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Harvard Physicist shows female prowess

Zane Styron

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With the last presidential election finalized and history made, we recognize two things that have never happened in American history before, a woman and a minority both running for the office of the president.

It's often stated that Hillary Clinton left large cracks in the so called glass ceiling, but what are women doing in the science community to break down gender barriers?

Physics, the oldest science, has been a male-dominated field and continues to be the most male dominated field in the world at present with only 21 percent of newly enrolled graduate students being women.

Lisa Randall is currently one of the leading theoretical physicists working on changing not only the way we look at gender roles but also the way we look at the universe. According to Harvards information Randal has been named one of the top 100 most influential people in the world by Time Magazine, and in the top 75 by Esquire Magazine. She has received numerous awards such as a National Science Foundation Young Investigator Award , the Premio Caterina Tomassoni e Felice Pietro Chisesi Award, from the University of Rome, La Sapienza among numerous others and she was at one time the most extensively cited physicist in the world.

Also acccording to Harvard's website, Randall earned her Ph.D. at Harvard in physics, continued on to hold a professorship at MIT and Princeton and has now returned to Harvard where she became the first tenured female theoretical physicist. Randall has turned heads with her revolutionary ideas on describing the fundamental forces and giving answers to some of the most difficult questions in physics at this time.

Randall's research interests focus on using several modern theories such as string theory to describe fundamental particle physics and cosmology (the study of the history of the universe). In an interview with Charlie Rose she explains that physicists are currently trying to work out a theoretical model that describes all four fundamental forces, gravity, electromagnetism, and the strong and weak nuclear forces.

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Currently, a question of much debate is why gravity is so much weaker than the other three forces. (Note how easy it is overcome by simply jumping or using a magnet to lift a paper clip despite the gravitational force of the entire planet.)

In her research Randall has proposed a new way of looking at the idea that there may be extra hidden dimensions beyond the four we are familiar with, which have been on the table for quite some time now.

In her interview with Charlie Rose she explained that these dimensions may be hidden and therefore difficult to perceive. These dimensions could be "curled up" inside of the dimensions we normally experience and too small to view directly, much as one might think a hose looks like a one dimensional line when viewed from afar, yet once the observer is close enough to see that it is in fact a tube, one realizes that it is a three dimensional object with two hidden dimensions unobservable at a certain distance.

Generally speaking, many of the modern theories attempting to explain the fundamental forces aren't testable. Many physicists have proposed complicated and exciting new ideas in attempts to forge a theory of everything but Randall is one of few who have been able to come up with testable predictions in a theoretical model.

With the now operational Large Hadron Collider in Geneva, Switzerland, the predictions Randall has produced will be tested. In this research facility two underground magnetic rings, with a circumference of 27 kilometers, will project high energy proton beams into one another in a head on collision.

Due to the high energies involved, new subatomic particles will be created and then instants later they will vanish due to their extremely large masses, exploiting the famous mass energy equivalence e=mc^2 found by Einstein over 10 decades ago. For those interested in understanding more about these concepts without needing to know math or physics in any formal sense, Randall has written a book, "Warped Passages: Unraveling the Mysteries of the Universe's Hidden Dimensions," where she uses analogies that make this exotic and interesting material more accessible to the laymen.