

Multidimensional evolution in a social microbe

Supervisors

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Project description

Individuals are composed of large numbers of traits that are built through development from a single genome, and which together determine the fitness of the individual. Consequently, to understand evolutionary processes we need to take a multidimensional perspective that considers the genetic relationships between traits and their links to fitness. This perspective has been challenging in many complex systems, where there are simply too many traits to begin to understand. This project will use a simple multicellular system (a social amoeba) to explore multidimensional evolution in response to selection pressures imposed experimentally. It will use modern microbiological, genetic, and developmental techniques to decipher the underlying basis to evolutionary changes, with a broad goal of understanding the importance of the genetic links between traits in shaping patterns of variation in response to selective pressures.

This project harnesses world-class skills in multidimensional evolution (Hunt, Wolf), experimental evolution (Hunt, Buckling), quantitative genetics (Hunt, Wolf) and microbial evolution (Buckling) to achieve a truly integrative perspective on this critical problem in evolutionary biology. The project will provide opportunities for the student to also work with our collaborators at other institutions to complement their training, with an ultimate goal of developing a broad array of skills in microbiology, developmental biology, genetics, genomics and computational biology. The project goals complement ongoing work in all three labs, including work on the developmental basis of evolutionary change funded by the BBSRC to Wolf and Hunt and on experimental evolution in microbes funded by NERC to Buckling. The student will have the opportunity to interact within the vibrant research environments in all three groups, including the opportunity to reap the benefits of the training opportunities funded through these ongoing projects. At the end of this PhD the student will have acquired the skills to undertake independent research in a range of fields within evolutionary biology and will be equipped with the skills needed to pursue a wide array of different postgraduate career paths.