

Free online courses in Bioinformatics

Statistical learning (a great introduction by famous authors):

https://www.youtube.com/watch?v=5N9V07EIfIg&list=PL0g0ngHtcqbPTlZzRHA2ocQZqB1D_qZ5V

Khan academy offers many free courses, e.g.: <https://www.khanacademy.org/math/statistics-probability>

EMBL has a collection of courses online (with a focus on computational biology analyses):

<https://www.ebi.ac.uk/training/online/course/embo-practical-course-analysis-high-throughput-seq/differential-expression-rna-seq>

Along the same lines (starts with basic concepts and then it gets more complicated; also provides R code): <http://genomicsclass.github.io/book/>

Coding (general concepts, different programming languages, guided examples):

- <https://www.codecademy.com> (for example: R <https://www.codecademy.com/learn/learn-r>, python: <https://www.codecademy.com/learn/learn-python-3>)

Coursera is a great site with many online courses (<https://coursera.org>). Some even have guided exercises and offer the possibility to get a certification after the completion of the course. I took this course for Machine Learning (very easy to follow, it's good for beginners and also has some exercises in matlab or octave (open source)) (<https://coursera.org/learn/machine-learning>)

These blogs are a quick read and great for understanding how different parameters affect tSNE and UMAP projections:

- UMAP: <https://pair-code.github.io/understanding-umap/>
- tSNE: <https://distill.pub/2016/misread-tsne/>

Differential expression analysis tools and examples:

- <https://bioconductor.org/packages/release/bioc/vignettes/edgeR/inst/doc/edgeRUsersGuide.pdf>
- Understanding interactions: http://genomicsclass.github.io/book/pages/interactions_and_contrasts.html

Single cell analysis tools and guided examples:

- <https://satijalab.org/seurat/>
- <https://icb-scanpy.readthedocs-hosted.com/en/stable/tutorials.html>

Web Seminars of Swiss Institute of Bioinformatics

<https://www.youtube.com/playlist?list=PLoCxWrRWjqB1JUCntI4X09ezmOtKx1Gke>

Darren Wilkinson's blog (quite computational)

<https://darrenjw.wordpress.com/2010/01/30/yet-another-introduction-to-r-and-bioconductor/>

Learn R

#install RStudio locally, or use the free RStudio Cloud: <https://rstudio.cloud/>

- Basic intro: <https://www.codecademy.com/learn/learn-r>
- Interactive R learning with swirl: <https://swirlstats.com/students.html>
- Examples of main concepts: <https://www.datamentor.io/r-programming/#tutorial>
- R intro video: <https://www.youtube.com/watch?v=V8eKsto3Ug>
- Full stats intro: <https://stat545.com/index.html>
- The "tidyverse" is a godsend for biologists <https://www.tidyverse.org/>
- R Data Science book (lots of tidyverse): <https://r4ds.had.co.nz/>