

Keen anticipation permeated the air as parents, students, faculty and alumni milled about the school's lobby on the evening of May 10. Dr. Brian Greene, the man who can explain string theory to a child, was coming. Would he talk about the latest superstring hypotheses? Would he give us clues about getting accepted into Columbia University? (He said he doesn't know anything about that.) Could he share insights on his upcoming special for Nova? We would soon see. A table was stacked tall with his four books, including the latest creation—a hardcover with the almost science fiction title of *The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos*. He smiled out at us from the book jackets, and the man was instantly recognized when he strolled with the same smile into the building to be immediately surrounded by his admirers.

As soon as he began to speak, the audience could easily understand why there is a waiting list to get into Dr. Greene's courses at Columbia University, where he has been a professor of mathematics and physics since 1996. His charm and wit came through in his droll manner and ever-present smile. Students and adults alike leaned forward in their seats, eager for Dr. Greene to share his wisdom and knowledge. Those audience members who expected an hour-long physics lecture were disappointed. Dr. Greene said that he traces his interest in physics to the halls of Stuyvesant, but he had not come to share stories about his days on East 15th Street or his theories on parallel universes—what he calls multiverses. Instead, he chose a question-and-answer format so he could tell us about what we really wanted to hear. The audience was happy to accommodate as a dozen hands shot up into the air. The questions varied from his memories of Stuy, to advice for college, to how to get a teen interested in science, to esoterica about the Large Hadron Collider and how one can prove the existence of the multiverses using mathematical equations.

Dr. Greene answered everyone in such a way that every head nodded in understanding whether he was explaining abstruse theories or suggesting that everyone did not have to attend Harvard to succeed in life. One message continued to emerge. The wonder of science is the journey of science, and it is not one that everyone is excited to travel.

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The important thing is that we must love what we do. The work Dr. Greene does today is a “different sort of science from what I learned at Stuy.” His research and calculations are conducted “at the edge of speculation. Textbooks present an established, static scenario. Real science is living, evolving and exciting.” There is a lot of uncertainty in this type of study and that can be uncomfortable. Yet, every morning he wakes up excited to face that uncertainty. He walks out his door looking forward to hypothesizing on how the world really works and striving to understand how what we experience fits into the weirdness of time and space in the universe.

To the parent who sought his advice on how to interest his Stuyvesant daughter in science, he advised that these ideas don't excite everyone.

Many people remember very clearly exactly when they were turned off from science. It's not an interest that can be forced, but a great experience—perhaps like the one he had at Stuy's East 15th Street building with its cracked ceilings and beige-green walls—can catalyze a life-long curiosity that translates into a career of discoveries.

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For the students who wanted to hear about physics, Dr. Greene accommodated them with an explanation of the incompatibility between the two pillars of modern physics—quantum mechanics and Einstein's general theory of relativity. The Big Bang theory on the origin of the universe requires scientists to reconcile the space-time warp in Einstein's spatial geometry (very, very large) with the microscopic quantum mechanics used to explain our world at sub-molecular levels (very, very small). The search for a unified theory led scientists to string theory, which melds the two together. The cost of this theory, Dr. Greene explained, is that we must accept that there are more than three dimensions in our world. In fact, he proposed ten dimensions and proceeded to use a piece of paper to demonstrate how the others might coexist within our three. Strings can address an entire class of questions that we can't yet ask, but scientists need to first arrive at a set of fundamental laws that includes multiple dimensions and multiple universes. It seems parallel universes are no longer the stuff of science fiction.

While Dr. Greene is rather seriously immersed in these as yet unproven theories, he is also capable of poking fun at them. He talked about a new vocabulary used

by particle physicists working on a theory called supersymmetry. He explained that elementary particles have superpartners: quarks have superquarks or squarks, neutrinos have sneutrinos, and particles have sparticles. He followed this with a chuckle and an “I didn't make this stuff up.” It's not difficult to see him in a lecture hall mesmerizing young minds with the nearly unimaginable ideas that comprise the emerging sciences.

Today's scientists are fortunate that the math they need is so much more advanced than what was available to Einstein or even to Dr. Greene in his early days. Dr. Greene co-developed the concept of “known math versus unknown math” by way of a mutual exploration with Dr. David Morrison many years ago. The two spent time at Princeton University lecturing to each other every evening. Dr. Greene shared what he knew of physics and Dr. Morrison shared his knowledge of math. What amazing discussions the two must have had! By combining a deep knowledge of math with an equally deep grasp of physics, superstring theory continues to evolve in his brilliant mind today.

Dr. Greene closed with the thought that scientists are on a journey for the sake of science. It's not about the win. “The wonder of science is the journey of science.” There are multiple teams imagining new and possibly divergent theories to explain our world and the universe. “They're wrong; I'm right,” he shared with another chuckle. We are on a collective journey to understand nature, whether we came from 345 East 15th Street or are at 345 Chambers Street. His love for the journey and the excitement he finds in it are clear.



photo: Andrew Cribb