

TURNING POINT

Carl Boettiger

While working towards his PhD in mathematical ecology at the University of California, Davis, Carl Boettiger launched a kind of career experiment. He started keeping an open lab notebook online, aiming to find new ways to communicate science and to seed collaborations. As he begins a postdoc at the University of California, Santa Cruz, Boettiger explains the pros and cons of sharing his work on the Internet.

Your first degree was in physics. How did you move to ecology?

As an undergraduate, I didn't enjoy biology classes — basically memorizing facts — as much as physics classes, which involved problem-solving. But I knew I that I would leave physics after I got a quantitative background. In my second year, I met Simon Levin, a mathematical ecologist at Princeton University in New Jersey. I believe I told him that I wanted to go into ecology to make it more mathematical. He, I'm sure, resisted the urge to throw me out of the window. But he invited me to join his weekly lab presentations. That and a research project with one of his postdocs were my only ecology training before my PhD.

Have you had a turning point in your career?

I got a computational-science fellowship from the US Department of Energy, designed to encourage supercomputing throughout the sciences. Getting that and thinking in a more computational way were big turning points. The programme is very interdisciplinary. It brings us — astrophysicists, genome biologists, ecologists — to a conference every year so that we can talk in the same computational language, if not the same scientific language.

Why did you start your open notebook?

I didn't have much research training. While trying to figure out what I had done months before, I realized that I should be more organized. I stumbled on tips for keeping an electronic notebook, and started mine in January 2010. I wanted to see if it could help me to educate people about my work, communicate faster with colleagues or make my research more transparent and reproducible.

How many people check out your work?

I get about 60,000 page views each year — roughly 150 a day, usually from 50 visitors.

What has keeping the notebook taught you?

I discovered an online community, including ecologists, that I didn't know existed. I have



had tonnes of fruitful interactions. I have been given valuable feedback, including suggestions on tackling computational problems, and I participate in conversations about how to make large-scale modelling more reproducible. I was surprised to see colleagues emulate my approach, and almost terrified when other graduate students whom I had never met started keeping open notebooks. I thought, "This is still an experiment; I hope I'm not responsible for anything" — whether it was harsh criticism or someone getting scooped.

How have advisers and colleagues reacted?

Usually more with ambivalence than discouragement. One of the biggest challenges is addressing data-sharing concerns. We have to establish whether collaborators are comfortable putting their work in this environment. If someone is uncomfortable, but hasn't said explicitly not to share the work, I have to decide what to do.

Were you afraid of getting scooped?

That concern is there, but I haven't experienced any scoops. I think it is an overrated fear, especially when compared with the risk of being unknown in your field. My notebook has helped me to extend my reach in ecology and computing. People were aware of me before I had published — which led, for example, to invitations to review papers. If anything, I was reluctant to put things up in case they contained mistakes. Every mistake that I made during my PhD is in there. But if I am trying to resolve an error, I can easily show others all the work I have done and the steps I have taken, and ask them for advice. ■

INTERVIEW BY VIRGINIA GEWIN

MISCONDUCT

Fraud by gender

Men have committed research fraud more often than women, according to a study published on 22 January (F. C. Fang *et al. MBio* 4, e00640-12). The authors reviewed 215 cases of fraud in the life sciences reported by the US Office of Research Integrity between 1994 and 2012. Of those, 65% were committed by male scientists. In cases involving US faculty members, 70% of whom are men, male researchers were responsible 88% of the time. In those involving postdocs, of whom 61% are male, it was 69%. Arturo Casadevall, a microbiologist at the Albert Einstein College of Medicine in New York, who led the study, says that the finding underscores the need for ongoing ethics training.

PHYSICS

Permanent jobs scarce

The recession seems to have increased the proportion of US physics PhD holders who are taking postdoc jobs rather than waiting for permanent positions, says a brief released on 17 January by the American Institute of Physics (AIP) in College Park, Maryland. *Physics PhDs: One Year Later*, which is based on survey data, reports that 59% of people who earned physics PhDs in the United States in 2009 and 2010 and remained in the country took postdocs within a year. Of those, 13% did so because they could not find permanent work, compared with 7% from the classes of 2007 and 2008, according to AIP data. Similarly, 44% of physics PhD holders who took temporary positions had failed to find a suitable permanent job, up from 42% from the classes of 2007 and 2008.

GENDER BIAS

Resources denied

Women need to justify requests for pay increases and other resources more than men, a study reports (H. R. Bowles and L. Babcock *Psychol. Women Quart.* <http://doi.org/j99>; 2013). The authors asked more than 500 university graduates with some work experience to evaluate videos of men or women asking supervisors for resources. Women's requests generally met with disapproval. Co-author Hannah Bowles, who studies gender and leadership at Harvard University in Cambridge, Massachusetts, says that mentioning a mentor or adviser in negotiations may help women. "Use a lot of 'we' language and signal that you have these positive working relationships," she says.