Instructor and Contact Information
Professor Wilma K. Olson - Wright-Rieman Labs, Rm A209; 848-445-3993; wilmaolson@rutgers.edu

Time and Location
Tuesdays and Thursdays 1:40-3:00 PM
Wright-Rieman Laboratories, Rm 260

Description
Three-dimensional structures and interactions of proteins, nucleic acids, and their macromolecular assemblies, emphasizing the principles of structural assembly and the connections between structure, interactions, and biological/physical properties and introducing students to the methods used to visualize and analyze macromolecular structures and assemblies.

Course Structure
Members of the class are expected (i) to read and understand all of the course literature, (ii) to participate in class discussions, (iii) to complete a variety of written/oral assignments, (iv) to prepare a final written paper, and (v) to deliver an in-depth oral presentation on a biomolecular system/structure of his or her own interest. Students will prepare answers to homework questions in advance of a particular class/paper, discuss the paper in class, and individually investigate supplementary issues brought up in class discussions. The supplementary items might include a brief oral/written report on relevant background material. Students will build simple molecular models and become familiar with and use various databases and software tools helpful in understanding/manipulating the 3D structures of biological macromolecules.

Literature
There is no textbook. The course will be taught using peer-reviewed literature as source material. The articles, which are required reading, are listed at the end of this document. The readings and associated homework questions must be submitted in advance of the class meeting at which the material will be discussed/presented.

Useful Supplementary Textbooks

Prerequisites
Physical chemistry or equivalent. Organic chemistry and one semester of biochemistry highly recommended

Requirements
Homework (30%), class participation (20%), in-class oral presentation (25%), and final written report (25%)

Attendance
Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website https://sims.rutgers.edu/ssra/ to indicate the date and reason for your absence. An email is automatically sent to the instructor.
Class Schedule (tentative)

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<td>Conformational variables and models</td>
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<td>Sept 15, 17</td>
<td>Principles of protein structure</td>
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<td>Sept 22, 24, 29</td>
<td>Understanding protein structures</td>
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<td>Oct 1, 6, 8</td>
<td>Protein folding and fluctuations</td>
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<td>Oct 13, 15</td>
<td>Discovery of the double helix</td>
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<td>Oct 20, 22</td>
<td>Principles of nucleic acid structure</td>
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<td>Oct 27, 29</td>
<td>Double helix at atomic resolution</td>
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<td>Nov 3, 5</td>
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<td>Nov 10, 12</td>
<td>Nucleosome organization and recognition</td>
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<td>Nov 17, 19</td>
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<td>Nov 24</td>
<td>Protein-nucleic acid recognition principles</td>
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<td>Dec 1, 3</td>
<td>Student projects/presentations</td>
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<td>Dec 8, 10</td>
<td>Student projects/presentations</td>
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Students may be interested in attending and, for extra credit, preparing summaries of the following lectures in the 2015 Fall Quantitative Biology Seminar Series held on Wednesdays at 12 noon in Proteomics 120 or CABM 001:

- Oct 7 – James Berger (Johns Hopkins U)
- Oct 14 – Colin Groom (Cambridge Crystallographic Centre)
- Oct 21 – Wayne Hendrickson (Columbia U)
- Nov 11 – Stefan Sarafianos (U Missouri)

Course Literature

Principles of Protein Structure

Understanding Protein Structures

Protein Folding and Fluctuations
Biophysical Chemistry I – Fall 2015


Discovery of the Double Helix


Principles of Nucleic Acid Conformation


The Double Helix at Atomic Resolution


RNA Folding and Unfolding


Principles of Protein-Nucleic Acid Assembly: Nucleosomes, Ribosomes, and Recognition Principles

