

## C Further Reading

*In the Library*

*Bart:* Lisa, we can't afford all these books!

*Lisa:* Bart, we're just gonna borrow them.

*Bart:* Oh... heh, heh... gotcha! [wink].

From: *The Simpsons*

### **Calculus**

- Frederick Adler, *Modeling the Dynamics of Life*, Brooks/Cole, 1998  
Similar in scope to the present text but covering a wider range of topics and demanding greater sophistication from the reader.
- L. Goldstein, D. Lay and D. Schneider, *Calculus and its Applications*, 7<sup>th</sup> edition, Prentice-Hall, 1996  
A standard calculus text for the traditional one-year calculus sequence. Well -written and a good source for review.
- Claudia Neuhauser, *Calculus for Biology and Medicine*, Prentice-Hall, 2000  
Similar to Adler's book. Covers a lot of territory, some of it normally considered quite advanced.
- James Stewart, *Calculus*, 4<sup>th</sup> edition, Brooks/Cole, 1999  
Very clearly written and complete calculus text. Used in the standard three-semester sequence for science and engineering majors.

### **Biological Modeling**

The following books are all in some ways more advanced than the preceding and are focused principally on modeling.

- D. Brown and P. Rothery, *Models in Biology: Mathematics, Statistics and Computing*, John Wiley, 1993  
A voluminous treatment of analytical and statistical methods for the biologist. Aimed at the British University student and therefore a reach for a lower division U.S. undergraduate. Many interesting examples and challenging exercises.
- Joshua Epstein, *Nonlinear Dynamics, Mathematical Biology, and Social Science*, Addison Wesley, 1997  
A short volume covering in more depth the ideas discussed in chapter 6.
- Daniel Kaplan and Leon Glass, *Understanding Nonlinear Dynamics*, Springer, 1995  
Excellent introduction to modeling, with particular emphasis on questions in physiology, for example heart rhythms. Large collection of excellent problems, many requiring computer use.

- E. Yeagers, R. Shonkwiler, and J. Herod, *An Introduction to the Mathematics of Biology*, Birkhauser, 1996

Makes extensive use of the computer algebra system *Maple* for studying a variety of biological models. Can be followed without knowing *Maple*, but you will miss something if you don't play with the models yourself.

### **Topics in Biology**

The following books present in greater depth some of the biological ideas emphasized in our applications.

- Richard Burton, *Biology by the Numbers*, Cambridge University Press, 1998

Low-level mathematics but a wide range of interesting biological applications. Aims to inculcate quantitative thinking, rather than teaching a lot of new methods.

- Scott Freeman and Jon Herron, *Evolutionary Analysis*, Prentice-Hall, 1998

A comprehensive text dealing with genetics and its applications in population biology and ecology.

- Daniel Kammen and David Hassenzahl, *Should We Risk It?*, Princeton University Press, 1999

Treatment of risk analysis and risk models for a student of moderate mathematical sophistication (for example, does not explicitly use calculus). The mathematical details are sometimes a little sparse. Good exercises.

- Mark Ridley, *Evolution*, 2<sup>nd</sup> edition, Blackwell Scientific, 1996

Similar in scope to Freeman and Herron above, but somewhat more mathematically advanced.

- Jonathan Roughgarden, *Primer of Ecological Theory*, Prentice-Hall, 1998

Uses the program *Matlab* to help analyze models in ecology and population genetics. Readable and informative even if you don't know or care to know *Matlab*.

### **Probability & Statistics**

- Douglas Altman, *Practical Statistics for Medical Research*, Chapman & Hall, 1991

Good description of the principal statistical techniques and concepts used by the medical practitioner and researcher.

- T. W. Anderson and J. D. Finn, *The New Statistical Analysis of Data*, Springer, 1996

Well-written non-calculus based introduction to statistics.

- D. Freedman, R. Pisani, and R. Purves, *Statistics*, 3<sup>rd</sup> edition, W. W. Norton & Co., 1998

Probably the best book currently available at getting to the meaning of the most important statistical ideas. Aimed at the math phobic student of the social sciences, shows how much can be done without resorting to lots of formulas. In depth discussion of many applications.

## C References

- Stanton Glantz, *Primer of Biostatistics*, 4<sup>th</sup> edition, McGraw Hill, 1997  
A short, popular text showing how to apply a variety of statistical tools. Targets the prospective or practicing MD, but technical medical terms are minimal.
- J. Ingelfinger, F. Mosteller, et. al., *Biostatistics in Clinical Medicine*, 3<sup>rd</sup> edition, McGraw Hill, 1994  
Illustrates and discusses statistical methods via the case-study methodology. Examples require a moderate familiarity with technical medical jargon.
- S. S. Wilks, *Elementary Statistical Analysis*, Princeton University press, 1948  
A classic text treating the subject with a small dose of calculus. Short, elegant and clear – what more can you say?

### **Excel**

As mentioned in Appendix A there are numerous books on learning to use *Excel*. The following are of more interest to the science student.

- S. C. Block, *Excel for Engineers and Scientists*, John Wiley, 2000  
Emphasis on using *Excel* to do scientific calculations. Focus is on problems from the physical sciences. Includes CD with all source worksheets, plus others not discussed in the text.
- Reed Jacobson, *Excel 97 Visual Basic*, Microsoft Press, 1997  
Teaches how to use *Visual Basic* to extend the capabilities of *Excel*. Nice introduction to the ideas of object oriented programming, but done rather informally. Comes with CD containing source code.
- B. V. Liengme, *A Guide to Microsoft Excel for Scientists and Engineers*, John Wiley, 1997  
Similar to Block's book, but with a wider (and more elementary) scope to the examples. Covers some elementary programming ideas using Visual Basic. Good set of exercises.

### **Websites**

There are numerous websites whose content overlaps and enhances material in the text. The following represent a small selection, but each has links to many others. These sites appear to be actively maintained and updated.

- [www.dartmouth.edu/~chance](http://www.dartmouth.edu/~chance)  
This is the website of the “Chance” project, an NSF sponsored consortium aimed at developing new approaches to the teaching of probability. There is much interesting material on this site, including a free on-line text in probability theory by L. Snell
- [www.statistics.com](http://www.statistics.com)  
A commercial site with many statistical links. Easy access to governmental and health data.

## C References

- <http://lib.stat.cmu.edu/DASL/DataArchive.html>

The Data And Story Library site containing a variety of data sets organized by content. Background on most of the data sets and a description of relevant statistical procedures.
- <http://dna-view.com>

Site run by Dr. Charles Brenner on forensic mathematics – i.e. applications of probability and statistics to DNA matching. Interesting material, but terse.
- [www.zoology.ubc/~otto](http://www.zoology.ubc/~otto)

Home page of Prof. Sally Otto at University of British Columbia. Good, though somewhat abbreviated notes on Biomathematics and Evolutionary Genetics. Links to many other sites.
- <http://esg-www.mit.edu:8001/esgbio/7001main.html>

This site contains a hypertext for Introductory Biology developed by the Experimental Study Group at MIT. There is one chapter on Mendelian genetics and some interesting talks on DNA fingerprinting by some of the experts in the field. Otherwise, this is a basic biology text, well-written, with problems and solutions.