Creationists are pushing intelligent design in the classroom.
Scientists are pushing back.
At the turn of the 18th century, a debate erupted among Europe’s leading thinkers over the question of whether the world as it existed was the best of all possible worlds. This debate revolved around such enduring issues as the role of evil, possible limitations on the Divine powers, human ability to understand God’s hidden plan through critical analysis, and why the world was created as it is. Points of departure not only were traditional religious doctrine, but also growing scientific insights into the workings of nature. First and foremost was the view that an invisible force played a critical role in ordering the universe: the law of gravity. Equally revolutionary were the era’s emergent disciplines of botany, biology and comparative anatomy. The physical world became multiple, diverse and changeable. It was governed by unseen laws.

German mathematician and philosopher Wilhelm Leibniz added fuel to the best-of-all-possible-worlds debate. The world as it currently exists, he reasoned, does not tell the full story because without the possibility of change beyond prescribed boundaries, it would limit God’s potential as Infinite Creator. The principle of plenitude, Leibniz argued, mandated an accounting of potentially different worlds, different species and different types. Each thing in the constituted world had value and the right to realize its individual value fully within the system to which it was attached. This world he declared to be the only one that could ever conceivably exist because it allows for change and for the growing perfection of the parts and of the whole.

While not yet within the realm of a Darwinian theory of evolution, Leibniz’s version of “intelligent design” clearly points forward toward evolutionary and co-evolutionary theory. The human mind he then likened to the mind of God, the realm of eternal verities. Human understanding is designed to explore without hindrance how the world functions, the place of humankind in it, and the role that reason plays in advancing God’s ultimate design.

Much has been written on the subject since 1700. What Leibniz had to say about diversity, plenitude, interacting sub-systems, possible worlds, and the creatively analytical thrust of human understanding as a god-like operation retains its value for examining the relationship between critical inquiry and religious belief within the context of institutions of higher learning 300 years later.

Last fall I served as organizer and moderator for a panel discussion at Vanderbilt addressing the role of reason and faith in the pursuit of science and understanding the place of humanity in the world. I invited Father Edward Malloy, PhD75, president emeritus of the University of Notre Dame, to join Vanderbilt faculty from several disciplines in the discussion, in which participants were asked to address, either directly or indirectly, the current battles over evolution prompted by advocates of intelligent design. Not surprisingly, given recent media attention to the subject, a standing room-only crowd turned out.

The event was sponsored by the Vanderbilt University Faculty Senate, the Center for the Study of Religion and Culture’s Project in Religion and Science, and the Metanexus Templeton Research Lectures in Religion and Science program at Vanderbilt.

Included here are edited versions of the five panelists’ remarks. Each was free to view the constraints, challenges and opportunities posed by the intersection of religion and critical inquiry from her or his own perspective.

— John A. McCarthy, professor of German and comparative literature and chair of the Vanderbilt Faculty Senate
I am one of many biologists who fears that someday, non-scientists and politicians will tell us what science really “is” and exactly how science should be taught.

I’ll start by describing the day I fear might come true: In this scenario I am halfway through the semester, teaching advanced molecular genetics to a class of 60 students—bright young women and men who have studied the sciences for many years. They hope to someday use evolutionary principles to defend us from pandemics and to develop genomic therapies for diseases we cannot treat today.

Imagine on this day I say, “Students, today we are going to learn the truth. First, you must forget what you have learned in physics and in chemistry. You must forget what you have learned in geology and about plate tectonics. You must forget what you know about the fossil record. You must forget astronomy. You must forget all you have learned in biology, biochemistry and especially genetics.

“The truth is this: Everyone in this room and everyone on the face of the Earth today can trace their ancestry to a man named Noah. And according to some of the people who claim to know about Noah, he lived about 4,000 years ago.

“So, students, what we know about genetic diversity in humans must be some kind of mean trick because Noah’s children’s children would have had to mate among themselves for generation after generation after generation. Yes, I know, this is inconsistent with the existence of the Chinese, and the Africans, and Europeans, and Aborigines. But the truth is the truth.”

My predicament as a biologist is that, if limited to this so-called truth of intelligent design, I might as well teach that the earth is flat.

The same thing happens if I stand out in the cold: Every hair on my arm will stand up, and I will see goose bumps caused by contraction of the piloerector muscles. But I am not warmed by the hair standing up on my arm, and I will freeze to death. Does that sound like an intelligently designed system? It just doesn’t work. Think of all the wasted genes, wasted enzymes, wasted muscle energy, wasted nerves—a total waste.

Evolutionary theory predicted long ago that as generations pass through time, we retain our ancestral genes. In other words, the major mechanism of evolutionary change is gene over-duplication followed by divergence. This is now confirmed in the sequenced genomes of both humans and chimpanzees. We can look directly at how our genes and the genes of chimpanzees are organized and evolved in our chromosomes.

Scientists want evidence, we want facts, and we want to understand the how and why. Without this kind of knowledge, there is nothing we can do to design new therapies.

Here is an example of randomness followed by selection at the molecular level, another example of an inefficient system that questions the argument that all life is designed by an intelligent creator: The biochemical conversion of the compound lanosterol to cholesterol takes 19 high-energy reactions. The entire process consumes massive amounts of energy. The end product, cholesterol, differs from lanosterol only by a couple of protons and carbon atoms. Today a good organic chemist could convert lanosterol to cholesterol in about six reactions. So not only is this an example of random reactions, but it does not seem especially intelligent.
I could provide hundreds of examples of life depending on random events followed by selection. DNA replication is totally dependent on this process. The point is that many millions of years ago, animals that could make cholesterol had enhanced survival value. Any mutation that inactivates any of these 19 enzymes is lethal. This is the mechanism of genomic conservation: Animals that can make cholesterol survive, and those that do not can’t survive.

Even at the molecular level of life, we see clear examples of randomness followed by selection. It is the true genius of creation. It not only led to the origin of life on this planet, but it continues to create today. From this biologist’s perspective, evolution based on randomness and selection is the best argument today of an “intelligent design.”

No matter what our path of inquiry, whatever our level of confidence about the truth we’ve discovered, we should have a humility about other paths to the same reality

Every Pursuit of Truth Is a Potential Path to God

By Father Edward A. Malloy, PhD ‘75
President emeritus, University of Notre Dame

Last summer when the Vanderbilt Board of Trust, of which I’m a member, gathered in Colorado, we had the opportunity to hear presentations by a number of faculty members. It gave us an appreciation of the cutting-edge research going on at Vanderbilt and also helped us recognize how difficult it is to find a common language by which we could interact and ask appropriate questions. The more specialized the research, the more difficult it is to communicate even to colleagues, let alone enlighten a broader audience.

I believe in a unified theory of knowledge that presupposes that every form of inquiry, whether highly sophisticated or not, has value in and of itself. To use theological language, every pursuit of the truth is a potential path to God, wherein the discovery of beauty can illuminate the wonder and brilliance of God’s creation. To make a claim like that is not to assert that at any given moment, any one of us as particular limited human agents can fully comprehend the full nature of the integration of that knowledge, or even the particular path that we’re pursuing at the time.

Much of human history is taken up with efforts within particular faith traditions to account for the creative order, to ascribe creation to a kind of agency, and to give that agency a name. It is an effort to recognize in the unfolding of history a sense of time and a sense of development that accounts for the future—either in hope or despair.

One part of that inquiry is a preoccupation methodologically with the created natural order, the social structures within which human life takes place, and all the subdisciplines by which we account for things.

When I was a sophomore undergraduate at Notre Dame, I remember taking a philosophy course in which I read a book that introduced me to the “nothing but” fallacy—the idea that all of reality is reducable to economic dynamics, to some psychological perspective, to the biological workings of the human organism, or something else. It has always seemed curious to me that, in the history of ideas, when someone is considered a genius in one realm of understanding, that same person is often thought of as all-encompassing, like the old Renaissance scholar. The assumption is that one human agent can be so wise in all things, in knowledge and in wisdom, that he or she alone among all human agents has something special to say. Albert Einstein, for example, one of the greatest physicists in human history, had attributed to him an understanding about other areas of human inquiry that seems in retrospect utterly naïve.

A perspective that I find helpful is the question, What is a door? If you ask that question of an architect, or a car-}

No matter what our path of inquiry, whatever our level of confidence about the truth we’ve discovered, we should have a humility about other paths to the same reality

penter, or a poet—you can fill in the blank—each will give you a different understanding of what a door is. Some answers will be symbolic or indirect, appealing to a different dimension of human perception. And each can be appreciated on its own terms without necessarily being contradictory.

Those of us who are not scientists, for example, need to be open to the very best understanding of the world as we know it, according to the methodologies and tools available to us at a given time in history.
When John T. Scopes Came to Peabody

On April 1, 1917, I reported to work as a janitor at Peabody College in Nashville, where I was to serve as an janitor for the next 31 years. My duties included cleaning the classrooms, library, and other areas of the college. I would later be known as the "Barefoot janitor of Peabody College," and my story is one of perseverance and determination.

I was born in a small farming community in Tennessee and had little formal education. However, I had a strong work ethic and a desire to learn. I was determined to make the best of the situation and use my skills to help the students and faculty at Peabody College.

One day, I was called into the office of President John T. Scopes to discuss the upcoming trial. Scopes was a biology teacher at a one-room schoolhouse in Athens, Tennessee, and he was facing charges under the Butler Act, which prohibited the teaching of evolution in Tennessee schools.

I was given the task of cleaning the courtroom where the trial would take place. I took this opportunity to familiarize myself with the proceedings and the legal issues involved. I read the Butler Act and the case law surrounding it, and I came to understand the importance of the trial.

The trial began on June 10, 1925, and I was present throughout. It was a time of intense public interest and media coverage. I witnessed the testimony of expert witnesses and the cross-examinations by the defense attorneys. I was also present when the verdict was announced on July 26, 1925, and John T. Scopes was found guilty.

The trial had a significant impact on me and my community. It highlighted the struggle against intolerance and the importance of education. It also underscored the need for more access to educational opportunities.

I continued to work at Peabody College until my retirement in 1948. Over the years, I rose to become the head janitor and later the head custodian. I was beloved by the students and faculty, who would often stop by to chat or ask for help.

Looking back, I am proud of my role in this important event in history. It was an honor to serve as a janitor and a witness to the trial of John T. Scopes. I am grateful for the opportunity to be part of a story that has endured for generations.

—George Washington Smith, janitor, Peabody College 1917-1948
substitute for God. “Intelligent design” is not a biblical notion, nor is it a doctrine in the history of theology. Rather, something different is at play, and it does not take a very perceptive mind to see that. Our own self-image, smoke and mirrors, undist the radar, Trojan horse. It is a deliberate and unconvincing attempt to divert attention from the Supreme Court’s decision regarding the First and the 14th Amendments.

It’s naïve to suppose that, for its proponents, intelligent design is a substitute for religion that’s being elicted the design work. The next question is obvious: Which god, or whose god? Of for that matter, which god? There’s nothing in the phrase “intelligent design” that requires the believer be one only divinedesider

The religion of the world is filled with a distinctive: Each was immensely important for the religions who system they preach intelligent design is taught. So a unifying “design” is discussed, and any of these great deus design(s) the equal serving with the Christian God. Finally, there is the fundamental profet mocking those who reconcile a benevolent and omnipotent God with reality. That which abolished all of these phreno, plenty fully evident in the history of the world, also the salt of “intelligent design” or any of its sowers? Is the premise being all-powerful but not fully good? Or thoroughly good but not powerful enough to press all that is destructive and evil? It’s an ancient dilemma, experienced by most of us at one time or another in our lives. A common manner of re-solving it is to adopt a dualistic view, whereby good and evil are played off against each other—

for example, by picturing God vs. Satan in constant battle. Yet, even this approach leaves the ultimate question of theodicy still open. In intelligent design tends to downplay this importance of the meaning, purpose and morality of the universe, emphasizing instead that the world and all life are simply crafted in an “intelligent” manner. Why, however, are the realms of the world presented as so casually and remotely? It’s as if those advocate intelligent design, why not propose the concept of a “just design” or a “compassionate design?”

The notion of intelligent design, I would argue, unibil- leal, unreasoned, uninformative, unscientific and, quite likely, unconstitution al.

Science Is a Living Enterprise, Not a Finished Book
By Lynn Goodman
Andrew W. Mellon Professor of Humanities and professor of philosophy

Evolutionists need not get defensive and circle the wag- sons over intelligent design. Instead, we need to delve into it and understand the nature of those who make the argument for teaching intelligent design. I think the issue offers an opportunity for teaching about more evolution and about related issues of law and religion, public policy and poetry. The’s are deep from which all of us can learn.

The fact is that there are gaps in the evolution on a countout of the living species by natural selection. Some of those gaps will not be filled by new empirical discoveries but will require new conceptual ones. In an address last year, it was found that a natural selection on did not explain everything. He expanded his realm of models, his realm of hypotheses, to include se sexual selection. He also, erroneously, leant Lamarck’s idea of the inheritance of acquired traits. Humility and intellec tual honesty call us to recognize that science is a living, growing enterprise, not a finished book.

Stephen Jay Gould, an accomplished and rival evolu tionary biologist, worked for decades, until his death in 2002, seeking to develop new naturalistic lines of explanation that would redress misunderstanding of evolution. His work sug gests that intelligent design is a step to the areas not yet examined by natural selection may be performing

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odney Stark is a plan-sponsor jumpac a ter, a former journalist who writes prolifically and gets to the point. He has a knack for sifting out conventional wisdom in his world of the sociology of religio, then delving it.

Where others argue that organized religion has held back science and enlightenment, Stark says monolithic led to the n of science and the end of the title. The title of his latest book is an announcement of his view: The Victory of Rea son: How Christianity Led to Freedom, Capitalism and Western Success. The medieval world was, he says, not a dark ages but laid the foundation for sci entific discovery, free enterprise and belief in the progress, belief in the accumulation of knowledge. Anti-Catholic bias among generations of medieval scholars has distorted the historical record.

“There shouldn’t be a need to make these arguments, but they do need to be argued,” he said recently.

In his book he writes: “During the past cen tury, Western intellectuals have been more than willing to trace European imperialism to Christian origins, but they have been entirely unwill ing to accept that Christianity made any contribution (other than intolerance) to the Western capacity to dominate.”

We肥胖的 at the intersection of religious thought and economic change, Stark, 73, is a hot ticket in sociological circles these days. In February and March he came to Vanderbilt to give a series of lectures on a subject dear to him: a “market approach” to understanding relig ion. Religion works rather like a supply-and-demand economy, he says. Religious provide their denominations (compete for consumers (i.e., people). Throughout history, religious have risen or declined based on their competence at meeting the public’s demand for spirituality. Religious “monopolies”—state-subsidized faiths, whether in ancient Egypt or modern Europe—irreversibly either they’ve failed because they repress religious pluralism and force only one “brand” on people. Also, they get lazy. Since their salaries are guaranteed, rather than tied to success in the field, they lack motivation and lose touch with consumer needs.

A free-enterprising system of competing faiths— the American scene—keeps religios “capital ism” in balance. In The Churching of America (published in 1965), Stark states, “Religious life is characteristic of the middle class.”

In their book, America’s Christian work ethic and flexibility, however: “Christian faith is the credit for the in values of Europe’s tech nological superiority in the last millennium. The reason is: Carrie Vittigh, Christi an theologians “taught that faith in reason was intrinsically a force in God,” he says. Intellectual rigor and logic became worthy guides to theo reytical discovery and individual rights. This spiritual style had world-wide consequences, Stark notes. “It created a baseline of ‘natural’ that were the pursuit of science, and applied natural laws to economics. It trimmed early capitalism on its own, and on Catholic monastic estates—some 600 years before the Protes tant Reformation. The usually accepted version of history gives the Reformation credit for sparking a work ethic that made free enterprise possible. When Stark is not rummaging through historical records to recover the received wisdom about religions’ role, he is watching current spiritual shifts. He’s as blunt about the present as the past. He explains the decline in main line Protestant church memberships by their fa tion (liberal) politics and neglect of a demanding traditional faith. Conservative churches are outperforming them in the spiritual marketplace, he says. Churches that preach sin, salvation, hell and hope—churches that still “hold church”—do well. “If you forget to hold church, people won’t come,” he says.

RAY WADDE,
MA’91

Rodney Stark’s Vanderbilt visit was hosted by the Center for the Study of Religion and Culture and financed by the Vanderbilt Research Lecture Grant, which will bring at least $270,000 to Vanderbilt over three years to fund a research group, speakers, publications and a major conference. The grant was awarded by the Metaxus Institute, which advances research, education and outreach on the engage ment of science and religion. It runs some 30 projects in 30 nations, including the Templeton Research Lectures funded by a grant from the John Templeton Foundation.
Intelligent design presents itself in part as a lawyer’s brief—not surprisingly, since Phillip Johnson, one of its chief advocates, is an attorney by trade. The aim is to shift the burden of proof to one’s adversary. But in formal terms the move is fallacious. The advocate challenges evolutionists by pointing to “irreducible complexities” that natural selection has not explained, and then urges that what has not yet been explained is in principle impossible to explain—that is, naturalistically.

But science need not be adversarial. Here the burden should be shared. We should all assume some part of it. That means that the poet who celebrates the beauty and complexity of life has a place at the table alongside the scientist, whose explanatory work celebrates the same beauty and complexity in quite a different way.

I think it’s a mistake both tactically and strategically for theists to rely on intelligent design: tactically, because they will find themselves on the defensive, open to refutation as new cases are found and new explanations worked out; and strategically, because it depends on a “god of the gaps.” God becomes the explanation only of what’s inscrutable, and as science advances God then retreats into ever narrower and darker corners. A more hopeful strategy, which I am trying to pursue in my work, is to explore the compatibilities of science and religion, creation and evolution.

As for the question of whether evolution or intelligent design should be taught, I think the question itself is based on a misunderstanding of what teaching is—as if teaching meant the same inculcation or indoctrination. As I see it, intelligent design presents an educator with an opportunity, that is, the opportunity to teach the controversy, analyze and discuss the issue, open up a dialogue between the sciences and the humanities, and ask ourselves, What kind of explanations can science offer? What kind of explanations go beyond what science can offer? Where is the right way of relating these areas of human experience? Are there things in nature that can’t be explained mechanically? What do we see that can? This is a fruitful arena for conversation in which dogmatists on both sides will be very much hampered by their dogmatism, but people with open minds will find they have much to say to each other.

Wandering in a Dark Labyrinth

By Vicki Greene
Associate professor of physics

My role in the mission of higher education is that of science teacher. My statement about intelligent design and creationism focuses on science education because the intelligent-design debate has revealed a deeper problem about the teaching of science.

A recent Pew poll shows that 67 percent of white Christians favor teaching creationism along with evolution. No significant differences on this matter exist among evangelicals, mainline Protestants and Catholics. Among those who believe in evolution by means of natural selection, 62 percent believe that creationism should be taught along with evolution.

Why do so many people without either scientific or religious predilection favor the teaching of creationism in the science classroom? We infer from the poll results that many people in this country do not understand science, neither as a body of knowledge nor as a process of discovery. The resulting vacuum allows many unfortunate ideas to rush in.

For the moment, physics teaching is removed from the controversies attending the life sciences classroom. However, physics has many pedagogical, structural and cultural attributes in common with these other sciences. Thus, the physics classroom is an excellent place to explore the various contributions that scientists and science teachers often make to popular misunderstandings of science. There are several possible reasons many people don’t understand science well enough to classify descriptions of nature as scientific or nonscientific.
Among these are the construction of private universes, bad science teaching, bad translations, scientific arrogance, the “science as religion” problem, and general complacence on the part of scientists.

People have their own theories about how the world works. This set of theories forms a person’s “private universe.” This personal cosmology can be as firmly held as any religious conviction, more elaborate than epicycles and very, very wrong. A well-known videotape shows recent Harvard graduates, Boston city high-school students, and at least one tenured professor at Harvard struggling to explain why it is warmer in the summer and colder in the winter. All have similar, incorrect explanations for this phenomenon. It is extremely hard for a teacher to help the students replace this picture with the correct explanation that seasons come from the tilt of the earth’s axis relative to its orbit around the sun.

Much of bad science teaching can be summed up in the words of physicist Wolfgang Pauli: “This isn’t right. This isn’t even wrong.” Explicit definitions of science in science textbooks range from reasonable to nonexistent. One example in an elementary physics textbook shows a high-speed photograph of a water balloon shortly after being popped with a pin. The photograph shows that the water inside retains the shape of the balloon briefly before collapsing. The caption explains that the photograph provides evidence refuting the theory that liquid does not retain its shape when removed from its container. In fact, there was no such theory to contradict. The photograph shows that the water has conformed to the shape of the container as expected.

Another problem is the difficulty of translating physical concepts from the mathematical language of science. So many people are averse to math, and innumeracy is culturally acceptable in our culture. In the words of Galileo: “Philosophy is written in this grand book, the universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and read the characters in which it is written. [The universe] is written in the language of mathematics, and its characters are triangles, circles and other geometric figures without which it is humanly impossible to understand a single word of it; without these one is wandering in a dark labyrinth.”

The arrogance of proponents of science also increases the difficulty with which many people willingly integrate scientific understanding into their everyday thinking. Philosopher Daniel Dennett said, “To put it bluntly but fairly, anyone today who doubts that the variety of life on this planet was produced by a process of evolution is simply ignorant—inexcusably ignorant.” This sort of thinking is not likely to leave the reader with an open mind towards science.

Some scientists concatenate their scientific beliefs into their spiritual ones or simply substitute one for the other. In “The One That Got Away,” a 1997 Science magazine article, Gary Taubes wrote an account of a Yale professor of physics, Jack Greenburg, who spent years trying to reproduce evidence for a new particle he thought he had discovered. His analyses were based on throwing out any data that didn’t look right. Decades of wasted funds and lost careers later, a colleague explained: “Jack was on this Nobel Prize hunt. Jack was so convinced from his GSI data that it had to be there, it was like a religion with him.”

Scientific explanations are built on observations, hypotheses and theories. But ID advocates want to redefine science, giving rise to the practical problem that we can’t arbitrarily redefine science and simultaneously maintain our dependence on technology. Those of us who are teachers and practitioners of science need to counteract the various problems I have outlined. We also need to educate our students about the process of scientific inquiry and teach them the nature of scientific proofs. We need to distill the statistical arguments on which evolutionary biology depends so that students can still recognize the scientific method within these arguments. When the public can make informed decisions about what does and does not constitute a scientific argument, we will not have to worry about pseudoscientific controversies such as the intelligent-design debate. ▼