Title: Where does sequence information come from? Native state, function and evolution of proteins

The idea is to show the students the existence of a substitution pattern in coding sequences and relate it with different aspects of protein structure, function and evolution.

Contents: Native state of proteins. Anfinsen Experiment. Levinthal Paradox. Protein Structure organization (surface, cavities, tunnels). Structural basis of protein function (key-lock, induce-fit, pre-equilibrium, population shifts). Protein dynamism. Evolution.

Practice:

Search for residues involved in pi-pi, and pi-cation interactions.

Explore the surface compositional properties of the same protein but coming from three different organisms (psychrophilic, mesophilic and thermophilic)

 Use of servers to find protein residues located in the surface, cavities or in the protein core.

Given an active site of a protein explore residues near the active site, in the same cavity.

Estimate the relative conservation of residues associate with substrate binding, substrate catalysis, protein cavities and protein surface.

Programs and servers to use: WebLab (visualization program), servers on the web and Excel.