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### Lunch with the FT: A world of her own

By Stephen Pincock

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It's a warm day and I'm running terribly late for lunch with Lisa Randall, perhaps the world's most influential living physicist, so I'm more than a little flustered when I'm shown to the table where she's waiting. Maybe the sweat running down my face is blurring my vision, but for a moment I could swear I'm being seated opposite Jodie Foster.

Randall has been a star of the theoretical physics world since 1999, when she and her colleague Raman Sundrum - both then in their thirties - published a pair of papers that opened up

new horizons for explaining the fabric of reality. But she could not be further from the popular stereotype of a theoretical physicist.

For a start, there's no fright-wig hair, and no painfully withered body. Instead, Randall is young and stylish, with refined features and an athletic figure. And she is, of course, female. In a field where there are almost no women at any level, Randall has made her way to the top.

She's passing through London en route to Harvard, where she is professor of physics. The flying visit has been scheduled to promote her first book, *Warped Passages: Unravelling the Universe's*

Hidden Dimensions, in which she explains many recent developments in physics, including her own work.

As she's in town for just a day, we have arranged to meet very centrally, at the Oxo Tower Brasserie on the south bank of the Thames. It's an upmarket place with spectacular views of the city, and draws a well-dressed, enthusiastic lunchtime crowd.

While I catch my breath, I ask her why she was drawn to physics when so many of her peers seem not to have been. "I know a lot of people talk about how they looked around the world, saw the wonders of the universe and got inspired to do physics," she says. "But that's not how I viewed it. I just liked solving problems and trying to answer questions. It was kinda fun."

Randall has a fast-talking, straightforward way about her, and an accent that retains hints of her childhood in the New York borough of Queens. "I actually started off liking math a lot in school, but I was a little afraid to do something quite so abstract and wanted to do something where you could actually look at the world and see how it relates," she explains.

"Admittedly," she laughs, "I have ended up doing fairly theoretical work... But that's part of what I'm trying to get at. I want to relate this very abstract work to the world."

The vexed question of women's place in science was brought sharply into the headlines earlier this year when Harvard's president, Larry Summers, appeared to suggest that one reason there were few women in science might be because of innate differences between the sexes.

Randall was a member of the Women in Science and Engineering panel Harvard set up after the furore caused by Summers' comments. She says there are probably many reasons why women are less well represented in scientific disciplines.

"It's a really tough question and I don't know the answers. Part of it of course is that these things feed on themselves - you see fewer women and it seems less attractive to do it."

As we begin choosing our food from the Asian-influenced menu, I can see she's still pondering the question. We both end up selecting the same - fried tofu followed by sea bass - and Randall suggests that the gender imbalance in science might stem in part from choices that girls make at school.

"A lot of the time, girls don't want to define their identity as much," she says, choosing

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her words carefully. "Some of it might be that girls think they have to abandon other aspects of their personality when they're making this decision to study science.

"I don't mean that girls are different in any intrinsic way, but just that there are differences in the ways we expect them to act, and the other interests they may have. I think a lot of them do have the same skills as boys, but they have other skills as well. A lot of the girls who were good at math were also good at other things, too."

Randall might be the wrong person to ask about these issues. After all, she did go into science, and with a vengeance. She was the first tenured woman in the physics department at Princeton, and the first woman to hold a tenured theoretical post in science at the Massachusetts Institute of Technology and at Harvard.

"I've obviously done very well, so if I say that I was discriminated against, I think that would be viewed with a great deal of scepticism. But I do think there's a sense in which the world hasn't fully accepted the idea of women scientists, and there are times when you notice it."

These days, Randall's work is among the most frequently cited in all of science. She is in the vanguard of an exciting new era in theoretical physics, whose leading lights are exploring the fundamental structures of matter, and trying to explain connections between what is seen at the tiniest scales of quantum mechanics and the largest dimensions of cosmology.

Her work suggests that extra dimensions in space that are invisible to us - but no less real for all that - might be infinite, provided that space is warped in the right way.

It also suggests that space-time might be arranged on structures called branes (think membranes) that can be thought of as parallel universes. Our entire three-dimensional universe might be contained on one of many branes. The world that surrounds us could be a three-dimensional slice of a cosmos with many more dimensions.

All this and more is explained with quite some flair in her book. So, as we finish our main courses, I tell her I think the book is a major achievement. It manages to be approachable - fun, even - and explains some of the most esoteric science imaginable without once resorting to mathematical formulas.

Randall says she thinks there are plenty of people who are interested enough in the concepts of theoretical physics to expend a little effort to understand them. "Certainly my book isn't for people who aren't interested, because you have to learn, but I've met quite a few people who really want to know what it is we're thinking, what it is we're trying to do."

This reminds her of a time recently when she was on her way to give a public lecture in a small town in Pennsylvania. "In the cab on the way there I was thinking that no one there was going to care about any of these things, but the hall was full and a number of people stayed behind for half an hour afterward asking questions. That makes me think maybe it is all worthwhile."

Unlike that audience in small-town Pennsylvania, the crowd at the Oxo Tower is now beginning to dwindle, as the City folks head back to the office for a dozy post-lunch afternoon. Thankfully, the decibel level drops noticeably.

"After all," Randall says, "what makes us interesting as human beings is that we can try to answer the big questions, even if we don't have all the answers right now."

She readily admits that she is far from having all the answers. In fact she likens her work to playing the stock market, a venture that might fail, or produce spectacular rewards. "Part of the art of making predictions is being willing to take that risk and go beyond what's known."

I'm aware that it is starting to get late and that Randall has other appointments to keep, so before we run out of time I ask her what she hopes readers will get out of her book. "In terms of the message of the book, I think it really is that there can be other universes out there that are different than our own," she says. "I mean in some sense it's all one big universe, but there can be places where the fundamental ingredients are different."

She also wants to get across the point that even phenomena as exotic as extra dimensions can be relevant to measurable things in our world. They can help solve scientific problems and we can test whether they are right.

They might also mean that the structure of our universe is very different from what we have so far imagined. If it turns out that our universe exists on a brane, then why shouldn't there be others, she asks. "To be honest, those other branes could be really close to us and still completely invisible to us. And that's not just some mirage or some gee-whiz idea, there really are reasons to think this is happening."

At this point, a cup of coffee arrives just in time to help clear my spinning head. Randall is an avowed fan of Alice in Wonderland, and I feel as if she's pulled me down a rabbit

hole of her own making. I'm willing to believe what she says, but that doesn't make it

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