Religious naturalism isn't a religion, really, but a rational frame of reference that will accommodate the religious minded. Think of it as science with a soul. How that soul was lost and how it can be regained to address our deepest spiritual yearnings, is the subject of today's presentation. Many believe the western Enlightenment dealt a crippling blow to religion, that it disenchanted the world. But most of the great thinkers and scientists from that era were quite religious. Their mistake was to "look under the hood" of the universe and portray a God that cannot be proven or personified, but only experienced. In *The Age of Reason*, deist Thomas Paine said God created an intricate and orderly universe to "educate and enthrall man." Paine's God *wanted* us to look under the hood and be amazed by what we saw. This notion threatened the Christian establishment, which branded scientific reasoning as atheistic, and clung ever more tightly to scripture and miracles for validation. I believe it was the ensuing backlash that set the western world on a path toward secularism. Skeptic David Hume shook the underpinnings of Christian faith by asking which was more likely: that a miraculous event would contradict the laws of physics, or human beings would see it as a miracle by mistake.

Today the pattern has resurfaced. Discoveries in paleontology and genetics threaten religious fundamentalists and draw them into a public debate. Their dubious arguments provoke the radical atheists who, better armed with facts, nudge the disillusioned away from *all* religion. How ironic that the adverse reaction to newly discovered truth leads to the very disenchantment it sought to prevent. But despite this polarization, the last few decades have seen a resurgence of early-Enlightenment reverence that Einstein described as "rapturous amazement at the harmony of natural law."

Edward O. Wilson first made mention of religious naturalism in 1978. Many eminent scientists have since embraced this perspective. It asserts that (a) all of reality is constrained by natural processes that are consistent over time and space; (b) this natural law is potentially discoverable by humans; and (c) duly understood, the symmetry and coherence of natural law can evoke a genuine religious response. The constancy of natural law is an article of faith, since the proof would be inexhaustible. But simple induction makes it compelling. Human history follows a pattern of attributing natural phenomena to the supernatural, until someone unveils an indisputable explanation. The Catholic Church has grudgingly yielded its myths to the advances of science, having exonerated the likes of Copernicus, Galileo, Newton and Darwin. One myth still persists: God infuses every fertilized human egg with a spark of the divine, distinguishing it from other life forms and making it His own child. This claim is not easily dispelled by science, although the evidence suggests we differ from other life forms only in degree, and not in some radical way that makes us eternal or essential to some cosmic master plan.

The astounding successes of modern science have led to a thought process referred to as reductionism, which deconstructs reality to its tiniest and most basic components. The reductionist might represent the biosphere as a collection of organisms, each comprising organs, cells, molecules, atoms, subatomic particles, and perhaps down to strings of pulsating possibilities. According to this view, a complex system is completely defined by its parts. Most unsettling perhaps, it reduces human consciousness to mere electrochemistry. Physicist Steven Weinberg famously said, "The explanatory arrow always points

downward. The more we comprehend the universe, the more pointless it seems." Maybe we shouldn't look under the hood after all.

Molecular biologist Ursula Goodenough came to this bleak realization at an early age. "I found myself in a sleeping bag looking up into the crisp Colorado night. Before I could look around for Orion and the Big Dipper, I was overwhelmed with terror…All of the stars I see are but one galaxy. There are some 100 billion galaxies in the universe, with perhaps 100 billion stars in each one, occupying magnitudes of space I cannot begin to imagine. Each star is dying, exploding, accreting, exploding again, splitting atoms and fusing nuclei under enormous temperatures and pressures. Our sun too will die, frying the earth to a crisp during its heat-death, spewing its bits and pieces out into the frigid nothingness of curved space-time…I wept into my pillow, the long slow tears of adolescent despair." Her testimony tells me modern religious naturalism is motivated more by the emptiness of reductionism than by the potentially dangerous fantasies of supernaturalism.

If Hume hastened the downward march toward reductionism, his contemporary Immanuel Kant hinted at a contrasting principle we now call emergence. "An organized being is then not a mere machine … but it possesses in itself formative power of self-propagating kind, which it communicates to its materials though they have it not of themselves." Kant held that a complex system is more than the sum of its parts, prophesying the self-organizing tendency in nature that modern biologists routinely observe.

Religious naturalism sides with Kant, arguing that physics alone can't explain complexities like evolution, consciousness, free agency, and meaning. These phenomena emerge spontaneously from the elements that comprise them, through a strange mixture of randomness, order and necessity. In evolution, mutations happen randomly but are passed on predictably. The necessity of survival with limited resources leads to either their selection or their elimination. The workings of creativity and chance mean that even with perfect knowledge of natural law, we cannot pre-state the possible outcomes much less predict which one will actually occur. This doesn't mean any physical laws are violated, only that the products of their interactions cannot be deduced from the laws themselves.

Did you ever wonder at the similarities between the evolution of language and the evolution of species? My epiphany came when I read Darwin's *Origin of Species* while learning Spanish in Chile. Chinese bears no more resemblance to French than elephants to butterflies, yet all language ascended from the same neuro-physiological machinery. Like species, languages exhibit a tree-like lineage, with divergence between geographically isolated branches. Both forms of evolution yield greater variety and complexity over time. There are now some 6,500 spoken languages in the world. By one reckoning the English language surpassed a million words this year, double the number in 1900. The ultimate products of biological and language evolution appear highly ordered and complex, yet they proceeded by chance. There was no prior design. Neither God nor your English teacher was in charge.

Since language developed over a time scale that humans can comprehend and collectively remember, it may help us understand the more enigmatic evolution of life. There are about 40 or 50 distinct and indivisible sounds in the English language, called phonemes. For example, the word "enough" contains 4

phonemes (e-n-u-f). Some languages use over 100 phonemes. Let's assume 200 is the universe of possible sounds that can be uttered by the human voice. Let's further assume that all words range in length from 1 to 15 phonemes, with 6 being the most frequent. A typical language might have 50,000 words to convey 10,000 unique thoughts or meanings. These are very rough numbers but they will suffice to make my point. Imagine how many possible words, whose lengths follow the bell-shaped frequency distribution, could be constructed from 200 sounds. Of course, most of them would be gibberish to any human. If we randomly selected one of those possible words and matched it to a randomly chosen meaning, the odds of reproducing both the sound and the meaning of a word that already exists in any of the world's languages are one in two million. This simulation would have zero chance of replicating an entire language. If we rewound civilization and started over, the many languages that developed would be unintelligible to anyone living today. This describes emergence.

Might the same rationale apply to biological evolution? The building blocks of life are proteins. Each protein strings together some 20 different amino acids (from a possible pool of around 200). The potential unique assemblies of life-forming proteins are mind-boggling. We observe only what *happened* – a tiny subset of what was *possible*. Human reason is led in circles by the anthropic principle, which states that creation in general and the earth in particular, are uniquely suited for human life. True enough. But humans evolved eyes sensitive to the visible range of the electromagnetic spectrum (red to violet) because the atmosphere is transparent in that range, not the other way around. Earth is perfect for human life because we arose from it, but different conditions might have produced something even more remarkable (perhaps a creature intelligent enough to be unimpressed with itself).

Randomness and the absence of design can still produce order in complex systems. But even with complete knowledge of the parts, the eventual whole can be neither predicted nor repeated. Emergence means the explanatory arrows point upward. Notice that in language not only are the *words* emergent, but so too are the structures that guide their use. Might what we call "natural law" and the self-organizing qualities of the universe also be emergent? Such a thought would disturb even a deist!

Reducing life to physics and chemistry is no less demeaning than reducing poetry to phonemes. Emergence offers an escape for the religious naturalist. It is miracle enough without the need to infer divine intervention. However, to some theists the argument from Intelligent Design is the only way to rescue civilization from a "Godless, meaningless, amoral secular humanism" (Kauffman). The argument rests on the improbability of irreducibly complex systems existing without having been designed in advance by a supreme intelligence. A commonly cited example is the bacterial flagellum motor, which requires all its component proteins in order to function at all. Presumably these parts could not have evolved, since their function as a complex whole would not have been anticipated by natural selection.

Religious naturalism is compelled to address this claim. Intelligent Design ignores Darwinian *preadaptation*, whereby useless features of selected mutations may in a later environment offer adaptive advantages and become selected. Or features useful in the original context may develop new functions advantageous in a different context, much like the meaning of a word can change in response

to new conditions (for example, the word “gay”). Such processes are emergent. Biologists generally agree that bacterial flagella evolved from much simpler secretion systems. As a testament to creative adaptation, these protrusions not only propel and steer cell locomotion, but they also act as food sensors. In another example of selected preadaptation, three critical bones in the human ear have been traced to the jaw bones of an early fish. Nature is terribly inefficient, but wonderfully resourceful.

One could argue that my language analogy only strengthens the case for intelligent design, since language has been steered by human intelligence. This argument confuses design with selection. Design requires planning and conscious intent. Selection occurs by random trial and error, retaining favorable deviations and discarding detrimental ones. The evolution of language is driven by the need to communicate in a changing social environment. Some words stick, others never catch on, and some grow obsolete. Yes, the process is steered, but only to stay on the road – wherever it may lead. There is no road map, no future destination. Whereas the object of design is to arrive, the object of selection is to survive.

The courts saw through Intelligent Design as religion in disguise. Even if it were serious science, most of its adherents resort to the supernatural as the final explanation of design (if the designing entity were natural, its greater complexity would necessarily infer an even higher intelligence, ad infinitum). But the supernatural falls outside science, whose tools can only probe the natural world. Advocates of Intelligent Design attempt to ride science as far as it will carry them, only to end in a leap of faith. This is analogous to driving a car to the edge of a chasm and pretending it will fly over the abyss.

Have you ever read a poem so perfect that it seemed the poem was not made from the words, but the words were made *for* the poem? It is tempting to apply the argument of Intelligent Design to language as well as biology. But we know the words evolved before the poem appeared, and the sounds were there long before the words. In no way does this diminish the poem’s beauty. The long journey from primitive grunts to Shakespearean sonnets could neither have been predicted nor repeated, but it can certainly be admired. Relentless improvement makes a more awe-inspiring story than sudden creation.

Religious naturalists accept the reality of emergence in the natural world, but how does that make them religious? Theologians and scientists alike argue that meaning and values are not the purview of science. This is a false dichotomy. Reverence, wonder, and conscience can all be aroused by witnessing nature. Complexity theorist Stuart Kauffman contends the qualities of divinity that we revere – creativity, meaning, and purposeful action – are properties of the universe that can be investigated methodically. His leading research in this field reflects the religious naturalist’s belief in a unified reality.

The mission of religion is to help humans grapple with mystery and morality – cosmos and ethos. Kant could not escape these “two things that fill me with constantly increasing admiration and awe … the starry heavens without and the moral law within.” Religious naturalism illuminates and integrates these two dimensions of human experience. Mystery entices us to explore and contemplate the natural world. The insights gained invoke a sense of kinship and responsibility to all life. As Rachael Carson wrote, “The

more clearly we can focus our attention on the wonders and realities of the universe around us, the less taste we have for … destruction."

Oliver Wendell Holmes understood that humans are designed to wrest ultimate meaning from mystery. "A man may fulfill the object of his existence by asking a question he cannot answer and attempting a task he cannot achieve." I don't speak of mystery as a black box, impervious to human understanding. It is constantly unfolding, offering an impression here, an invitation there. Einstein said, "The most beautiful experience we can have is the mysterious. It is the source of all true art and science." I cannot fathom infinity, although as a child I tried. One night I decided to see how high I could count. At the point of exhaustion I was no closer to infinity than when I started. But I had a heightened appreciation for it. Isaac Newton never solved the mystery of infinity (nor did he intend to), but he *harnessed* it through his discovery of calculus and the laws of motion. He opened the black box and changed the world.

I believe that like other emergent phenomena, mysticism transcends but does not contravene physical laws. William James said, "True mystical experience … falls outside objective thought and experience. We have no right to invoke its prestige as distinctly in favor of any special belief."

Religious naturalism links transcendent experience of mystery with acts of goodness. Our moral awareness is stimulated by a mystical connection with and dependence on external reality. Mystical experiences often lead to a feeling of oneness with life and an acceptance of its intrinsic value – even in the face of pain and death. The poet Wordsworth looked to nature for mystical *and* moral insight. He declared himself

> "A lover of the meadows and the woods,
> And mountains; and of all that we behold
> From this green earth; of all the mighty world
> Of eye, and ear,--both what they half create,
> And what perceive; well pleased to recognize
> In nature and the language of the sense,
> The anchor of my purest thoughts, the nurse,
> The guide, the guardian of my heart, and soul
> Of all my moral being."

Research suggests that natural selection has operated to tune human morality; sympathy and altruism confer evolutionary advantages. Moral reasoning is tied to neural structures in the brain, as well as to cultural origins. Both forms of evolution create and conserve socially beneficial values. Goodenough notes, "The epic of evolution is beautifully suited to anchor our search for planetary consensus, telling us of our nature, our place, our context." Humans innately possess a facility for honesty and compassion. Whereas orthodox Christianity asks us to renounce our true nature, religious naturalism asks that we get to know it and honor it.

In summary, there is ample reason to doubt the literal claims of all religions. Unlike the scientific method, these claims only amplify disagreement. But religious naturalism does not dismiss the authenticity of religious experience. It merely removes the *need* to believe in the supernatural or to compromise scientific reasoning. It avoids the pointlessness of reductionism by recognizing emergence as the source of complexity and meaning in the universe. It answers the call of religion to inform mystery and morality. "Religion" means to bind together again. How better to accomplish this than to understand our genetic heritage and restore our connections to each other and to nature? Human evolution affords both the means *and* the motivation to cultivate a global conscience. E. O. Wilson admonished, "The more closely we identify ourselves with the rest of life, the more quickly we will be able to discover the sources of human sensibility and acquire the knowledge on which an enduring ethic … can be built."

For non-theists like Stuart Kauffman a fully natural God is the very creativity of the universe, "so worthy of awe, gratitude and respect, that it is God enough." Religious naturalism will never answer all our questions. But it can be enough to exercise our imagination, expose our intellect to doubt and discovery, and open our heart to all of existence. I do not accept the implication that the more we know the less we feel. In the creation myth, Adam and Eve were punished for partaking of the tree of knowledge. But to flourish today, humans need knowledge more than ever. The vision of creative emergence could unlock the door to enlightenment for people of any faith. And in those who express no faith, it could awaken the sacred and reveal a world of enchantment.

How did Ursula Goodenough eventually overcome the despair that seized her when she looked into the night sky? She embraced the unknown with keen reflection and uncommon humility. In her book, *The Sacred Depths of Nature* she says, "To assign attributes to mystery is to disenchant it. I needn't have answers to the big questions. I let the enormity wash over me. The gasp can terrify or the gasp can liberate." At the end she confesses, "My yearning to be known is relegated to the corridors of arrogance." She expresses deep gratitude for life on *its* terms. She regards the complexity and beauty around her, and her "ability to apprehend it," as the ultimate meaning and value. Her credo: "The continuation of life reaches around, grabs its own tail, and forms a sacred circle that requires no more justification, no Creator, no superordinate meaning of meaning, no purpose other than that the continuation continue until the sun collapses or the final meteor collides."

Imagine the whole space-time continuum as a vast ocean, and life as a giant wave rolling across its surface. You and I are tiny droplets in this ocean, connected by surface tension to all creation, past, present and future. We live but briefly in the rise and fall of the sea as the wave moves through us. Its oncoming energy animates and lifts us. We alter the energy ever so slightly and then, our downward plunge pushes it on to the next generation. Some religions see us riding the crest into eternity, but I don't think waves work that way. For religious naturalists it is enough to believe that in this moment we are the moved and the mover, beneficiary and benefactor, handiwork and artist, in the miracle of unceasing creativity.