

**Course: PROTEIN BIOLOGY AND BIOINFORMATICS - BNFO 591**

**Place:** Harris Hall (3112) computer lab

**Time:** Tue, 2-4:45 pm

**Dates:** Aug – Dec 2018

**Instructor:** Peter Uetz

Harris 3136

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**Office hours:** by appointment

**Recommended text:** **Wikipedia** articles, original research articles and reviews

**Course Goal:** Understanding proteins, sequences, and how proteins can be analyzed both experimentally and computationally. Student will learn how to find literature, online resources and tools, read research reports, analyze data, and integrate information into knowledge by writing Wikipedia pages on proteins and proteomics.

**Course description:** We will explore the current state of protein research and thus molecular biology, find relevant literature and Wikipedia articles, identify gaps in the latter, study the original research literature, and fill the gaps in Wikipedia or write entirely new articles. Students may identify their own favorite subjects but our Wikipedia project will focus on the bioinformatics analysis of proteins. The course will introduce a number of online resources and tools for proteins data and analysis. Every student will give a short presentation about their Wikipedia project. In order to illustrate the article, students will prepare figures based on raw data or published information and post their articles in Wikipedia. The students will then examine each other's articles, or invite either the authors or other outside experts for peer review.

**Preliminary Topics\*:**

- 1 Intro: Proteins and resources
- 2 Methods: structure (X-ray, NMR)
- 3 Methods: structure (Pymol, docking)
- 4 Methods: Mass Spectrometry (incl. tour of MS facility)
- 5 Methods: Y2H, PCA (theory and experiments)
- 6 protein sequence analysis: feature analysis
- 7 protein function prediction
- 8 protein families: PFAM, etc.
- 9 Protein synthesis: translation, regulation
- 10 protein interaction networks
- 11 signaling
- 12 protein evolution
- 13 enzymology and metabolic networks

## **Bioinformatics subjects covered (as part of the topics above)**

- 1 Proteins and bioinformatics on Wikipedia
- 2 Databases: NAR database issue
- 3 Databases: NCBI: PubMed and beyond
- 4 Databases: Uniprot, domain databases
- 5 Databases: Genome databases, other than NCBI
- 6 Databases: model organism databases, orthology
- 7 Databases: PDB
- 8: Tools: PyMol
- 9: Tools: general productivity tools
- 10: Tools: genome browsers, sequence alignments, phylogenetics
- 11: Tools: systems biology, networks, Cytoscape

**Grading:** 20% - Mid-term quiz  
40% - Wikipedia article  
40% - final exam  
bonus points for good presentation and homework exercises

**Grading Scale\*:** 90 to 100 = A  
75 to <90 = B  
60 to <75 = C  
50 to <60 = D  
Below 50 = F

\* subject to change

**Class Attendance and Time Expectations:** You are expected to attend every class session and to spend ~2 hours every week outside of the class doing research and working on your Wikipedia article. Each student is expected to give a short presentation on their chosen subject and why their Wikipedia subject (article) needs work.

**Wikipedia article.** Your article will be a central part of this course. You will write an article, edit one substantially, or write a new section of an existing article. You are expected to add the equivalent of 1/2 page of text (200 words), 3 images and one table (maybe replaced by a figure).

**Presentation:** the presentation is not directly graded, but if well done, may count as a bonus and lift your grade.

### **Email Policy**

Electronic mail or "email" is considered an official method for communication at VCU. Please read the policy in its entirety: <http://www.ts.vcu.edu/kb/3407.html>

### **VCU Honor System: Plagiarism and Academic Integrity**

The VCU honor system policy describes the responsibilities of students, faculty, and administration in upholding academic integrity, while at the same time respecting the rights of individuals to the due process

offered by administrative hearings and appeals. According to his policy, "members of the academic community are required to conduct themselves in accordance with the highest standards of academic honesty and integrity." In addition, "All members of the VCU community are presumed to have an understanding of the VCU Honor System and are required to:

- Agree to be bound by the Honor System policy and its procedures;
- Report suspicion or knowledge of possible violations of the Honor System;
- Support an environment that reflects a commitment to academic integrity;
- Answer truthfully when called upon to do so regarding Honor System cases, and,
- Maintain confidentiality regarding specific information in Honor System cases.
- Most importantly, "All VCU students are presumed upon enrollment to have acquainted themselves with and have an understanding of the Honor System." (The VCU Insider).

The Honor System in its entirety can be reviewed on the Web at [http://www.provost.vcu.edu/pdfs/Honor\\_system\\_policy.pdf](http://www.provost.vcu.edu/pdfs/Honor_system_policy.pdf) or it can be found in the current issue of the VCU Insider at <http://www.students.vcu.edu/insider.html>

In this class, because coursework will be collaborative at times, particular issues of integrity arise. You should not copy or print another student's work without permission. Any material (this includes IDEAS and LANGUAGE) from another source must be credited, whether that material is quoted directly, summarized, or paraphrased. In other words, you should respect the work of others and in no way present it as their own.

### **Student Conduct in the Classroom**

According to the *Faculty Guide to Student Conduct in Instructional Settings* (<http://www.assurance.vcu.edu/Policy%20Library/Faculty%20Guide%20to%20Student%20Conduct%20in%20Instructional%20Settings.pdf>), "The instructional program at VCU is based upon the premise that students enrolled in a class are entitled to receive instruction free from interference by other students. Accordingly, in classrooms, laboratories, studies, and other learning areas, students are expected to conduct themselves in an orderly and cooperative manner so that the faculty member can proceed with their [sic] customary instruction. Faculty members (including graduate teaching assistants) may set reasonable standards for classroom behavior in order to serve these objectives. If a student believes that the behavior of another student is disruptive, the instructor should be informed." Among other things, cell phones and beepers should be turned off while in the classroom. Also, the University Rules and Procedures prohibit anyone from having ".in his possession any firearm, other weapon, or explosive, regardless of whether a license to possess the same has been issued, without the written authorization of the President of the university..." For more information, visit the VCU Insider online at <http://www.students.vcu.edu/insider.html>

Certainly the expectation in this course is that students will attend class with punctuality, proper decorum, required course material, and studious involvement.

The *VCU Insider* contains additional important information about a number of other policies with which students should be familiar, including Guidelines on Prohibition of Sexual Harassment, Grade Review Procedure, and Ethics Policy on Computing. It also contains maps, phone numbers, and information about resources available to VCU students.

### **Students with Disabilities**

SECTION 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 as amended, require that VCU provides "academic adjustments " or "reasonable accommodations" to any student who has a physical or mental impairment that substantially limits a major life activity. To receive accommodations, students must request them by contacting the Disability Support Services Office (DSS) on the Monroe Park Campus (828-2253) or the Division for Academic Success on the MCV campus (828-9782). More information is available at the Disability Support Services webpage: <http://www.students.vcu.edu/dss/> ; or the Division for Academic Success webpage at [www.specialservices.vcu.edu/disabilityss/](http://www.specialservices.vcu.edu/disabilityss/).

If you have a disability that requires an academic accommodation, please schedule a meeting with me at your earliest convenience. Additionally, if your coursework requires you to work in a lab environment, you should advise me or department chairperson of any concerns you may have regarding safety issues related to your disability. This statement applies not only to this course but also to every other course in this University.

**Campus Emergency information**

What to Know and Do To Be Prepared for Emergencies at VCU:

- Sign up to receive VCU text messaging alerts (<http://www.vcu.edu/alert/notify>). Keep your information up-to-date. Within the classroom, the professor will keep his or her phone on to receive any emergency transmissions.
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in on-campus classrooms.
- Listen for and follow instructions from VCU or other designated authorities. Within the classroom, follow your professor's instructions.
- Know where to go for additional emergency information (<http://www.vcu.edu/alert>).
- Know the emergency phone number for the VCU Police (828-1234). Report suspicious activities and objects.