UNIVERSITY OF YORK

Presentation address by Professor Ed Corrigan on the occasion of the conferment of the honorary degree of Doctor of the University upon Professor Sir Michael Atiyah on 15 July 2005.

Vice-Chancellor,

It is a great honour for me to introduce Sir Michael Atiyah to you. In the worlds of mathematics, theoretical physics, and beyond, he is a household name, now regarded as one of the greatest mathematicians from the second half of the twentieth century. His long and varied career provides abundant evidence of his enormous energy, deep conceptual intuition and clarity of thought. He is uniquely able to combine mathematics of the very highest order, and its dissemination, with a wide variety of demanding administrative tasks.

Born in 1929, Michael was educated in Cairo, in Manchester (at Manchester Grammar School during the time Lord James – the first Vice-Chancellor of York – was High Master), and Trinity College, Cambridge, where he obtained his BA, and afterwards his PhD under the supervision of Sir William Hodge. His mathematical work attracted immediate acclaim and he was elected to the Royal Society in 1962, appointed to the Savilian Chair of Geometry at Oxford in 1963, and awarded a Fields Medal at the 1966 Moscow International Congress of Mathematics.

In 1969 he moved to the Institute for Advanced Study at Princeton but returned to Oxford in 1972 to take up a Royal Society Research Professorship, remaining there until 1990. During this period he established a renowned algebraic geometry group, and served as President of the London Mathematical Society from 1974-76. He was knighted in 1983.

In 1990, Michael branched out, taking on three posts simultaneously, two of them in Cambridge: he became Master of Trinity College, first Director of the Isaac Newton Institute for Mathematical Sciences, and President of the Royal Society. In 1992 he was awarded the Order of Merit. In 1997 Michael retired – though not from mathematics – and now lives and works in Edinburgh. He is also Chancellor of the University of Leicester, which incidentally allows those universities located on the east-coast line a chance to listen to him.

During his professional life he has been awarded numerous awards and prizes, both in the UK and outside, and elected to many foreign academies. In 2004, with Isidore Singer, he was awarded the Abel Prize - a prize of Nobel stature devoted to Mathematics, awarded annually by the Norwegian Academy of Science and Letters - for their joint works known as

the 'Atiyah-Singer Index Theory'. This theory links together geometry, analysis and topology in a surprising manner and has been extraordinarily fruitful in unanticipated directions in many branches of mathematics and theoretical physics.

The prizes he has received indicate there is something uniquely special about Michael's work but how best to describe what it is, and how to define the qualities he possessed to make it all possible? How better than to use his words taken from two interviews: one published by the American Mathematical Society marking his Abel Prize in 2004, and another from the Mathematical Intelligencer in 1984.

Responding to a query on how he selects fruitful problems he said: *'I don't. I just move around in the mathematical waters, thinking about things, being curious, being interested, talking to people, stirring up ideas; things emerge and I follow them up....I have never started off with a particular goal, except the goal of understanding mathematics.'*

I can confirm from my own experience, from about the time Michael became interested in theoretical physics in the late seventies, that this is exactly his approach. He wants to know the skeleton of an idea and then he starts firing questions, which rapidly dig deep, followed by suggestions. Although his early interests lay in geometry his approach has led him to illuminate many other areas of mathematics, to collaborate widely, especially with younger colleagues, and to bring essential new insights and detailed solutions to problems fascinating theoretical physicists, especially in areas associated with solitons, gauge theories and string theory.

Indeed, he has also said: *'The more I have learned about physics, the more convinced I am that physics provides, in a sense, the deepest applications of mathematics. The mathematical problems that have been solved or techniques that have arisen out of physics have been the lifeblood of mathematics.'*

In this regard, one need only look at history. To mention just a few names, Newton, Gauss, Maxwell, Einstein, Weyl, Dirac and Yang spring to mind. In fact the observation is as true today as it has ever been.

He is concerned about the teaching of mathematics. Again I quote: *'The passing of mathematics on to subsequent generations is essential for the future, and this is only possible if every generation of mathematicians understands what they are doing and distils it out in such a form that it is easily understood by the next generation. Many complicated things become simple when you have the right point of view'.*

Anyone who has heard Michael speak knows he is a master at finding exactly the right perspective for his audience. Not everyone will understand everything but everyone gains something. Michael's view of the

interconnectedness of mathematics is shared by many professional mathematicians and teachers of mathematics, but not by all. It is not a view encouraged by the presently popular manner of organising teaching into self-contained modules - nor is it assisted by the tendency to over-examine.

He also noted that a poor lecture has its uses: *'I used to say - as a kind of joke – that the best ideas come to you during a bad lecture. If somebody gives a terrible lecture - it might be a beautiful result but with terrible proofs – you spend your time trying to find better ones; you do not listen to the lecture'*. Perhaps some of our students have also discovered this.

Vice-Chancellor, Sir Michael is a remarkable mathematician and it is with great pleasure that I present him for the degree of Doctor of the University, *honoris causa*.