UNIVERSITY OF YORK

Presentation address by Professor Ed Corrigan the occasion of the conferment of the honorary degree of Doctor of the University upon Professor Dusa McDuff on 13 July 2000

Vice-Chancellor,

It is a great honour for me to introduce Dusa McDuff to you. In the world of mathematics she is renowned as an exceptionally gifted mathematician who has succeeded on many occasions in surprising the mathematical community with her discoveries and insights. She has received many honours and awards for her work, including election to the Royal Society in 1994, to the American Academy of Arts and Sciences in 1995, to an Honorary Fellowship in Girton College, Cambridge in 1997, to the American National Academy of Sciences in 1999; she received the first Ruth Lyttle Satter Prize of the American Mathematical Society in 1991 and won an Outstanding Woman Scientist Award in 1997. She has been invited to give many prestigious lectures including twice to the International Congress of Mathematicians in Kyoto in 1990, and Berlin in 1998. She has served on national committees in the United States including the National Science Foundation Advisory Committee for Mathematical Sciences and the Advisory Committee to the Mathematical Sciences Research Institute at Berkeley, of whose Board of Trustees she is currently the chair; she has completed a period as Head of Department at Stony Brook. Clearly, she is riding the crest of a wave. This is the Dusa McDuff we see today but her path towards her present state has been long and varied.

Dusa entered the world in 1945 in London as Margaret Waddington, daughter of Conrad Hal Waddington and Margaret Justin Blanco White, and grew up in Edinburgh where her father was a professor of genetics; her mother, an architect by training, worked in the civil service. She decided she preferred to be called Dusa after her maternal grandmother who had been given this nickname by HG Wells and who was herself a formidable woman by all accounts with wide interests in Chinese philosophy and left-wing politics. Dusa attended school in Edinburgh and decided very quickly that mathematics was for her, although she had no idea how to become a professional mathematician and certainly there were no other women to show her the way or to explain the difficulties she would face. Even now it remains a sad fact that women are seriously under-represented among professional mathematicians, and although there is a good proportion of female undergraduates studying mathematics, almost all of them leave mathematics after graduating.

Dusa won a Scholarship to Cambridge but chose to remain in Edinburgh with David McDuff whom she married in 1968. Following her undergraduate studies in Edinburgh she moved to Cambridge supported by a Research Scholarship from the Carnegie Trust of the Universities of Scotland to take up functional analysis with George Reid. Almost

immediately she solved a long-standing problem in the theory of von Neumann algebras by establishing the existence first of countably infinitely many type II, factors, and then of uncountably infinitely many. If that does not seem like much, you have to remember that prior to Dusa's articles only nine different examples had been known; even von Neumann, the father of so many ideas in mathematics, physics and computer science, had found just two thirty years before. I do not intend to attempt to explain what the results mean, let alone their significance, but suffice it to say they came like a bolt from the blue and illustrate very well Dusa's ability to enter a new field and to change it dramatically; on this occasion they launched her career spectacularly.

Soon afterwards, while holding a Science Research Council postdoctoral position, she took a six-month break from Cambridge to follow her husband to Moscow. This was no doubt a daunting prospect in 1971, but it turned out marvellously well because she made contact with Israil Moiseevic Gelfand whose ideas and style made a lasting impression on her. I quote: "Gelfand amazed me by talking of mathematics as though it were poetry. I had always thought of mathematics as being much more straightforward: a formula is a formula, and an algebra is an algebra, but Gelfand found hedgehogs lurking in the rows of his spectral sequences".

After returning to Cambridge she studied topology, gave birth to her first child, and confronted the dilemma that all professional women must face. She felt isolated in Cambridge where few concessions were made to accommodate married postdocs and felt too that her research had lost its direction, perhaps not realising that the seeds of future work were already being sown.

Her next step was a lectureship at York from 1972 to 1976 during which she began a fruitful collaboration with Graeme Segal at Oxford leading eventually to a beautiful proof of the group completion theorem. She herself with characteristic modesty regarded this period as a second doctorate. In fact, the year 1974 was a turning point for Dusa because she was invited to spend a year at Massachusetts Institute of Technology and realised that although she was not yet the mathematician she felt she could be, there were steps she herself could take to make it happen. She took the initiative and applied successfully to the Institute for Advanced Study at Princeton and started to have original ideas again, one of which led to the paper with Segal I have mentioned already. She also struck up a friendship with Jack Milnor who helped and encouraged her.

Returning to England, she separated from her husband and accepted a permanent lectureship at Warwick. After two years, she courageously uprooted herself again to accept an untenured position at the State University of New York at Stony Brook. This was a risky move and yet it has worked out well. Dusa rose through the ranks to become full professor in 1984, and became in 1998 the Distinguished Professor of Mathematics. She married Jack Milnor in 1984, a second child was born, yet she maintained an independent career at Stony Brook, entailing many years of commuting to Princeton, often with her cello for company, all the while teaching and publishing deep, ground-breaking papers; in all, over seventy of them.

The citation for her election to the Royal Society sums it all up: 'McDuff is best known for her work in the geometry of multi-dimensional structures. Her work in symplectic geometry, functional analysis and diffeomorphism groups has provided understanding and unexpected results in a whole range of areas of great importance. Her work is based on a deep and wide mathematical understanding, and has opened an extraordinarily fertile new branch of mathematics'. But, one distinction I am sure Dusa does not want is that she is currently the only woman mathematician in the Royal Society.

Dusa herself, in reflective mood, has said the following: "I think there is quite an element of luck in the fact that I have survived as a mathematician. I also got real help from the feminist movement, both emotionally and practically. I think things are somewhat easier now: at least there is a little more institutional support of the needs of women and families, and there are more women in mathematics so that one need not be so isolated. But I don't think all the problems are solved."

Vice-Chancellor, Dusa is one of the most accomplished mathematicians of our time. Yet, she modestly ascribes her success to chance. However, most of us know that chance favours prepared minds and Dusa's career demonstrates above all the importance of constant preparation, thoroughness, a willingness to branch out into the unknown and to take risks. Long ago she was briefly associated with this University and many of my colleagues remember her with affection, although they tell me that they were always in awe of her, even then. She is a remarkable person and it is with great pleasure that I now ask you to confer on her the degree of Doctor of the University, *honoris causa*.