DR. BRAD BASS Q&A

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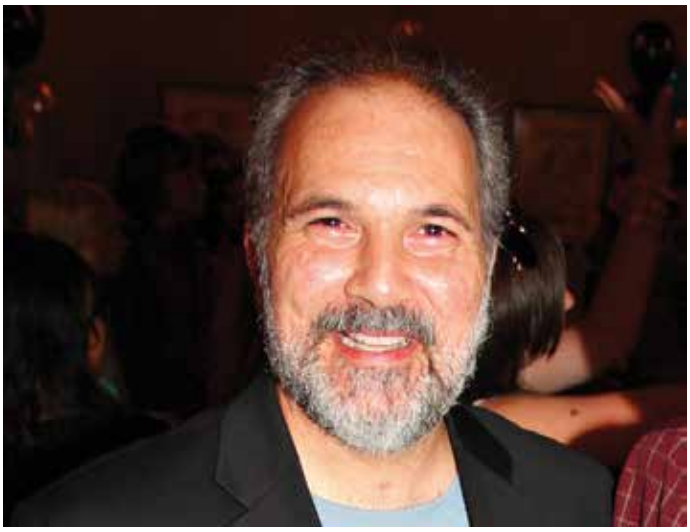

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HOW DID YOU BECOME INTERESTED IN GEOGRAPHY?

What drew me to geography as an undergrad was the strong environmental component, which covered both science and social science, in the department at the University of Toronto. Once I started, I became very interested in the range of methodological approaches that geographers were using to look at a far wider range of problems than I thought possible in one discipline. In geography, I found people using standard statistical tools and mathematical models based in differential equations and matrix algebra, but I also found other geographers who were using analyses based on abstract algebra and other types of mathematics not normally found outside of that discipline. Philosophically, geographers were quite sophisticated, not only well-versed in Marxism, but I also found geographers who were well-versed in the phenomenologists, Hegel, Wittgenstein and Heidegger. In addition to being well versed in these mathematics and philosophers, geographers were also integrating them in their analyses.

I was often directed into an area of study by a direct supervisor or when an opportunity emerged that met my qualifications. Certain legacies, such as COBWEB, the software built to study complexity, were my own idea, but may have been inspired by the work of other scientists. New work in some areas is now driven by student interests as much as my own. The application of COBWEB to the synapse, Alzheimer's disease, malaria, lock-in theory and international conflict were all student ideas.

WHAT PEAKED YOUR INTEREST IN GREEN ROOFS?

Green roofs came about much later. I was formulating a second-law thermodynamic perspective of cities (second-law thermodynamics takes you into entropy and exergy) with Roger Hansell, a colleague at the University of Toronto. At the same time, he had been building prototype green wall structures to act as window shades. We began to realize that vegetation on a large scale would alter the thermodynamics of cities, and that green walls were a way to move in that direction. Since I was at the University of Toronto (although not working for the university), we put together a second-year research course on green walls. One of our applicants had already been investigating green roofs and asked if she could continue in this area. That was how the door was first opened.

Later that spring, I planned a one-day symposium on financing municipal environmental initiatives with a private consultant. At dinner, we were both sitting with my regional director general from Environment Canada. This consultant, out of the blue, blurted out that Environment Canada should look into green roofs. I was able to validate his claims about the expected benefits, and we were asked to write a proposal. This ended up becoming a proposal to the Canada Mortgage & Housing Corporation (CMHC). CMHC decided to fund our proposal, which in turn led to the first Canadian symposium on green roofs and the first synthesis of green roof research in English. What I thought would end with our publication, Greenbacks from Green Roofs, kept going and expanding. I kept receiving phone calls from all sorts of people about green roofs and energy. Finally, I decided to put some effort

into this area, just so I could answer the questions, and it led to whole new research area.

CAN YOU DESCRIBE YOUR WORK AND ACHIEVEMENTS AS PART OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)?

While I was working on the IPCC, I was a member of a task group that was responsible for making climate model output and global socio-economic scenario data available to anyone, anywhere in the world. This involved the management of three data centres. We also created a unique conference on emerging issues in the area of climate vulnerability and adaptation and held that conference in one of those vulnerable areas. I think that one of personal achievements in this realm was sharing my own experience in managing a climate scenario network with this global management team. I was also heavily involved in determining the greenhouse gas emission scenarios that were used in the fifth assessment (I came on board during the completion of the fourth assessment). At one of those meetings, the membership was split over the lowest greenhouse gas concentration scenario. I was involved in some very late night discussions between a modelling group and a number of climate impact assessment researchers. Neither group wanted to budge, and I worked out a compromise position that they could both accept. In this type of committee work, there were countless little accomplishments that many of us made that pushed the work forward, but were never recognized. However, without these little steps, many of the bigger steps would not have been possible.

WHAT IS YOUR EDUCATIONAL BACKGROUND AND HOW HAS IT HELPED YOU GET TO YOUR CURRENT POSITION?

I have a Bachelor's of Arts (BA) with a specialisation in Geography and a Major in Commerce & Finance. I also hold a Master's of Science (MS) in Geography and a PhD in Geography.

My BA focused on economic geography, while my MS focused on development issues, and the PhD focused on climatology and climate change.

Along the way, I did quite a bit of economics, quantitative methods and mathematical modelling and philosophy. The breadth that I had in all three degrees has allowed me to take on a lot of breadth in my career. There are those who know me for my work in green infrastructure, and others for my work in complexity, energy systems and climate change scenarios. My background allowed me to move into water quality issues and the economic analysis around those issues.

WHAT IS A TYPICAL DAY IN YOUR LIFE AS A SCIENTIST?

Since i have multiple projects on the go at any one time, a big part of the work is to manage the work of others, while directing my attention to a specific deadline. The deadlines are usually in the policy realm of my work or administrative deadlines from the university. A good part of this requires a lot of communication and monitoring the direction of the work, and sometimes changing direction. Once I get out of the office and into the computer lab, then I get to engage in some cutting-edge research or answer questions from students about how to do something with COBWEB in their cutting-edge research. In the lab, there are anywhere from five to 15 individual projects in progress at once, any one of which will be running into a problem or providing a new insight into an issue, both of which provide unexpected intellectual challenges.

WHAT ARE YOU CURRENTLY WORKING ON IN THE LAB?

In the policy realm, I am working on a new economic analysis for the development of a new policy. In the computer lab, students are just learning COBWEB, but we do have ongoing work in computational chemistry (simulating soil phosphorus chemistry), simulating suicide genes and developing original, dynamic art. One of the issues we are trying to resolve is the addition of a drug intervention into some of the models in a manner that replicates the known actions, but does not trigger other events that are interesting from the perspective of complexity but not representative

of the system we are investigating with COBWEB. I also have a few students who are working on a green wall biofilter to remove excess nutrients from water in a greenhouse.

WHAT HAS BEEN YOUR MOST INTERESTING/ IMPORTANT SCIENTIFIC FINDING?

My most requested paper was a theoretical argument as to why outgoing longwave radiation could be used to monitor changes in biodiversity. However, the work with the most impact was my discovery that a small amount of green roof coverage in a city like Toronto would have a very significant impact.

WHAT HAS BEEN YOUR BIGGEST RESEARCH CHALLENGE?

Applying COBWEB to a brand new problem, because it was not designed to be applied to any real issue. Yet the students keep pushing it into new areas.

HOW IS YOUR RESEARCH APPLICABLE TO REAL WORLD PROBLEMS?

All of the policy work is grounded in the real world, as it has to be by default. This work will shape some of the new policies emerging around water. The COBWEB work has become very applied to real world problems due to student interests. Our hope is that these projects will help us understand something new about the systems that we are investigating with the software. The work on green roofs and green walls was from the beginning, addressing a number of real world problems. Some of that research was used in making the case for Toronto's green roof by-law.

WHEN YOU GET FREE TIME AWAY FROM RESEARCH, WHAT DO YOU LIKE TO DO?

I'm a bit of a foodie, so I do like to try out new places to eat, new wines and new local beers. I also enjoy live music, and will take the time to check out various concerts or festivals. I will still spend time working in one of my own gardens, and I do have a few native meadows that i have built in Mississauga.

WHAT EXCITES YOU ABOUT YOUR WORK?

What really excites me is the generation of new ideas and the constant freshness of the program that comes with the new students each year. I am also still excited by the discovery of something new or coming up with an answer to a question. Finally, in my work, there are several possibilities that the environmental improvements of real places that we will see in 20 years will be, in part, due to my efforts today.

WHAT ASPECTS OF YOUR WORK DO YOU LIKE THE LEAST?

There are a lot of administrative details that have to be dealt with, sometimes on a daily basis. I also really don't like seeing a good idea go nowhere.

WHAT IS THE ADVICE YOU WOULD LIKE TO GIVE TO STUDENTS INTERESTED IN PURSUING A CAREER IN GEOGRAPHY AND ENVIRONMENTAL SCIENCE?

Geography's strength is its interdisciplinary perspective. Take advantage of courses outside of your area to became a well-rounded analyst. For environmental science, you may still have a long fight to prove yourself to the the other sciences. Take a few courses in the more traditional sciences so that you can read through the higher-level information when necessary. Finally, try to develop one unique skill set that is relevant to your field, but also at a level that challenges you. Geography has also developed some important core ideas such as central place theory, spatial autocorrelation, land use theory, areal integration and distance decay. Learn these contributions as they will allow you to make important contributions to interdisciplinary work and be recognized for an original and valuable perspective.