My Career in Mathematical Biology
A Personal Journey

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Since I was a young boy I have been fascinated by nature and how it works. I grew up in the coastal town of Victoria, Canada, surrounded by nature and active in natural pursuits such as canoeing and backpacking. On a class trip, I visited a local natural historian, Francis King, and he taught us how a web of interactions shapes the natural world. I was amazed by the collection of butterflies and moths he had amassed: how could the world be so diverse and complex?

I was a mediocre high school student. My favorite subjects were biology and physics. My physics teacher had a poster of Einstein at the front of the class, under which he had written "forgive them for they know not what they do," particularly apt for our graduating class.

As a university student I was keen on studying ecology, but was curiously disappointed in the subject. Where were the ideas and principles? Was every study a special case? My lack of enthusiasm persisted until I took upper level courses on quantitative ecology and island biogeography. Ideas in these courses struck me powerfully: dynamics of populations and diversity of species could be understood from first principles, for those who could write down the equations and then analyze them---heady stuff. Inspired, I took several math courses. These turned into many math courses and many computer science courses, until I graduated from the University of Victoria in 1987 with a double major in Biology and combined Math and Computer Science.

Late in my undergraduate career I wrote a term project on statistical sampling methods for estimating animal densities, and, for this paper, received an award in honour of the natural historian, Francis King, who had recently passed away. This award, from the Victoria Natural History Society, connected my studies back to my boyhood days, and it occurred to me that it might be possible to work in an area that I loved and felt connected to.

Subsequently I was able to get summer experience working with Pauline van den Driessche, studying the dynamics of diseases. When it came to graduate schools, she suggested that I apply to work with Jim Murray, a professor of Mathematical Biology at Oxford. I applied and was pleasantly relieved and excited to hear that I had a place there.

Three years later I received my D.Phil. Mathematical Biology on mathematical electrophysiology and the dynamics of cell structures. Besides developing an appreciation for room-temperature beer, and an aptitude for rowing, I had learned about the process of being a mathematical biologist, specifically, about the creation and analysis of mathematical models for biological phenomena, and about the development of new mathematical ideas. Even though mathematical biology could be frustrating and unpredictable, I found that I enjoyed it to the point where I wanted to continue with it.

Although I had learned an immense amount during my graduate years, I had strayed from my original love of ecology. This was remedied in my postdoc, joint with Peter Kareiva (Washington) and Jim Murray (who by then had moved to Washington). Immersed in a spatial ecology lab, I got daily updates on the role of modelling in resolving the legal dispute over forestry and the spotted owl, and in methods for applying mathematics to the spread of invasive species.

My graduate and postdoc mentors really shaped the way I view science more than anyone else. I suspect that this is true for many people---influences during formative years remain for life. From Jim Murray I learned how to think as an applied mathematician, connecting science and dynamical systems in deep ways. From Peter Kareiva I learned how to communicate science effectively and how this can impact its application.

I took my first faculty position at the University of Utah, a hotbed for mathematical biology. I was blessed with senior colleagues who would not only happily dispense advice on scientific issues, but would help look out for my needs at a departmental level. I learned, by example, how research groups are built and how to fund science with competitive grants.

My wife Allison and I fell in love with the Salt Lake Valley, surrounded by the towering Wasatch Mountains. We made good friends, laid down roots, and started a family. However, we had long planned to move back to our home country, Canada. When I was offered a Canada Research Chair at the University of Alberta we said good-bye to colleagues and friends and moved to where we now live in Edmonton, Alberta.

In my current position, I am jointly appointed between two departments: Math/Stat Sciences and Biological Sciences. This has had an amazing impact on the science I can do. I collaborate closely with biological colleagues on subjects as diverse as wolf movement, diseases in wild and farmed salmon, mountain pine beetle spread, and the energy dynamics of polar bears. Collaborations with my biological colleagues are invigorating, because the work can have direct policy implications as well as mathematical and scientific implications. This new direction of policy-relevant research suits me well. It is a way of impacting the society that funds my research primarily through tax dollars. At the same time, I collaborate with mathematical colleagues on problems in partial differential equations, nonlinear waves, and pattern formation. Often the interactions involve shared graduate students or postdocs.

The Society for Mathematical Biology has been a constant presence during my career, and I have benefited greatly from attending annual meetings. I was privileged to serve a term as President of the Society for Mathematical Biology, and am pleased to see the Society is thriving. I recently took on the role of co-Chief Editor for the Journal of Mathematical Biology, am active on the boards of several mathematics institutes, and direct a Centre for Mathematical Biology at Alberta. These activities allow me to give back to the field that has nurtured my career.

I find I am constantly learning from colleagues, many of whom have also become good friends. When I explain my work to them, I am challenged to become a better scientist and to develop my thinking in new directions. I also learn from students in the same way. In fact, I have very much enjoyed building up a dynamic lab group of over a dozen researchers, ranging in level from undergrad to research associate. Keeping the lab running is a big job, but it is rewarding to see students and postdocs working together and learning from each other. This also gives me enough time to slip out of the lab to prepare for class, revise a paper, or even write a short biography!

Selected publications of Mark Lewis

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