Teaching Statement **Daniel Runcie**

My goal as a teacher will be to provide a solid foundation in statistical methods for experimental biologists that emphasizes modeling, exploration and discovery. I will help students develop an appreciation for the importance of quantitative models for biological questions, an understanding of their limits and their underlying assumptions, and an intuition for when models can derive novel insights out of a sea of data. I have teaching experience as a TA for three semesters in two lab-based courses and one semester of a discussion-based course while a graduate student at Duke. I have also guest-lectured on MCMC techniques to a modeling class at Kansas State University and led a workshop section on Epistasis at the Duke Systems Biology Symposium. As an instructor, I found that students learn in different ways and at different paces, and that classes that draw on multiple types of instruction and activities are the most successful. I believe the most important aspects of effective teaching are 1) creating a student-centered classroom that fosters active learning and assesses student understanding through applications, 2) clearly defining the learning objectives, and 3) conveying excitement in the subject material. I will continue to improve my teaching skills in these directions based on student feedback and participating in teaching workshops that develop and assess my teaching.

My teaching interest is primarily in modern statistical approaches in biology. I would be excited to teach classes in *Introductory Quantitative Genetics*, or an *Introduction to Bayesian Inference* at the undergraduate or graduate level. I would also like to develop graduate courses in emerging areas at the interface of statistical and experimental biology, such as *High-Dimensional Data Analysis*, focusing on machine learning and Bayesian methods for genome-scale data sets, or *Quantitative Systems Genetics*, exploring statistical methods for discovering and quantifying the dynamics of agriculturally and evolutionarily important molecular traits. My background in both modern statistical methods and experimental biology is well suited to teaching in these areas.

In addition to classroom teaching, I will mentor students in research and career development and do public outreach. These activities are important to the university community, and I believe they are synergistic with research. I have experience mentoring early graduate students in research projects both from my PhD and my current postdoc. I have also done extensive informal mentoring of other graduate students and postdocs in statistics and the use of *R*. Mentoring takes time and organization, but I have found these experiences to be enjoyable and I learned a lot from them as well. My mentoring philosophy is that students learn best in an environment that fosters independence in a collaborative atmosphere. I will work to bring together a team of scientists at all stages: undergraduates, PhD students and postdocs where everyone has intellectual ownership and responsibility over a project or portion of a project, but also shares expertise with others in the group. In addition to mentoring graduate students in research, I will encourage them to develop skills in other aspects of scientific careers such as grant writing, communication, outreach, mentoring, teaching and service. I will also encourage each student to pursue his own career track – whether academic research, teaching, industry, outreach, or policy – even if these are not my own strengths. My own scientific mentors advocated these approaches to research and career development, and I strongly believe that they have made me a better scientist today.