Preface

This book is presented as an essay, a long argument about the value of a specific type of evolutionary process in biology, which we call *nonadaptive selection*. The idea is simple, yet we think the implications are profound. Nonadaptive selection, as we use the term, is ordinary selection among biological entities, but based on fitness effects intrinsic to the entities under selection, rather than on interactions of traits with a local, shared environment. Thus nonadaptive selection, alone, cannot serve to adapt those entities to a local environment. Instead, it tends to maintain stability and stable equilibria. Nonadaptive selection is of particular value in explaining broad, persistent patterns in multispecies biological units at various levels, where adaptive evolution may be weak or poorly defined. We see it underlying patterns of ecological allometries, community structure, and species interactions, with some implications for macroevolution. Moreover, we find a surprising relationship between these nonadaptive processes and biological laws. We do not advocate the reorientation of any existing research programs, but present nonadaptive selection as an additional conceptual framework that may be useful to add to ecology and evolution.

This book has a somewhat unusual structure. A common type of technical scientific book concerns a specific subdiscipline and takes an "Advances in . . ." approach, updating or reviewing a well-established field in which there is much active research. As mentioned, this book is quite

different. It takes as its subject a new (or at least barely explored) idea and argues for the widespread applicability of this idea in the form of an *essay*. The topics that the book touches upon are wide-ranging, and the challenge has been to produce a volume that can be read by as wide a variety of researchers and students as possible. We have kept the text as free from mathematical formulas and jargon as we can; technical details are in a set of appendices for those more familiar with a particular topic or those who want a fuller explanation of it. Thus, we think that one can get a good understanding of our argument from the main text alone. However, we also provide extensive endnotes; these are filled with parenthetical material, but also with significant clarifications and augmentation of the material in the main text. We strongly encourage people to read the endnotes at some stage; they are substantial additions and not just references.

The collaboration that grew into this book began in earnest in 2012, when the authors were both fellows at the Stellenbosch Institute for Advanced Study in Stellenbosch, South Africa. Throughout our careers, we have pursued very different research programs, though we share an interest in theory that addresses general questions. In discussing our work we kept seeing that there was something of a commonality in the way we were thinking about various topics, but it took a while to discover that this common thread was nonadaptive selection.

What follows is our best attempt to present the idea in an accessible form. Since a wide range of subfields is under discussion, it was not possible to give a thorough, detailed review of every topic. The references we cite are meant in many cases merely to lead the reader to a larger literature. We apologize to those readers whose relevant work or ideas were not cited or were treated too briefly.

We also apologize for focusing almost entirely on our own work. This is not because we think the concept of nonadaptive selection applies only to our previous work, or that our work constitutes the best examples of it. However, it is what we know inside and out and turns out to reveal the potential value of nonadaptive selection that we have been working on for so long without knowing it. We sincerely hope that readers, on reflection, will find the concept of nonadaptive selection useful and will uncover many more examples.