

Ph.D. Supervisor: C.S.I. Dr. Habil. Vlad Cojocaru

Admission exam topics (for the PhD position with governmental fellowship):

1. The structure of DNA from the double helix to the organization in genomes
2. Protein structure; experimental and theoretical methods for determining protein structures
3. Types of interactions between proteins and nucleic acids and their role in cells
4. Gene regulation
5. Computational methods for the study of biomolecules and their interactions (including basic concepts in Linux and Programming Languages)

Bibliography:

- Stryer, L., et al. (2019): *Biochemistry*. 9th Edition
- Sanger, W. (1984): *Principles of Nucleic Acids Structure*. Springer Verlag.
- Stigliano A.F. (2020): *Biomolecular Interfaces*. Springer Verlag
- Leach, A. R. (2001): *Molecular Modeling: Principles and Applications*. (2nd or 3rd edition)
- Schlick, T. (2013): *Molecular Modeling and Simulation: An Interdisciplinary Guide*
- Mistelli, T. (2020): The Self-Organizing Genome: Principles of Genome Architecture and Function. *Cell* 183(1):28-45 (<https://doi.org/10.1016/j.cell.2020.09.014>)
- Lambert SA et al (2018): The Human Transcription Factors (<https://doi.org/10.1016/j.cell.2018.01.029>)
- Zaret KS (2020). Pioneer Transcription Factors Initiating Gene Network Changes (<https://doi.org/10.1146/annurev-genet-030220-015007>)

Recommended software tutorials:

VMD (<https://www.ks.uiuc.edu/Research/vmd/>)

Amber (www.ambermd.org)

Haddock (<https://www.bonvinlab.org/software/>)

Chimera (<https://www.cgl.ucsf.edu/chimera/>)