My Career in Mathematical Biology
A Personal Journey

Philip Maini

I was first exposed to mathematical biology in the final year of my undergraduate degree in mathematics when I went to a course on ordinary differential equations given by Jim Murray. The course motivated modelling and mathematical techniques by examples in ecology, biology and epidemiology and I was struck not only by these novel (to me) examples but also by the fact that here was a lecturer who genuinely seemed excited by the subject he was teaching.

I was very happy when Jim took me on as a graduate student – it was the early days of the mechanochemical models and of the Centre for Mathematical Biology (CMB), which opened in 1983. It was very exciting for a graduate student to have the chance to meet many of the major names in the field and to watch them at work during the morning coffee break. I worked on investigating the Oster-Murray-Harris mechanochemical model in the context of feather germ formation. I also got to visit Los Alamos National Laboratory and the University of Utah in my third year when Jim was on sabbatical in those places.

In fact, I went back to the University of Utah in 1988 as an assistant professor before returning to Oxford in 1990 as a lecturer in mathematical biology. I have worked on a number of areas of application of modelling, for example, pattern formation, wound healing and tumour growth. Presently I am Director of the CMB, Professor of Mathematical Biology and Editor of the Bulletin of Mathematical Biology.

I never intended to become a university academic as I always wanted to be a high school teacher. In fact, in 1986 Jim Murray very kindly let me take a "sabbatical" from my postdoc at the CMB to work as a teacher at Eton College. Despite its austere appearance I found the school to be very warm and friendly and I was very tempted to stay on permanently. However, 26 seemed a very early age to have a real job so I went back to being a postdoc and sort of ended up in a permanent job in university without really planning it.

I have been very lucky to have as my mentors Jim Murray and Hans Othmer, both of whom have always given me great support and excellent advice. I think that it is very important to have experienced people you can trust to discuss not only science but also all the other aspects of being a university academic.

What do I like about my job? I find the applications to biology very exciting indeed. Biology never ceases to fascinate and surprise me. I enjoy working together with colleagues from other disciplines. I have been lucky to work with a lot of bright people and learn from them. One of the highlights is seeing, both at undergraduate and graduate level, students develop and mature into mathematicians and independent scientists. I also enjoy travelling, learning about new areas (biological and geographical) and having friends from many different cultural backgrounds. Mathematical biology seems to be a very friendly subject and the atmosphere at conferences and summer schools is something very special.

What don't I like about my job? Politics, metrics and the

fact that we have allowed the importance of one aspect of our job (research) to grow out of all proportion at the cost of all the other important things we do (teaching, general service).

What about the future? This is a very exciting time for mathematical biology. When I started out in 1982 one actually knew everything that was going on in the subject. Now, it is a challenge to keep up to date with the latest findings in one's own specialised area of research. I think that there has been a change over the past 5-6 years as more biologists now feel that mathematical and computational approaches are necessary. The boom in systems biology has been astonishing and while this means that the immediate future is very bright, we have to be careful longer term. There has been a lot of hype and while we are presently reaping the benefits of that, we could suffer long term if we do not deliver.

Overall, I think that being a university academic is a great privilege. I do not know of many other jobs where by and large you are left to get on with whatever interests you at the time (and can take time off to play football!). The variety is enormous and the intellectual challenges stimulating. It is a pleasure to be consistently working with young people who are at a formative time of their life. However, my mum is not convinced and still asks me when I am going to get a real job, but I am having too much fun to worry about that.

Selected publications of Philip Maini:

E.J. Crampin, E.A. Gaffney and P.K. Maini, Mode-doubling and tripling in reaction-diffusion patterns on growing domains: A piece-wise linear model, J. Math. Biol., 44, 107-128 (2002)

T. Alarcón, H.M. Byrne, P.K. Maini, A multiple scale model for tumour growth, SIAM J. Multiscale Modelling and Simulation, 3(2), 440-475 (2005)

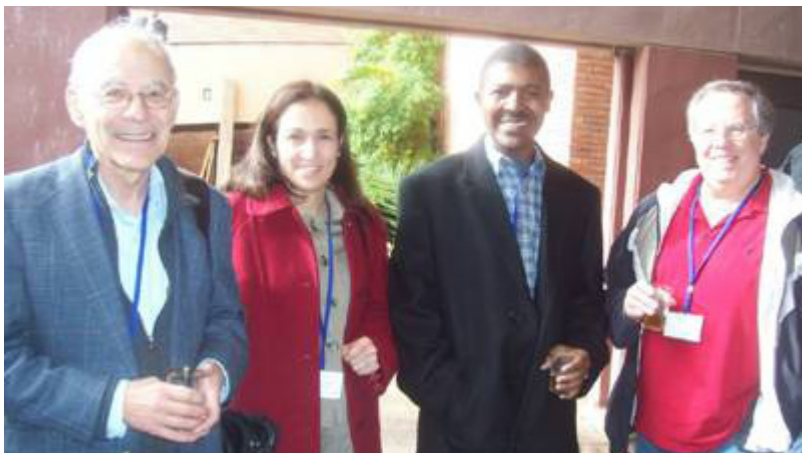
R.E. Baker, S. Schnell, P.K. Maini, A clock and wavefront mechanism for somite formation, Dev. Biol., 293, 116-126 (2006)

S. McDougall, J. Dallon, J. Sherratt, P.K. Maini, Fibroblast migration and collagen deposition during dermal wound healing: mathematical modelling and clinical implications, Phil. Trans. R. Soc. A, 364, 1385-1405 (2006)

S. Schnell, R. Grima, P.K. Maini, Multiscale modeling in biology, Amer. Sci., 95, 134-142 (2007)

M.D. Johnston, C.M. Edwards. W.F. Bodmer, P.K. Maini, S.J. Chapman, Mathematical modeling of cell population dynamics in the colonic crypt and in colorectal cancer, PNAS, 104, 4008-4013 (2007)

R.A. Gatenby, K. Smallbone, P.K. Maini, F. Rose, J. Averill, R.B. Nagle, L. Worrall, R.J. Gillies, Cellular adaptations to hypoxia and acidosis during somatic evolution of breast cancer, Brit. J. Cancer, 97, 646-653 (2007)



SMB World Outreach members and other SMB members celebrate the formation of the African Society of Biomathematics in January 2008. (See additional picture and story on page 5.)