



Isaac Newton Institute for Mathematical Sciences

An Interview with John Toland

Ben Mestel, Isaac Newton Institute Deputy Director, posed several questions to John Toland, the new Institute Director from October 2011. John's response to the questions is given below.

Ben, You ask difficult, multi-faceted questions that I will do my best to answer. But if you were to ask the same questions a year or two from now, my answers might not be the same.

1. Next year, the Institute will celebrate its 20th anniversary. What do you think are the principal achievements of the Institute over its first 20 years?

Although the work was not done here, a rather prominent incident in the history of the Institute to date was the announcement by Andrew Wiles of his ultimately successful assault on Fermat's Last Theorem. Of course that particular event was not in the original plan, but the intention always has been, and will remain, to create and develop one of the premier mathematical institutes of its kind, cultivating research of the very highest quality, attracting the best scientists and mathematicians from around the globe. At first I think the Institute was regarded by UK colleagues with suspicion, as an elite institution with programmes that benefited Cambridge most. Twenty years later, when large numbers of UK mathematicians have benefited from its ever-widening portfolio of activities, the mood has changed. That represents real success in what it set out to do.

2. What is your vision for the Institute over the next 20 years?

Over the next twenty (or fewer) years the Institute will have to confront a broad range of difficult issues, some of which are commented upon in responses to subsequent questions. On the one hand it is small, but at the same time expected to deliver high quality, visible, mathematical achievements across a huge range of mathematical activity. On the other it has to continue its support for the individual researcher, working alone or in collaboration, on fundamental problems in diverse areas, to achieve research outputs of the highest international

quality. It has to be alert to new developments and prepared to pump-prime emerging ideas, and it has to recognise that not all will be equally successful. The role of the director is to maintain an atmosphere and promote a culture of creativity. On a related note, I hope that in twenty years time there will be a much larger proportion of women participants than now. The Institute needs to make its activities accessible through a broad range on measures.

3. What do you think are the challenges and opportunities for the Institute in the next five years?

Challenges: to maintain the high quality and level of the Institute's activities in the information age, when there are many more institutes worldwide than twenty years ago, and when travel costs, visas issues, availability of long-term participants and the green agenda impinge on its everyday activities. This is to say nothing of the financial threat following cutbacks in public funding in real terms.

Opportunities: The Newton institute is well placed to play a prominent role in what is undoubtedly a golden age for mathematics and it is the only Institute of its kind serving colleagues across the UK with long-stay programmes of such breadth and depth. It has an increasingly successful fund-raising Development Committee. The opportunity to support and extend its work must be grabbed with both hands.



4. The UK's 2010 International Review of Mathematical Sciences has published its draft report. How do you think the Institute can help with the development of the Mathematical Sciences in the UK?

This is a very big question, parts of which have been answered in response to other questions and I will say only this. I think the Institute aspires only to support the best mathematics being done today in whatever context in which it is found.

5. The Institute is an active member of ERCOM, the European Research Centres on Mathematics, and has links with MSRI and the Fields Institute. How do you see international collaboration developing between the research institutes?

Within the UK the Institute has a complementary relationship with ICMS and creative relations with other institutes world wide. With modern technology there seems no reason why activities should not be shared between institutes and delivered to participants in developing world who lack the resources to travel. At the same time, there is no substitute for personal contact and the visitors programme is essential, most particularly for early career mathematicians. The opportunities created in this Institute and similar buildings cannot be replicated by electronic means.

6. How do you think the Institute can respond to the 'Impact' agenda?

I believe that a significant concern for mathematics in the context of Impact is that in law you cannot patent a theorem. When a good and entirely original mathematical idea becomes 'a method', without attribution as so often happens, its impact cannot be tracked, and credit is attributed to the science in which the final outcomes are described. This is inevitable and it was always thus. Mathematicians need to maintain confidence that the value of their work is not diminished by the lack of auditable impact and to recognise that its all pervasive influence and relevance across science and technology is beyond question. They should also be conscious of the need where possible to explain what they are doing, sometimes at public expense, to a wider audience, including politicians.

7. What are your thoughts on the Institute's new Cross-Disciplinary Research initiative?

I realise that within the mathematical community there is some concern that mathematics could be pushed out of the mathematical sciences institute by this initiative. However, it can equally be argued that the cross-disciplinary agenda is seeking no more than formal recognition of a status quo in which cross-disciplinary research absorbs a significant proportion of the Institute's resources, perhaps not always with proper acknowledgement (and I refer you to my response to question 6).



8. The Institute is formally part of the University of Cambridge but sees itself as a part of the UK, European and World mathematical sciences communities. How do you see this tripartite relationship developing in the future?

These three facets of the Institute's role are familiar to me from my time at ICMS where I learned they are equally important. In particular, Cambridge must not feel neglected because of the Institute's national and international vocation which, at the end of the day, is its *raison d'être*. The benefits to Cambridge of a leading international institute at its door are apparent. However, involvement of the Institute in support of activities in Cambridge might bring resources and thereby benefit its national and international agenda. Indeed a good working relation with groups in Cambridge is essential for the best performance of the Institute.

9. Fundraising from philanthropic and charitable sources has become increasingly important for the Institute. What can be done to broaden the Institute's funding base?

Under the leadership of Howard Covington, the Development Committee has made huge strides with fund raising from non-governmental sources in a very short time. It seems to me that the Institute must now be prepared to invest time and resources in support of this activity.

10. You have had a distinguished academic career and you have led both the London Mathematical Society and the International Centre for Mathematical Sciences in Edinburgh. Which of your achievements are you most proud of?

I don't accept the premise of your question, but I was very grateful for the opportunity to work at ICMS. The foundations had been laid by my predecessor Angus MacIntyre and his colleagues, with stalwart support from two universities in Edinburgh. During my time a lot was achieved, from widening the scientific programme to moving the headquarters from the house in which Maxwell was born in the New Town to larger, more suitable premises in the university precinct of the Old Town. Outside research, this was the most rewarding period in my professional life to date.