

# Physicists Among Us

BY STEVE DAVOLT

A university physics education might best be regarded as a high-grade, adult version of the “thinking cap,” that imaginary chapeau that an elementary school teacher bid us don to magically deflect distractions so we can concentrate all our brain power on the matter at hand. Like a thinking cap, a physics education fosters the cognitive skills that allow us to focus and think clearly about a problem.

A physics education is invisible and, like a thinking cap, worn by people all around us who forsook a career founded on physics to pursue other vocations—writers, musicians, politicians, businesspeople, and computer programmers, to name a few. In the great diasporas that come after earning an undergraduate degree some migrate from physics to myriad other fields. Some seek an avocation, such as religion or politics, while physics continues to be their “day job.” The following profiles proudly expose some of those physicists among us who have parlayed their physics major into success in a diversity of careers.

Senator

THE  
AG

## From Protons to Politics

In mid-July 2007, Mike Fortner was feeling the onus of his responsibilities as a freshman state senator. Though the Illinois General Assembly was scheduled to adjourn on May 31, Gov Rod Blagojevich and the state legislators were at a stalemate on a budget. It was six weeks into summer with no relief in sight.

The political impasse presented a welter of logistical problems for Fortner. As long as the opposing sides remained deadlocked, he had to shuttle between Springfield and Northern Illinois University in Dekalb, where he was teaching an introductory physics course during the summer term. Fortner's home in West Chicago and the university are near one another, but both are a good two-hour drive to Springfield. Furthermore, his research as part of the "D Zero" collider team at Fermilab in Batavia, Ill., was temporarily on hold.

After moving to West Chicago in 1987, Fortner joined the physics faculty at Northern Illinois. Not long afterward he entered politics by taking a seat on an historic preservation committee. Over time, he gradually ratcheted up his political activities, joining a planning commission and other committees, then becoming an alderman. "I became more and more interested in different aspects of city government," Fortner says.

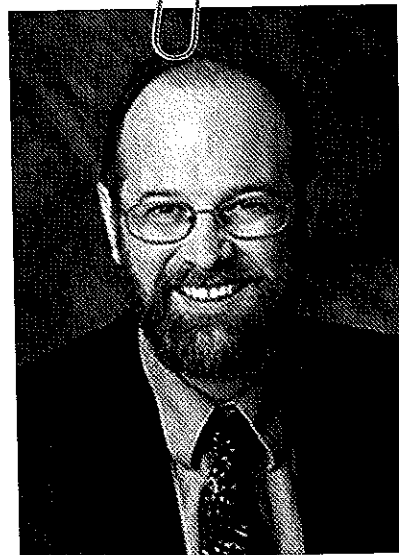
His hometown political career culminated in 2001 when he was elected mayor. He was into his second term when he ran for state senator and won a November 2006 election.

Fortner credits his physics background for being an able-minded politician. "Physics gives you the ability to analyze a complex problem, to break it down into its essential parts that are solvable," says Fortner. Being a physicist is also an advantage when he's analyzing the kind of data that inform policy decisions. According to Fortner, "Physicists have no fear of numbers."

His years of classroom experience imbued him with the ability to communicate complex issues, a skill that applies as much to deciphering the abstruseness of legislation as to explaining the theory of relativity.

Fortner doesn't expect his colleagues to run for civic office, but he does enjoin physicists to become more engaged politically: "Physicists can use their training to give the public a greater comfort level with science and scientists."

Although he won't rule out running for national office—after all, one former Illinois state senator, named Barack Obama, is a presidential candidate—Fortner must first convince himself he can serve better than from where he sits currently. "I'm pretty content where I am now." Δ



## A Singular Clarity

When Mike Long moved from his native Missouri to Washington, D.C., in 1996 to become a speechwriter for Sen. Fred Thompson, it marked a major turning point in his career. Long had spent a decade as a systems analyst, but had long since exhausted his enthusiasm for working with computers. So he turned to one of his first loves—writing.

That his college education has been in physics might have made writing seem a less than likely profession. Long received a bachelor's degree in physics from Murray State University in Kentucky. He did a year of post-graduate work at Vanderbilt University before abandoning academia.

"A physics education was perfect training for becoming a writer," Long says. "Many writers tend to be dreamy, romantic types. But physics is a fact-based discipline that teaches you to see a problem in its most elementary form. It gives you the ability to strip down a situation and impose upon it a singular clarity."

He counters the frequent criticism that such a technical approach deprives writers of a voice: "You learn to write as clearly as you can, then your voice or style comes through as an expression of your personality."

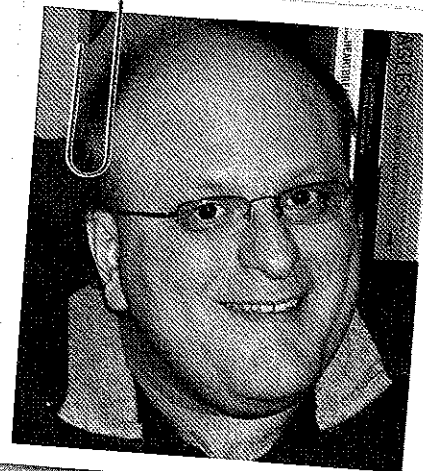
Long had gravitated toward science since his high school days in the tiny town of Matthews, Mo., where his first love was biology—genetics, in particular. But he discovered that physics was more conducive to his "mechanistic" way of looking at the world. "I wanted things to make sense," Long says. "Physics at its core level expresses how the world works."

When it came to making the transition to becoming a working writer, Long discovered that many of the writers he admired were pundits, critics, and speechwriters. He began contacting successful wordsmiths to find out how to break into the business. Two in particular—arts critic Terry Teachout, currently the drama critic for the *Wall Street Journal*, and Andrew Ferguson, a journalist who covered U.S. presidential elections for the *American Standard*—were exceedingly helpful by merely taking his phone calls and doling out advice.

After two years on Capitol Hill, Long spent several years picking up an assortment of political writing gigs. In 2004, he joined the White House Writers Group, a boutique communications firm founded by veterans of the Reagan and the George H.W. Bush administrations. WHWG writers pen articles, policy papers, and speeches for government, corporate, and nonprofit clients.

A Washington speechwriter with a physics education is such a rarity that his degree has become a sort of "calling card." According to Long, there is a demand in D.C. for someone who understands technology and can write. About half his clients these days hail from the technology sector.

Aside from his day job, Long is a frequent contributor to the political newsweeklies *Weekly Standard* and *National Review Online*. His writing even garnered a "Best of the Web" distinction from the *Wall Street Journal*. Δ



## A Harmonic Divergence

**Y**ou might never suspect that Amelia Kaplan set out to be anything other than a musician and composer until you notice in her oeuvre a work for solo violin titled "The Heisenberg Uncertainty Principle." For Kaplan, a professor of music composition at Oberlin Conservatory of Music in Ohio, the juxtaposition of music for a stringed instrument and quantum mechanics epitomizes the duet that physics and music have played in her life.



From an early age, both vied for her attention. In her eighth-grade science class, Kaplan was captivated with how electrical forces, or bonds, cause substances composed of the same elements to have different properties. "My science teacher told me that was physics—although it's also chemistry. I decided at that point I would be a physicist," Kaplan recalls.

Her primary extracurricular activity was music. She began taking piano lessons at age nine, later adding clarinet, oboe, and saxophone. She would play for many youth and community orchestras, usually as first-chair clarinet.

When the time came to choose a career, however, practical considerations steered her toward science. Kaplan majored in physics at Princeton University, but almost immediately misgivings arose. Kaplan says the rigor of the required math was daunting; she also wasn't enjoying it, but sheer doggedness saw her through. "I'm pretty stubborn, so I don't tend to give up things until it's past a reasonable point."

She received a bachelor's in physics in 1985 and went to work for Bell Communication Research in Morristown, N.J. (formerly part of Bell Labs). Kaplan continued to take piano lessons and in her spare time performed with Princeton's New Music Group. "I realized then that I absolutely had to try to make a go at it in music, or I would regret it forever," she says.

Kaplan began driving into New York City once a week for composition lessons from a professor at the Juilliard School. Later, she won a full scholarship to the University of Chicago, where she earned a Ph.D. in music composition in 1998.

Asked why music is often referred to as the most mathematical and scientific of arts, Kaplan replies, "I suspect it has to do with pattern recognition and quantitative thinking common to both. Both involve recognizing connections between sets of abstract objects, be they numbers or pitches or rhythmic structures."

Her own worst critic, Kaplan believes her best work as a composer is still to come. "Unlike some of my colleagues, who could use some humility, I am quite ready to pronounce something a piece of crap," she acknowledges. "Let's just say that I hope to have some notable achievements as a composer but haven't got there yet." Δ

# Riding the Waves

It was one of those scenarios for which the ancient Greeks coined the term "irony." As a geophysicist, J. Ernest "Sunny" Breeding, Jr., stalked ocean waves for three decades before one named Katrina finally caught up with him. She reached all the way up to Slidell, La., on the north side of Lake Pontchartrain, flooding his home with four feet of water and nearly wiping his travel agency off the map.

Sunny Breeding started World Class Travel & Tours after a long, successful career with the Naval Research Laboratories. An expert on wave mechanics, he studied how the wavelength, speed, and direction of ocean waves were influenced by meteorological change and ocean floor topography, which was critical in projecting their effect on sea-going vessels and coastal areas.

Breeding was of draft age during much of the Vietnam War, but the Navy asked the local draft board to exempt him from active duty. "[The Navy] said I was more valuable to national security as a civilian than as a soldier," Breeding explains.

Breeding first began thinking about the nature of waves as an adolescent in his native Iowa. A ham radio hobbyist at the time, he contemplated the radio signals oscillating across the cornfields. The rigorous certification process required to get a ham radio operator's license sealed his destiny as a scientist.

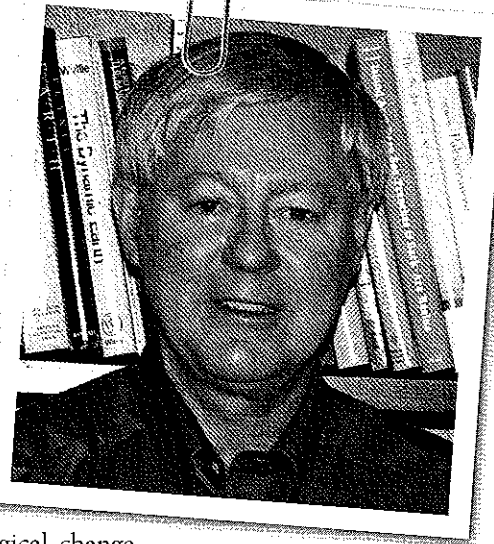
He earned a bachelor's degree in physics from Drake University in Des Moines, Iowa, later earning his Ph.D. in geophysics and physical oceanography from Columbia University, where he conducted research at Columbia's Lamont-Doherty Earth Observatory. "At Lamont-Doherty I had the privilege of studying with one of the great pioneers of geophysics, Maurice Ewing," Breeding says.

Breeding has taught undergraduate physics at the University of Tennessee-Knoxville, Florida State University, and the Florida Institute of Technology. His extensive collection of physics texts, fond relics of his teaching days, was among the property lost to Katrina.

After more than thirty years working as a physicist, Breeding made a career change after budget cuts at the Naval Research Laboratory at Mississippi's Stennis Space Center.

Breeding and his wife, Rebecca, a math major with a minor in physics, had started World Class Travel & Tours in 1994, at a time when Rebecca's employment situation

was uncertain. Rebecca eventually landed another job, so Breeding, newly unemployed, devoted his full attention to the travel agency, where he has occasion to draw on his knowledge of waves to advise his clients. "If someone is prone to motion-sickness, I can tell them which cabins to book on a cruise ship to experience the least amount of movement," Breeding says.  $\Delta$



World Class Travel & Tours

J. Ernest "Sunny" Breeding, Jr., Ph.D.  
Travel Agent

## Returning to Earth

Like many schoolchildren who lived through the post-Sputnik zeitgeist, David Larson was lured into science by a combined sense of patriotism and adventure. "The space program was in full swing, and the race to the moon was a pretty romantic notion," Larson says.

How would rockets work in space? Could a space vehicle safely convey a man to the moon? Larson says these were huge questions that had to be answered. "This was pure science fiction."

Like nearly all wannabe space travelers, Larson was destined to remain grounded. He enrolled in the physics program at Washington University in St. Louis "not really knowing what I'd do with the degree," he recalls, but after a change of heart, he set his sights on a business career.

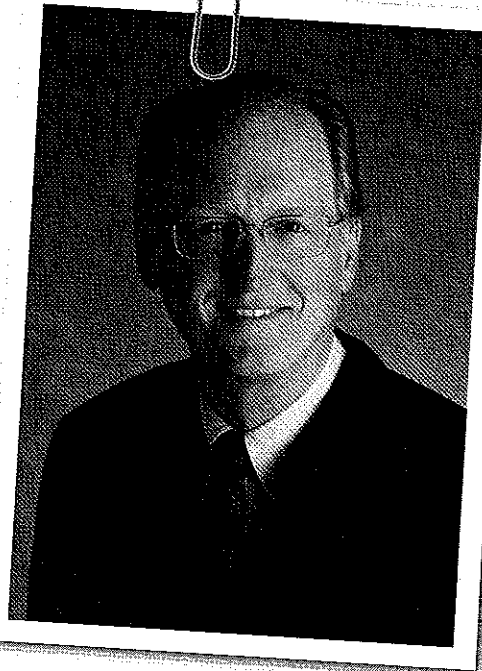
Although easy to assume, Larson didn't abandon physics because the stars in his eyes had been replaced by dollar signs. "Once you get to college you realize there's this whole world out there," Larson explains. "So much of physics involves working in a lab, in isolation. I was getting the idea that I wanted to be more actively involved with people."

Fortunately, the university offered a 'three-two' program, which allowed students to work toward their undergraduate and master's degree simultaneously. Larson earned a bachelor's in physics and an M.B.A. He soon found, however, that the earthbound world of business is light years from his star-struck dream of working on space projects.

"When I started studying business I had no idea what a liability or an asset is," says Larson, whose bank holds more than \$2 billion in assets. "Once I learned the terminology, I found that what physics taught me about problem solving gave me an advantage."

According to Larson, the scientific process physics students learn applies to problems in other fields. After physics, the math of accounting and finance came easy. This "competitive advantage" helped Larson quickly ascend to leadership positions. "Because physics is a problem solving discipline, it allows you to think about strategy," he said.

After a couple of marketing stints with Fortune 500 companies, Larson broke into banking and financial services, climbing rapidly through the ranks at Citibank. During the 1990s he helped bring financial services to the Internet with companies such as Mortgage.com and Monetricks, a car loan broker. He returned to traditional banking in 2006 as CEO of Birmingham, Ala.-based New South Federal Savings and Loan.  $\Delta$



# Physics and Faith

In an era when science is argued to be the antithesis of religion, however shall the twain meet? Answer: Father Cyril Opeil, physicist and Jesuit priest. An assistant professor of physics at Boston College, Father Cyril reconciles faith and science on a daily basis.

Father Opeil was a young engineer working on aircrafts for Westinghouse in Baltimore in the 1980s before being called to the priesthood. He chose the Jesuits because of their well-known scholarly tradition and spiritual devotion. "It was a wonderful combination that the Jesuits offered," Opeil says. "I could have a profession, and be a priest and live a ministerial life."

Such a creed offered the scholar in Opeil the perfect opportunity to devote himself monastically to his work. A few years after his ordination, Opeil taught chemistry and physics at Gonzaga High School, a distinguished Jesuit school in Washington, D.C. His provincial, Rev. Edward Glynn, recognized his scientific aptitude and suggested he pursue doctoral studies.

Opeil earned a Ph.D. in physics at Boston College. He then accepted a two-year postdoc, becoming the first Jesuit priest to work at Los Alamos National Laboratories.

While at Los Alamos, Opeil attached himself to the tiny parish of Chimayo, which is tucked away in the Sangre de Cristo Mountains. Although encouraged by his superiors to exempt himself due to his research schedule, he took on a full range of ministerial duties—saying Masses, hearing confessions, conducting weddings and baptisms.

The heart of the parish is the Sanctuaria de Chimayo, a small chapel also known as the "Lourdes of America," where pilgrims come to carry away small amounts of the red earth to which they ascribed healing properties.

Founded in 1534 by Ignatius of Loyola, the Society of Jesus boasts a long history of scholarly and intellectual achievement. The Jesuit scientists that Opeil counts among his precursors include the polymath Athanasius Kircher, the German astronomer Christopher Clavius, and the French paleontologist Teilhard de Chardin. Opeil points out that 23 lunar craters are named after Jesuits. "We were the people mapping the moon."

"It was the idea of our founder, Ignatius, to educate and nurture the whole person, to care for the soul, not just to make sure people are meeting certain requirements," Opeil says.

Much of his research involves studying electrons in uranium. Opeil unifies the supposed dichotomy of his two callings through the Jesuit motto, "To find God in all things," as he unlocks the mysteries of the smallest components of the natural order. Says Father Opeil, "Science is a way of looking at how the Creator manifests himself in the world." Δ

