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Teaching Statement

During my scientific career I had the occasion of teaching in different countries and at different education levels. In Spain I gave lectures of ecological modeling in undergraduates courses during the beginning of my PhD. in the University of Alcala, Madrid. During my PhD. I gave several lectures to PhD students on graph theory and its applications to biological networks in the Spanish Research Council (CSIC).

During my postdoctoral research at the National Center for Ecological Analysis and Synthesis (NCEAS) I have been involved in the program *Kids Do Ecology* during the last three years teaching ecology to kids with different ages[1]. I have been actively participating in different teaching programs that attempt to develop strategies for education in ecology, diversity and sustainability. I participated in the "SEEDS" Leadership Meeting (ESA), in Albuquerque, New Mexico, February 2009 [2] to discuss about bringing big to light ideas in ecology and evolution. I also organized a course at NCEAS in 2009 about "Theoretical ecology and data-driven synthesis."

During my tenure-track at Eawag, Switzerland, and now as a lecturer at the University of Bern I have been co-teaching in different lectures and courses with Prof. Ole Seehausen and Prof. Barbara Taborsky. I now teach in one semester to 3^{rd} year biology students introducing them to scientific analysis, the cycle of the scientific process and the many skills required to become a scientist.

Thanks to those experiences in different countries I have developed some teaching skills. I am confident that students appreciated my teaching style. Because most of the topics I have teached-discussed require effort from the students, I think that it is essential to clearly state why these techniques are useful for the real world. I provide examples and case studies together with bringing researchers to present more in depth topics that motivate students to discuss and allow them to apply what they have learned in their careers.

[1] http://www.nceas.ucsb.edu/nceas-web/kids/kdesb/2008franklin.html
[2] http://www.esa.org/seeds/

From my previous experience an important point in the teaching process is that students should be exposed to the diversity of methods and solutions and the pros/cons of each one for any given problem. I also complement the lectures with practicals communicating the broad set of online open-source tools available for scientific computing in general and for biodiversity research in ecology and evolution in particular. Methods in scientific computing applied to biodiversity are rich and diverse and they are expanding and merging very fast with novel methods coming from many different disciplines at a fast pace. This evolution is essentially driven by the accumulation of larger and more accurate and complex data sets (i.e., NGS, paleontological, historical, environmental, and contemporary in the context of ecology and evolution). This implies that techniques with different assumptions, reliability and power should be clearly understood to be tested with a large amount of heterogeneous data.

I can teach fundamentals of graph theory, multilayer networks, Neutral Bayesian networks, Bayesian statistics with attention to inference, ABC, Bayes factors, optimization algorithms, and stochastic processes in networks. On the more applied and specialized side, I can focus on networks in ecology and evolution (i.e., eco-evolutionary networks) and spatiotemporal dynamics of biodiversity, stochastic dynamics in networks with attention to genetic and ecological drift, and fluctuating selection in networks. I have been using always open-source tools like julia, sage and octave for the practicals with special attention in notebooks like Jupyter to facilitate reproducibility in the classroom.

Yours Sincerely,

Carlos J. Melián, Kastanienbaum, 1 March 2019