DISCUSSING EVOLUTION IN GRUNEWALD

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I am a theoretical biologist with a keen interest in the process of evolution, especially how it shapes genomes and gene networks, and how these in turn shape evolution. Currently I am finishing my postdoc at the Centre for Genomic Regulation in Barcelona, Spain. Previously, I received my Ph.D. in biology at Utrecht University in 2009 and my M.Sc. in computer science at the Technical University Eindhoven in 2003. During my time at the Wissenschaftskolleg I was a Fellow of the College for Life Sciences and a member of the focus group on gene regulation and organismal diversity. My project focused on the evolution of a genome's three-dimensional organization in the nucleus of a cell, which oddly enough is best explained by saying it's like understanding the organisation of a good serving of spaghetti. – Address: Centre de Regulació Genòmica (CRG), C/ Dr. Aiguader, 88 PRBB Building, 08003 Barcelona, Spain. E-mail: anton.crombach@gmail.com

As I applied for a short-term Fellowship at the Wissenschaftskolleg zu Berlin in early March 2014, I anticipated that it would bridge my post-doctoral life and my aspirations to become an independent researcher. In November, as Claudia and I began our stay in Berlin, I set out to finish the papers that would complete the research I had conducted in Barcelona, to further develop my future projects and to apply for funding and jobs to gain an independent position. A quite ambitious work scheme, but I arrived full of enthusiasm and with several winter months ahead. Of course, I did not forget that we also wanted to make the most of our Wiko experience exploring the charming woods of Grunewald and the lively city of Berlin and its surroundings – especially as Christmas was approaching.

We settled effortlessly into our beautiful apartment in Villa Walther, and, like many Fellows before us, we got caught up in the various stimulating activities organised by the Wiko. From a marvellous tour around the Wiko premises by Reinhart Meyer-Kalkus to the Tuesday Colloquia, the evening concerts, movies and thematic documentaries; from German lessons to an organised visit to the Natural History Museum and various evening talks at the Wiko and the Forum Transregionale Studien across the street. The philosophy talk about puzzles vs. problems by James Conant and Bob Martin's movie night at the museum spring to mind, not to forget the amazing carnival party!

I found that the Wissenschaftskolleg is much more than simply a work experience. Wiko is a full immersion in the life of passionate researchers; Wiko is about getting to know them, exchanging thoughts and opinions on topics I would never even have thought of (for instance contemplating 18th-century theatre audiences). Wiko can be a constructive and challenging confrontation of different views, where the different styles of natural sciences and humanities – in the broad sense of the terms – lead to animated discussions at times. Above all, I realised that Wiko is an opportunity to build friendships and collaborations. As we arrived two months after the start of the Wiko year, we immediately realized that we had less time to enjoy some of the (Life Sciences) Fellows who would leave mid-year. On the other hand, we did have the opportunity to see other latecomers arriving in springtime and enjoy a sometimes hesitant sun mixed with the suddenly green trees around us. I am glad to say that our period was intense and full of stimulating discussions, yet also a moment to refuel from and reflect on the hectic times that preceded the Wiko.

In the first weeks, I slowly but surely disconnected from my old work routine. In comparison with my post-doctoral work environment, Wiko has an "extreme" interdisciplinary nature. Hence, being an academic, I started to think about the daily observations I was making. The differences and commonalities between (life) sciences and humanities, in particular, caught my attention and made me contemplate the social aspects of the academic world. I finally acknowledged the importance of the non-scientific part of science: whom you know and how you profile yourself is perhaps just as important as the work you have done. As the word "acknowledge" implies, I had been aware of this, but my idealistic side had been arguing that it should not be like that. The quality of one's work has to be by far the most important factor, doesn't it? Obviously, life is not that fair and I decided to take the bull by the horns. During the winter months, I asked other Fellows for career advice and about their experiences, I read a book full of good advice on

networking, I designed my personal website (http://anton.cromba.ch) and created a twitter account to engage more easily with the scientific community and I contacted old colleagues to reinvigorate my professional network.

A second theme of my Wiko stay was modelling in biology. Bluntly put, many biologists just do not see the use of modelling and theory in biology. And if they do, a large majority have a rather warped idea of what "useful" biological theory is. Together with Flo Débarre, I headed a discussion on this topic with our colleagues of the College for Life Sciences and other Wiko Fellows. Both of us were pleased to learn how other, more experienced researchers have been dealing with the issue of defending one's approach to biology. We concluded that even if acceptance of modelling seems to be increasing in biology, we have tough times ahead of us before the attitude towards theory in biology will have any similarity with that towards theory in physics, for instance.

Besides contemplating the inner workings of the academic world, the quiet atmosphere at Wiko allowed me to get a lot of my planned work done. From an extra workstation kindly permitted in the office of Steve Frank and Johannes Jäger, I started to design and implement algorithms and software tools for my future projects. I harnessed the power of a polymer physics software package; I re-used, adapted and extended simulation code for *in silico* evolution; and I wrote various scripts for simulation analysis. When I was not coding, I was reading articles on the bewildering array of molecular players that orchestrate the folding of our genome. I also took full advantage of the excellent library services. To take the time to read books felt almost like a guilty pleasure. As a life scientist who usually reads on a single printed article basis, however, I believe my demands on the library have been extremely modest.

Good news arrived at the start of 2015 as several articles got published, and a document with generous feedback from reviewers gave me a strong push to further improve my proposals for future projects. And by virtue of the disappearance of most day-to-day obligations, I have had the time to elaborate on the scientific story of my current research, expand explanations and incorporate novel visualizations of data and analysis results. I have now incorporated videos in the presentation that I have used at various seminars and talks both during my Wiko stay (in Barcelona, São Paulo and Mainz) and immediately after (in Vienna, Schoorl and York).

Family and (non-)scholarly, good friends visited us in Berlin. Daniel and Laura, two colleagues from my Ph.D. time in Utrecht, joined us for a couple of days as we explored the theme of modelling in biology and how to do such modelling. Previously I questioned

how to get models and theory accepted amongst biologists of all kinds of backgrounds; with my visitors I studied some of the long-standing arguments that live in the community of theoretical biologists about the "proper" way to do modelling. Currently we are putting into words the long discussions that were spread over several days. We hope to turn these words into a manuscript that highlights our thoughts on the matter and that can contribute meaningfully to the debate.

Weeks turned into months. Of course, I focused on more than just work. Claudia and I also set out to experience the marvellous area of Berlin. At the weekends, we explored the parks and lakes surrounding our neighbourhood Grunewald by bike. We also went to many of the neighbourhoods of Berlin, from Mitte to Prenzlauer Berg to Neukölln, Charlottenburg, Tempelhof and the banks of the river Spree. We took the time to explore Potsdam, where we enjoyed Schloss Sanssouci and the various neighbourhoods of the town (there is a Dutch quarter!). We developed a habit of visiting parks. The botanical gardens are always worth a visit and Britzer Garten has a pretty decent display of tulips in springtime – for a Dutch person, that is. During our stay we also appreciated some of Berlin's cultural events, like the Berlinale film festival. And from time to time we would seek out Clärchens Ballhaus for a decent dosis of jazz/swing music and Lindy hop.

In May, after six months, with some reluctance but also with a long list of new experiences, we said goodbye to Wiko, to our new friends with whom we shared this period and to our amazing flat with a view of the lakes. We moved back to a warm and sunny Barcelona. In a half year, the Wissenschaftskolleg has catalysed my growth as a scientist in many ways. I have met valuable and stimulating colleagues and friends, and I have matured in how to live (and do) my science. As a result of the work I have accomplished during the fruitful Wiko time, my determination to pursue my career goals has only grown stronger. I am happy to say that I will have several job interviews in the months to come.

I would definitely like to come back at some point in the future. It will be different, of course; I am curious to have the Wiko experience at a different moment of my personal and professional life. Surely there will be a whole new set of insights to take away.