g., as in the definition of the set of positive integers.

The *Axiom of Emptiness*, or something equivalent, and the *Axiom of Choice* were used together by Zenkin to show that the famous proof of Cantor has two flaws. The Cantor proof is still elegant. Kurt Gödel may have taken Cantor's work on transfinite numbers into consideration in indexing theorems within a formal system. Something was hidden to both of these towers of mathematics.

Cantor's main argument regarding the size of sets has two errors⁹. We cannot have a formal process that produces a pure measurement of an event in the real world. To ignore this result is to NOT be a pure mathematician.

Mill's Logic and Axiomatics, again

The literature on this is significant, including the whole of the work by Robert Rosen, and others. This literature shifts the battlefield from AI to some well-developed sense of community intelligence. We move from pure mathematics to the examination of the several flaws in the AI paradigm. Then, after a while, we define a means to create

⁹Materials formerly at www.bcn.org/journal/ccg/beads/one.htm (removed from the Internet and stored on my web backups) this set of research notes is now at www.ontologyHub.com/journal.zip and also html file embedded in this zip file: Select: Desktop/journal/ccg/papers/statement.htm if a data transfer has occurred.

formalism instantly, using pure observation and a quasi-axiomatic process. Mill's log is used as well as models of neural architecture.

Events carry a new context, "9-11" for example. Cognitive computing as developed by Zenkin; this material is not public domain (Prueitt and Zenkin, 1998), may be applied to understanding artificial systems - such as a DARPA multi-agent agency technology (Prueitt, 1998 at ARL conference in new Mexico). One additional step, and we have digital immune systems (Prueitt, at Norwich unpublished 2008).

Digital Immune System

With the deployment of a digital immune system, we may evolve in two directions. The first direction is as an independent monitoring of parts of the Internet that appear to hold treats to national security. The second is as an independent infrastructure for national collaborative systems, including existing and future private or public virtual world infrastructure.

Klausner and Prueitt have agreed that full deployment might occur in eighteen months. Partial deployment may occur within 30 days. Klausner; however, does not have all of the intellectual property required to create a digital immune system for the current Internet. He is also, as are several of us, stuck without funding.

Internet shut-off button

The emptiness property of sets might be used with superdistribtuion to create an Internet shut-off button¹⁰. A complete shut off and refresh may be done in 3 nanoseconds if the coreTalk™ virtual engine is combined with the HilbertEngine™. The limitations of computing are seen, and the natural world gains new meanings. New innovations are born. A theory of multi-coherence is born. National security and national commerce will be enhanced in a way that is not foreseen. An Intellectual Property (IP) delivery system will be created and provably without any private interests.

10 The president currently has the authority to seize temporary control of private-sector networks during a so-called cybersecurity emergency. Media reporting at: http://news.cnet.com/8301-13578_3-10320096-38.html#ixzz16IZ9XI8p

We see paradoxes and sometimes embrace them. As senior members of the Russian science group invited by ARL to conferences (1994-1998) Alex and Fiona Citkin would say "Pragmatism brings with it an understanding". As one consequence, one MUST see that the two things "deduction" and "induction" are not remotely the same thing. Induction involves non-locality, as a first principle. How is a computing system to achieve non-locality?

The computer by its nature is a simple machine in Rosen's sense, and will never produce natural induction – even though there are formal constructs around the notions on stochastic induction and what are called hidden Markov processes. Hidden Markov processes assert that there is no influence from history not immediately past history. So we need at least a non-Markovian mathematics to model stratified processes. Markov processes assert as an axiom about ontology that all causes are local in time and in space. This is not one of the axioms of mathematics, but an add-on. The add-on is present in much of modern engineering and natural science. The new work attempts to address the required extensions of Hilbert mathematics, using ontological modeling.

Non-locality and Distributed Computing

In reviewing the work I have set forward, we find a number of very difficult concerns about the AI paradigm. These concerns are from a study of the foundations of computing and of mathematics. Limits on local computing are recognized and non-locality is overcome using distributed computing, and organizational stratification. Distributed computing gives stratified theory. This is not stochastic, or mathematical, in nature. It requires a reset mechanism, and we propose stratification, a computing backplate, movement of text to numerical hash tables, these are keyless tables. Thus the index key may be very quickly re-installed. One nanosecond reset, at least locally. Foot print, maybe several hundred binary bits. Measurements are necessary, and for measurement to be effective there must be instrumentation within the digital immune system. The instrumentation I propose is called super distribution. Stratified theory is combined with general framework theory (Prueitt, 1985). Clopen mechanisms must open the closed formal system. It is settled art as to how to do this optimally. *Thus the argument that this must be non-ownable, like air.*

A formal inference engine may be continuously checked to see if its axiom base is not longer reflecting what is easily seen to be true by an aware and informed human. If the

measure of connection is absent, the computing backplate may be turned off, a new rule set loaded everywhere within the infrastructure. QAT is how one develops the new inference engine. Checking processes were simplified in my 1997 international conference presentation in Moscow, to VINITI, on an algorithmic voting procedure.

AI and Pragmatism

Why is human awareness necessary as a control over so called AI systems? The first concern is Constitutional in nature. No constitutional authority exists to take control of natural processes without a complete proof that harm will not occur. Perhaps the current authority of the U. S. President is not constitutional. Legal concerns trump formal theory so the issue must be addressed in legal constructions. The second concern is about pragmatics. Pragmatism is seen fully only in a present moment. So this second concern suggests a way forward. In summary, someone must be in charge; otherwise there is the possibility of great social damage.

With the concern about pragmatism, we return to the core issues in cognitive neuroscience, as defined by Pribram and others. Like human consciousness, we are aware only in the moment. Humans may bring oneself into contact with one's awareness in the moment. Perhaps the computing device can do this in a way that interfaces with both natural reality and the human individual or collective awareness.

So we look carefully at the neuroscience. The computer cannot see reality as it happens. Humans can. How? We have a P3 wave and frontal lobes. This fact from natural science gives us the understanding required to build knowledge processors using computing devices. Meanwhile the AI battle goes on, as if we have no collective frontal lobes, nor a P3 wave. In summary, natural intelligence is stronger in the individual than in the group. So again, someone must be in charge.

The purpose of the DARPA programs on AI is to remove responsibility from agency systems that DARPA wishes to deploy. In spite of removing Topic Maps (the correct paradigm) from the battlefield over who gets the money, RDF/OWL works only in ways that remind us of the limitations of the expert system technology from the 1980s. The use of ontology in semantic extract does not work, as I remember a former PhD student of mine saying.

Contextualization and Measurement

Remember KIF; e.g., Knowledge Interchange Format? Hum, no longer discussed in the industry funding meetings with DARPA. Why? My answer is that KIF is not used because Schank's work, from which KIF arises, was on the contextualization problem. OWL ignores this problem. By saying that Gödel is not relevant to induction logics, knowledge engineers make an error in pragmatism. Why is this?

There is no formal argument that the logic created by computers is necessarily relevant to the human understanding of events occurring in the natural world. The description logic may allow us to talk endlessly about toppings on a pizza, and may produce results about anything. But we have no formal proof possible that will verify that a computed induction is valid as a perfect model of a real world event. So how to use such systems?

My professional life was expended as I attempted to take the Peircian position that an interpretant was essential to intelligence, and that computers could not, EVER, measure the world in real time in the way required to make judgments. I pointed out that without judgment there is no proper contextualization, and without contextualization one often will automated the production of non-sense.

This was the position taken by Penrose, until he just stopped talking about this issue, after his 1993 book. Only someone who has a deep understanding of these issues is going to have a chance at understanding the full picture. How many are there of these individuals? This is effectively what he told to me when we were both at the 1993 conference on Cognitive Neuroscience, at Radford University. Pribram attended two international conference I organized and funded at Georgetown, where Pribram and Stu Hameroff meet in late 1991.

What is missing is the ability to open the closed formalism. The history of my use of the term "clopen" may be given.

In summary and as a restatement, the Soviet Union's best mathematicians saw a flaw in the Western AI formalism, having to do with Godel and consistency arguments. How to open the closed formalism, and quickly create a new formalism? This was what V. Finn, D. Pospolev, K. Laura and others were working on in the Soviet cybernetic camp. The

formalism is called quasi-axiomatic theory (Finn, 1991). But the effort was side stepped by the collapse of the USSR. After the 1994 - 1998 conferences funded by Tom Reader (Army Research Lab), only a few keep the knowledge of what was attempted active. The Chief Scientist of the Air Force publicly ridiculed the Soviet science community, and in particular the foundations to it chemical and biological sciences. This foundation was quasi-axiomatic theory.

My friendships with Drs Alex and Fiona Citkin were kept alive between 1994 and 2003. Another scholar, Dr Peter Kugler, and I worked with the Citkins in private between 1995 and 1998. Our focus was on Robert Rosen's work on metabolic repair cycles. In this work one sees stratification between parts and wholes. But the issue as to how to replace the underlying axioms and facts as well as inference rules was not yet settled.

Work by Gruenwald and Klausner

Work by Gruenwald and work by Klausner was added to my neurally inspired architecture between 1998 and 2006. <http://www.hilbertcompany.com /index.php?id=47> lists Bjorn's patents. I helped him write two of these.

One of these is a patent on Hilbert space processing of ontology models. The core patent is extremely board and very well written by German patent attorneys. All numerical data representation and processing is covered; this is what you are looking for. He did not apply this to ontology computing, but I have. Complex manifolds are the means to persist data. The founder of Autonomy Inc; producers of knowledge collaboration systems, founded a company that developed the theory of Hilbert based computing of textual data repositories. I also worked on five other patents of some importance (going back to 1983 and in particular the CCM-model of semantic extraction, as generalized by Prueitt, under contract).

I have three additional unpublished patentable pieces to this puzzle. All three have been on chalkboards. First, very simple convolutions are the single procedure applied to in memory persisted data. Second, this can be done mechanically using Fourier transforms and thus can be done in the EM spectrum without a computer. No indexes. No hash keys. No hardware, just sound. Utility functions, non-localized except when collapsing into a local inference engine, may be supplied using light spectrum. Thus a secure and ultra-stable OS for quantum computing is defined.

Well, Bjorn has done well, but almost no one understands the simple underlying principles - representation of language text as base 64 numbers - the so called key less hash table, or RIB (referential information base). I do, and this is why he and I do not talk. I discovered in 1999 while working under contract with his company, that the Rib (Referential information base) has no add property. Only modifying the payload of a data packet may we modify the database, once laid out in computing RAM. There is no "add" this new data element.

There are other important features of Ribs, and the HilbertEngine's use of Ribs. The set of data packets must be the same size, or sizes must be a transform to a consequent use of binary digits. This allows very small footprint to a virtual engine, indexed by the Rib. The index can be changed using superdistribution. A complete re-write of the entire database can be accomplished in under five nanoseconds.

My work on Orbs (Ontological referential bases) generalizes Bjorn's work by replacing the base 64 number with a categorical framework having n dimensions with each of the n dimensions having $m(n)$ categories. This is general framework theory (as invented by Prueitt, 1999-2000) The categories cover the semantic space and thus the set of categories is a generalization of Zackman, Sowa and Ballard 's work on semantic primitives. I do not now know the state of classified use of these technologies, but the problem has always been program managers and the corporate need to develop continuing funding instruments.

This RIB and Orb data representational format supplied what I eventually called a "clopen" mechanism. During the period 1999 to 2007, I helped Sandy Klausner develop language describing cubism and frameworks as part of his CoreTalk specification (www.coretalk.net). Clopen is; however, a mathematics topology slang for a set that is both open and closed. Nice concept, actually related to T_2 spaces. T_2 spaces are abstractions of the set of real numbers.

Super distribution and the computing backplate

The pieces are understood, by a few of us, leading to a means to put the human in the intelligence loop, along with a very powerful, simple, fast "computing backplate" to the future Internets. The computing backplate is a derivative of the work by Klausner based on Orb data encoding using a tri-level architecture (memory, knowledge representation,

anticipatory mechanisms). The KOS (knowledge operating system) has a super distributed property that gives "provable" information assurance.

I have talked with co-inventor of Objective C, Brad Cox, about super distribution over the years. He and I could demonstrate this feature within 30 days if provided with a quality programmer team. The digital immune system that I developed with classified funding from the Air Force while I was at Norwich (2008-2010) has an exfiltration architecture that is designed to detect data structure that "should not be out there". I could demonstrate this in an additional 30 days. The central notion is about how to create an index on an empty set.

One then adds the linguistic work by Tom Adi, see: www.readware.com, to a linguistic structure sufficient for a "differential and formative ontology process" (Pruett 2001) and one has the new intelligence substructure that changes the nature of our various wars. I almost got this explained to Admiral Poindexter and his senior scientist in 2001 while I was senior scientist at Object Science Corp (acquired by SAIC in 2003). In 2005, I reported on income tax forms a yearly income of fewer than seven thousand dollars, compared with \$109,000 in 1999. These years were hard of many individuals. Two years (2005 – 2007) of seclusion was followed by now five years teaching mostly freshman mathematics, statistics, the calculus, linear algebra or computer science.

The architecture I have cobbled together is proposed as a natural infrastructure for all public sector functions, starting with the measurement of learning processes.

This architecture promises to be provable secure, ultra stable, and not encumbered by third party ownership. The full peer-to-peer engine is likely to be under 47 K in size, and based on a computing substructure that may be replaced everywhere in a very large distributed peer to peer communication system (within nanoseconds). This feature is not disruptive. I have restated the material discussed above in four papers at: www.reverseTwitter.com.

I would like to work on a 1099 basis with in home computing lab funding. I live in the country in the hills of Georgia north of Atlanta in a big farmhouse. I am willing to move in August 2011. With the secure farmhouse I have adequate space.

Conferences in virtual world are being hosted. Computing systems and software for full development on Open Sim, Maya and Blender platforms is needed (about 5K), but other than this only a salary or 1099 contract is needed. I would prefer to continue teaching for another year and to work with others in creating this new virtual world public infrastructure¹¹. We seek also, the ability to let out contracts to Klausner, and for use of the HilbertEngine™, as well as other requirements.

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¹¹<http://www.google.com/search?client=safari&rls=en&q=%22virtual+world+public+infrastructure'&ie=UTF-8&oe=UTF-8>