Fifteen Questions with Lisa Randall '84

By MEGAN B. PRASAD, CONTRIBUTING WRITER
Published: Thursday, October 06, 2011

1. Fifteen Minutes: What are some of the most important ideas from your recently published book, “Knocking on Heaven’s Door”?

Lisa Randall: There are a number of different themes in it. There’s one about the physics going on today, and what we hope to accomplish in the field. But there’s a second theme that runs throughout the book, which is to really clarify how scientists think about things. I talk about how science really works in practice when you are at the edge of knowledge before things are established, figuring out scientific knowledge and figuring out the role of creativity. There is a bit about the role of science in religion, but again, it’s sort of to clarify what science really does.

2. FM: Because of all the publicity you’ve been receiving from “Knocking on Heaven’s Door,” your days must be busy. What’s a typical day like for Lisa Randall?

LR: I have a couple of papers that I’m trying to work on when I have time. In terms of research, we have a couple of very interesting projects about dark matter and about the implications of the Large Hadron Collider. But I have to admit right now a lot of my time is caught up in the publicity. Part of the reason for that is when you put so much work into writing a book, you really want people to get the ideas in it.

3. FM: Writing a book is a long process. What made you decide to write a second one?

LR: This might sound funny, but in some sense it was sort of frustration with hearing the debates in the real world and realizing that even people who were interested in science didn’t understand how science was working in the sense of where the connections are and what it means to be right and wrong. You’ll see this now—people over-interpret and try to clarify whether it’s the right way to think about these things. And of course it was about the Large Hadron Collider. I thought it would be nice to sort of explain what was going on there.

4. FM: Speaking of the Large Hadron Collider, could you explain more about what this

MOST READ
1. MIT Freshman Satto Tonegawa Dies at 18
2. 15 Hottest Freshmen: All Summer Long
3. Make Your Own Candy Corn
4. Can I Come In, Please?
5. Coop Revisits Its Role in University

machine does, for all the non-physics people out there?

LR: Hadron refers to a proton and a type of strongly attracted particle. It experiences the strong force, one of the four basic forces of nature. And it's a collider, so what it does is it accelerates protons to enormously high energy so they can actually collide. Once they do, they can turn into pure energy and then turn into other types of particles, and this relates back to the equation E=MC2. But we are trying to do more than just make particles. We are trying to find out the underlying theory of nature—why do particles have the masses that they do—which could lead to very exotic ideas of understanding the nature of space-time better.

5. FM: What do you think about the recent OPERA announcement of neutrinos breaking of the speed of light?

LR: Basically, the most likely interpretation is that it's wrong, and there was a mistake made somewhere. It's like I explain in my book: when we are doing this cutting edge science we are at the edge of technology and theory, and it does go back and forth, and we are trying to sort it all out. Could Einstein's theory prove to be wrong? Well, maybe the fundamental assumption—such as the underlying symmetry—could be found to have holes in it.

6. FM: Do you think the media sometimes hypes up these discoveries?

LR: I think that the media to some extent reports what they are told. It is true that they are probably emphasizing the most dramatic interpretation of it, but I think that most of them did interview people who said they were skeptical of the result. Part of the reason to present this result is because these guys worked as hard as they could on it and didn't see anything wrong with it, and they wanted people to weigh in on it ... to see if they can verify it or find something different.

7. FM: You have also published many acclaimed scientific papers. How does the process of writing a book differ from the process of writing a paper?

LR: In my field and for me personally, I think that they are entirely different things. If you are a responsible scientist you are going to present your new results in a paper, and maybe if over time things are established and it's prime time for the public to hear about it, then you

TAGS
Arts Books Boston Cambridge College Film Food and Drink Football For The Moment Harvard Square Harvard in the World Men's Soccer Music **On Campus** Op-Eds Protests Student Life Summer Postcards 2011 Visual Arts Women's Soccer

include it in a book. When writing a book, I think it's somewhat more important to be entertaining—not constantly joking, but I think it's really important to make it something that people want to keep reading.

8. FM: How did you first develop your passion for physics?

LR: When I was younger I really liked math .... When I came to Harvard I was debating between math and science, and I guess I thought in the end I wanted something that could connect to the real world. I liked puzzle solving and connections. One of the things I really like in my field is that I can move around, and I like entering a field if there is something new to say.

9. FM: As you say, you like to move around in your field. Your work in theoretical particle physics and cosmology deals with both the incredibly tiny and the unimaginably gigantic. How do you reconcile working on such drastically different scales?

LR: Whether unimaginably big or small, we can't picture these things we are dealing with—but we can imagine them. We can find theories to describe them. It's sort of what you do when you use Google maps. You zoom in on the scales that are relevant for the problem at hand.

10. FM: You are said to be one of the most cited theoretical physicists of all time. Did you ever think your career would go this far?

LR: I do try to do high-impact work, and I try to think of ideas people haven't thought about that have broad implications, but I don't restrict myself to that. I try to work on things that I find interesting. Quite frankly, I think we still haven't realized that there are women out in the field, which is why I think it's very nice that my scientific work is important.

11. FM: Speaking of the importance of recognizing women, what advice would you give to girls who feel discouraged about going into physics or math?

LR: I think you do need some degree of confidence. It's important to really trust your own voice and ability. I don't know if I was just oblivious when I was younger, but I didn't really think of it in those terms. I think your generation is more aware of this as an issue, and hopefully they can use that constructively. It's important to focus on the material and what you are learning, and to enjoy your problem sets.

12. FM: You graduated from Harvard in 1983. What made you come back to teach here?

LR: It seemed like a fun place to do physics. There are smart people in the department and really great students, and I like being at a broader university that thinks about the humanities. I think there is just something about the underlying culture of the university that I thought I would enjoy.

13. FM: How do you think Harvard has changed since you went here?

LR: That is a very good question. I think it's really hard to say. Not only has Harvard changed, but I believe I may have changed a little bit too.

14. FM: You used to teach a freshman seminar. Why did you decide to teach one?

LR: I think it's a lot of fun and really interesting to share different ways to think about science. I've had some freshmen who end up going into physics, and I have some who might not take many other classes in physics, but they want a picture of what's going on. Harvard freshmen are smart, interested, and excited, and it's fun hearing their different perspectives and stuff that they will share.

15. FM: If you could take one class at Harvard, which class would you take?

LR: I probably wouldn't take one of those big classes because I find that you could read a book in there, but I probably would take a class in economics or English, or something in the Law School.

TAGS Fifteen Questions