Danna Gifford  
Biology Seminar  
Hosted by Prof. Joel Levine

Brief abstract
Antimicrobial resistance is a critical challenge for medicine in the 21st century, but it's also a compelling example of the nature of evolutionary change that results from dynamic environments. With this view in mind, my research seeks to bridge the gap between theoretical models of evolution and the molecular changes associated with resistance. Toward this goal, I use a combination of experimental evolution, genomics and modelling to predict how resistant microbes will evolve. My talk will focus on predicting the potential for resistance evolution from bacterial genomics. I will demonstrate that large-scale changes in resistance evolution can result from relatively subtle genomic differences, e.g. the presence/absence of a given gene, or where it is located. By comparing across species (Pseudomonas spp. and E. coli), this work is helping to codify some of the common principles of resistance evolution. Finally, I will speak about ongoing projects in my group that aim to bring theory and experiment in line with clinical resistance, and discuss how this may improve both our understanding of evolution and our ability to predict resistance in the real world.

Brief biography
Dr Danna Gifford is a UKRI Innovation/Rutherford Fund Fellow based in the Division of Evolution and Genomic Sciences at The University of Manchester in the United Kingdom. She undertook undergraduate and master's degrees at the University of Ottawa, and completed her DPhil degree at the University of Oxford in 2014. Following a short postdoc in Oxford, Dr Gifford moved to Manchester as a research associate in 2016, before beginning her current independent position in 2017. Her research uses a combination of experimental evolution, genomics and mathematical modelling to predict how and when microbes will evolve in response to environmental change.