BY AMY PELSINSKY

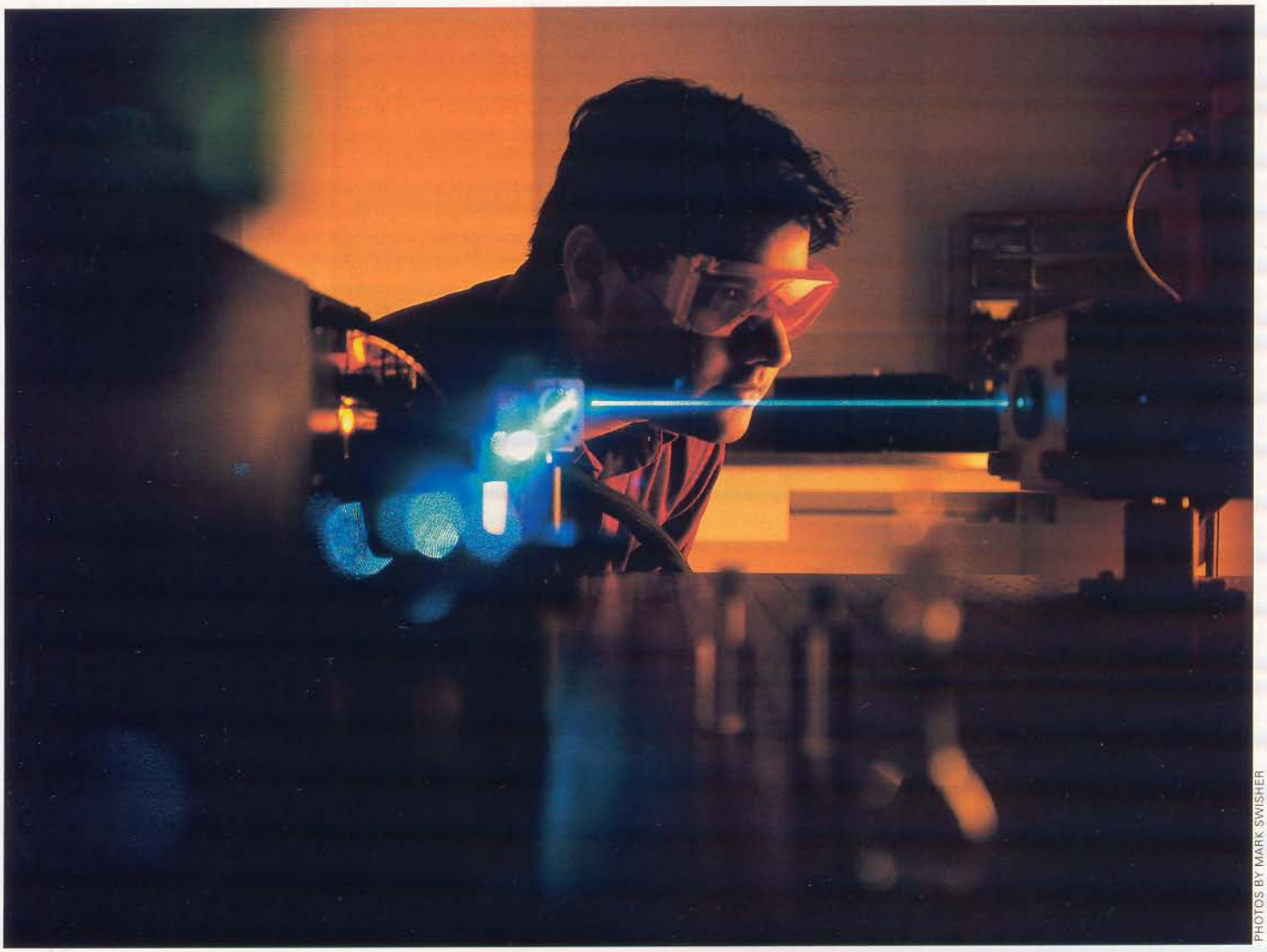
Quantum Countdown

July 20, 1969. Apollo 11 astronaut Neil Armstrong pilots the first manned spacecraft towards the surface of the moon. The world watches as he takes his first step onto the dusty surface against the black backdrop of unknown space.

Shabbir Mian's parents tune in from Bangladesh, cradling their son, born just two days before lift-off. In honor of the historic day, they decide to call him Apollo after the mission, not knowing that he would catch that same desire to make discoveries that could help change the way we look at our world.

Assistant professor of physics, Mian becomes animated when he discusses how our understanding of quantum mechanics, Albert Einstein's mechanical blueprint of how the universe works, has changed the way we view the universe and our place in it. After nearly a century, technology has progressed to the point that scientists are able to explore things at the atomic level that the wild-haired mastermind envisioned.

Einstein knew this would be a strange new world, but explorers like Mian are taking the first steps to take this knowledge from the realm of science fiction to our living rooms. Try this on for size: There are scientists who are able to demonstrate that it's theoretically possible to write on an atom.



PHOTOS BY MARK SWISHER

Backed by solid industry know-how, Apollo Mian was drawn to teach physics at a liberal arts school to share the thrill of discovery with his students.

"Theoretically, we have known these things are around," says Mian. "We are just beginning to learn how to use this knowledge to our benefit."

HOUSTON, WE HAVE IGNITION

Mian traveled with his family to the U.S. at the age of 3 so his father could finish his Ph.D. as an agricultural economist. At age 9, they headed back to Bangladesh, where he had to learn to speak Bengali, his own native tongue. By 16, he was ready to return to the stars and stripes like Buzz Aldrin yearned for apple pie on his final orbit around the globe.

"This was home for me," he said.

He was accepted to Berea College in Kentucky after persuading admissions that he wasn't too young to enroll. His father put him on a plane with a year's expenses in his pocket, selling some land and some of his mother's jewelry to scrape it together, and a wallet padded with $150 in American Express Travelers Cheques and $50 cash.

Mian enjoyed physics in school, but he found it more challenging than his other subjects. "Bottom line was that it kicked my butt," he says. "And I'm stubborn enough to stick with something and try to conquer it."

He double-majored in mathematics and physics, finishing in four years, and went on to grad school at Oklahoma State, where he tasted the thrill of discovery.

"My adviser gave me the freedom to explore science," he said. "When I started making discoveries, that's when I said, 'Wow! I'm the only person in this entire universe who knows this. No one told me that this was to be the result.' What a rush."

Mian was drawn to a liberal arts college to work one-on-one with students to help them experience the same kind of excitement. "I want to get them involved early on so they can see the relevance of their classes and find out what's going on in the real world," he says.

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He spent last year with Mike Morgan '00 working on a theoretical model with applications to the photonics and biomedical community. They presented their work at an international conference.

Mian also toils in the lab as an experimentalist in the area of nonlinear optics, studying the unique properties exhibited by materials using high-intensity lasers. Understanding these nonlinear optical properties is critical to optical communications and also can help industry select which materials to use for sensor protection, such as protective eye gear.

He's currently studying the fundamental characteristics of blue lasers, a $4 billion industry still in the experimental stages. Since these lasers have a smaller wavelength than the infrared lasers that are currently used in CD and DVD technology, they can be focused to a smaller spot, enabling us to store an incredibly dense amount of information in a smaller space.

The technology could replace the liquid crystals that compose laptop screens and the plasma that makes the Phillips flatscreen televisions possible. That could mean television screens as thin as a paper and life one step closer to the Jetsons.

He's also researching materials helpful to photonics, a field of science that is a marriage between optics and electronics. The cable and the telephone companies have replaced copper wiring with fiber optics to speed up the flow of information, so Napster downloads or stock updates travel at the speed of light instead of the crawl of electrons. The problem is that the information barreling down the information highway hits a tollbooth, a switch that has to convert the information from light back into electricity so computers can read it. Mian, and many others, are searching for a material to make an optical switch that will keep the information in the form of light, and keep the traffic moving.

But after spending a little bit of time in private industry and tasting the thrill of helping his students make their own discoveries, he says his real calling is teaching. He joined the faculty last year just in time to oversee the renovations of the physics floor in Lewis Hall of Science.

"I don't know any other new faculty who can help design a whole department," he says, mentioning the light-tight room for laser work in the making. "(Physics Professor) Bill Pagonis and I sat down with the architect and laid out the whole department."

He's been stocking the labs with optics and laser equipment from private industry (he secured a donation of optical equipment worth $81,000 for his laser lab and optics class from Melles Griot, a manufacturer of optics and optical equipment) and applying for grants for more instructional aids to give students a hands-on chance at learning.

"I'm just getting started, and I think I can do a lot of stuff," says Mian.

Anything is possible, when you have the right stuff. •