

Are we Alone? Discussing the Public's Most Asked Question with Professor Martin Rees

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In this column Sze-leung, editor of CAPjournal, interviews Professor Martin Rees, a well known astronomer and author of many public-facing astronomy and science books, on one of astronomy's most popularised questions: Are we alone?

Interviewer: Martin, you spend a great deal of time speaking to the public, what are the most fascinating questions you get?

Martin: Science is a truly global culture. It spans all barriers of nationality and faith. That's especially true of astronomy. Throughout history, people have gazed up at the same night sky and wondered about it. It's the one feature of our natural environment that all of us have in common.

It attracts the young and old from around the world and the scope for amateurs is now far larger thanks to the Internet. The discoveries being made can be appreciated by anyone, like close-up pictures of planets and moons in our Solar System, not to mention the remarkable realisation that billions of stars in our Galaxy are, like our Sun, orbited by retinues of planets, many like the Earth.

When I talk to general audiences about these discoveries or when I casually meet someone and tell them I'm an astronomer, the first question they are likely to ask is 'are we alone?'. This is, for me, the most fascinating question of all. It's also the one I enjoy talking about, even though it's a question that nobody knows the answer to yet. But searches are now being carried out.

Interviewer: So, from your point of view, compared to other disciplines, do you think communicating astrobiology with the public is particularly important nowadays?

Martin: I think astrobiology is clearly a very important subject, but it has had a fairly low profile in the past. Even though scientists know it's important, people thought it was too difficult and didn't work on

it because they didn't think they could make progress. But, so much progress has been made in the past decade that it has become a much more vibrant subject. Most importantly, of course, is the discovery of the exoplanets. We now know that there are literally billions of stars in our galaxy and yet, we have observed life only on Earth. People care about how life began here on Earth, but no one actually knows. We understand evolution as explained by

Darwin, evolution through bio-selection and into the biosphere. But, the actual transition from non-living to living, from complicated chemistry to the first metabolized reproducing structure, remains a mystery. No one understands that but people have been working on it. There were the Miller-Urey experiments 60 years ago, but now, years later, we have a lot serious chemists working on it.



Figure 1. Interviewer with Martin Rees. Credit: Sze-leung Cheung.

So, I think there is every hope that there will be progress in understanding the origin of life, and this is very important, obviously, for anyone who is interested in the evolution of life on Earth. It will also tell us two other important things. First, it will tell us whether it is a rare accident or if we should expect it to happen in other places, in environments and on planets beyond Earth. Secondly, it might tell us whether there is actually something very special about the chemistry of DNA and RNA. This would imply that other life is going to be of the same chemical basis. If it isn't special, it might just be one of many building blocks. We could even have life without water.

I am hopeful that in ten years we will understand the origin of life, have a better feel for how likely it is to find biospheres on other planets like the Earth, and what the chemistry of those biospheres might be. Now, of course, that does not mean any kind of intelligent life, which is the most fascinating question.

Interviewer: Yes, it is! So what about intelligent life? Are there aliens out there?

Martin: We don't really know because biologists who study evolution on Earth disagree on whether it was inevitable that simple life would evolve into complex life as in our case or whether it happened through a series of lucky accidents. But, the other issue is if intelligence has emerged, will it be in people like us? Or, will it be quite different? I think it is unlikely that we will settle this question, but I think it is worthwhile to look for evidence of intelligent life. And, there are several projects looking for this evidence. It could be some peculiar transmissions in radio observations or oddly shaped objects in the asteroid belt—we are looking for all of these things.

Interviewer: These kinds of major discoveries seem important to draw public attention. Do you think these are important topics for professional communicators to share with the public?

Martin: These are the most fascinated topics for the public and that's why it's a topic that should be funded, should be developed. Most funding for the search for intelligent life comes from private individuals like the SETI institute¹.

Interviewer: So you think that making the public understand the potential of this area could help with government funding?

Martin: If I was making a case to the government, irrespective of the country, I would feel more comfortable making a case for the search for intelligent life than for a big particle accelerator. I would feel that way because if you were to take an opinion poll of people coming out of science fiction movies, it's likely that a lot of them would be happy if their taxes were used in that way. I am not sure that as many would be happy with their money being used for the accelerator. So, I'm surprised there is no public money going into the search. But, the good news is there is enough private money going into this programme.

Interviewer: You mentioned there has been significant change in the past decade. What do you think might change in the next decade?

Martin: Well, I think in the next decade we will have a better understanding of how life began and of exoplanets. We will have the next generation of telescopes like the European Extremely Large Telescope with a 39-meter mirror to take a spectrum of Earth-like planets and perhaps, we will have evidence of their atmosphere and biosphere. We can't do this with the existing telescopes. But, I think with the next generation this will be possible and getting some good evidence will be very exciting indeed.

Interviewer: Yes, that would be very exciting! Thank you so much for your time.

Interview by Sze-leung Cheung.

Notes

¹ SETI is a not-for-profit research organisation whose mission is to explore, understand and explain the origin and nature of life in the Universe.

Biography

Martin Rees has been the Astronomer Royal since 1995 and was the President of the Royal Society from 2010 to 2015.

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