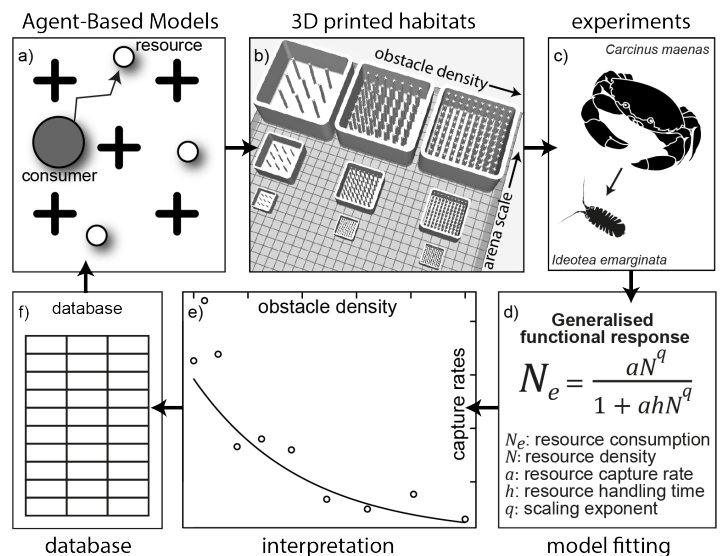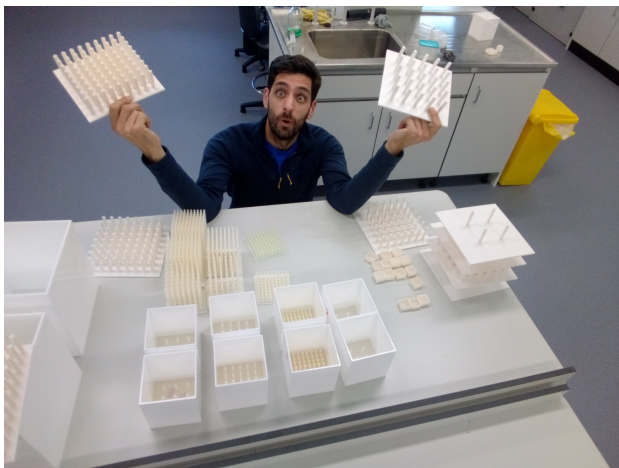# Ecology & Evolution Seminar Series

Thursday 31st October, 1 pm, Fisher/Haldane

A manifesto for systematically describing consumer-resource interactions

The survival growth and reproduction of organisms is universally limited by their ability to acquire and consume resources. Accordingly, much of the science that is ecology seeks to describe patterns of resource consumption, to anticipate the consequences of consumer-resource interactions, and to understand the mechanisms that underpin these interactions. In the 1950s, C.S. Holling's formalisation of the functional response—describing interactions in terms of search, encounter and resource handling by consumers—gave ecologists the first generalisable framework to understand interactions. Since then, ecologists have collectively and reproducibly quantified functional responses for less than 3000 consumer-resource pairs across all biomes. These data have revealed universal temperature and body size dependencies, but also many unexplained patterns. Using examples from my work on habitat structure and context-dependencies, I argue that it is now time to take a systematic approach describing interactions: ecologists should view undescribed interactions as knowledge gaps worthy of scrutiny, in the same way that taxonomists view undescribed species. High turnover experiments, advances in technology and statistical techniques all provide new opportunities to target these knowledge gaps. Undiscovered macroecological patterns, new theory and better ecological forecasting will all result from a more holistic approach to describing interactions across species, contexts and biomes.

$$N_e = \frac{aN^q}{1 + ahN^q}$$

N_e: resource consumption
N: resource density
a: resource capture rate
h: resource handling time
q: scaling exponent

database   interpretation   model fitting

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