

Recommended reading for the MPhil in Computational Biology

- Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, A. Baxeavanis and B.F. F. Ouellette.
- Genomes 3, T.A. Brown, 2nd edition, <http://www.ncbi.nlm.nih.gov/books/NBK21128/>
- Introduction to Scientific Programming and Simulation with R, Owen Jones, Robert Maillardet and Andrew Robinson
- Computational Genome Analysis, Richard Deonier, Simon Tavaré and Michael Waterman.

The following titles are recommended maths textbooks for those of you who are coming from a biological background and want to brush up on the mathematics:

- Applied Statistics for Engineers and Physical Scientists, Johannes Ledolter and Robert Hogg, (Chapters 2, 3 and 4)
- Statistical Methods in Bioinformatics: An Introduction, Warren Ewens and Gregory Grant (Chapters 1, 3, 8 and 9)
- Introductory Statistics with R, Peter Dalgaard, (Chapter 2)
- Biological Sequence Analysis, Richard Durbin et al. (first few chapters)
- For some of the practical sessions in R, we will make good use of the statistical programming environment, www.r-project.org
- Online course in R: <https://www.coursera.org/course/rprog>

Reference texts for specific course modules:

- *Bioinformatics Algorithms: An Active Learning Approach*, Compeau, P., & Pevzner, P. Active Learning Publishers (latest edition) - For dynamic programming, de Bruijn assembly, motif finding, and clustering
- *Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids*, Durbin, Eddy, Krogh & Mitchison (1998). Cambridge University Press - The spine for alignment (Ch. 2), hidden Markov models (Ch. 3), and HMMs applied to sequences (Ch. 4)
- *Python for data analysis*, Wes McKinney (2022), 3rd edition and available online at: <https://wesmckinney.com/book/>
- *Understanding Deep Learning*, Simon J. D. Prince (2026) <https://udlbook.github.io/udlbook/>
- *An Introduction to Statistical Learning*, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani (2023). <https://www.statlearning.com/>
- *Inferring Phylogenies* by Joseph Felsenstein focuses on the mathematical foundations to phylogenetics
- *The phylogenetic handbook: a practical approach to phylogenetic analysis and hypothesis testing* by Lemey, Salemi and Vandamme gives a more practical introduction to the field with many tutorials
- *Population Genetics: a concise guide*, by John Gillespie