

Preface

The goal of this book is to help instructors teach modern population genetics and genomics in light of their theoretical and empirical roots. From molecular evolution and coalescence through genome-wide association studies, transcriptome-wide association studies, ancient DNA, and studies of adaptation and speciation, modern genetics and genomics have emerged from these foundations. One motivation for writing the book is to summarize the revolution that has taken place in the field owing to low-cost, high-throughput genome sequencing coupled with vast increases in computing power to analyze the data and explore models of increasing complexity. Another is the favorable response to previous editions, which many students and their instructors have used as a brief but solid introduction to the field. The book is also suitable for self-directed learners who recognize the importance of the field and wish to know more.

Familiarity with the basic concepts of genetics and genomics has become essential in many areas of study including evolutionary biology, ecology, systematics, conservation biology and wildlife management, plant and animal breeding, human genetics, anthropology, and even medicine and public health. My own course in population genetics draws students from these fields as well as physics, applied mathematics, computer science, and history of science. Though brief, the book is intended to be sufficiently broad to appeal to readers with a diversity of interests and background.

Although the text introduces a significant number of equations, the emphasis is on explanation rather than derivation. Only elementary algebra is necessary to follow most of the material, but a familiarity with basic calculus is helpful for understanding diffusion equations, Poisson random fields, and complex threshold traits. Mathematical symbols are used consistently throughout the book; when results from the literature are quoted, I have changed the original symbols as necessary to maintain consistency.

I will be grateful for any comments or suggestions, especially those pointing out errors or descriptions that are unclear. My email address is dhartl@oeb.harvard.edu.

The companion website for this book (www.oup.com/companion/HartlPPGG4e) features all the figures in the book as freely downloadable JPEGs.