**Molecular biology primer**

**General Techniques (Stats + ML)**

Basic Statistics

-       Statistical testing

-       Multiple hypothesis correction

Probabilistic reasoning

-       Bayesian inference

- Expectation-Maximization

-       Graphical model: HMM

Dimensionality Reduction

Clustering

Classification

-       Linear Classifiers

-       SVM

-       Random Forests

- Evaluation of classifiers

Regression

-       Linear Regression

-       Logistic [Regression](https://learn.illinois.edu/mod/resource/view.php?id=6325932)

- Regularization

- Evaluation of regression

Neural networks

-       Basic ANN

-       Convolutional NN

- Recurrent NN

Random Walks on Graphs

**Applications**

Regulatory Genomics

-       Motifs

-       Protein-DNA binding

-       DNA accessibility & Chromatin states

-       Regulatory Networks from Transcriptomics data

-       Regulatory Networks from Multi-omics data

-       Single cell transcriptomics

- Spatial transcriptomics

Systems biology

-       Gene prioritization

-       Gene set characterization

- Gene Ontology

- Biological networks

Individualized medicine and genetics

- Pharmacogenomics

-       Coding variants

-       Non-coding variants

- GWAS & eQTL

- Expression outliers