BISC542: Seminar in Computational Molecular Biology

Instructor: Vsevolod (Seva) Katritch (katritch@usc.edu)

Time: 12:30-1:30pm, 2:00-3:30pm Thursday

Place: RRI 301, RRI 101

Requirements: Each student will give three presentations and provide feedback to other students on their presentations.

Short presentation: Two classes (01/16 and 03/26) will be devoted to every student giving a two-slide, three-minute presentation on a topic of their choosing: aim to teach the audience one (very simple!) thing. Slides must be emailed in pdf format to Dr. Katritch two days in advance.

Long presentation: Each student will also create a longer presentation, lasting roughly 15 minutes, plus 10 minutes for questions and discussion. Please choose a specific topic from the list provided below. You can give an introduction or technology overview, or you can discuss an important current or historical paper on this topic. If you chose topic related to your research, presenting your own original data is a bonus. Students choosing similar topics should coordinate their presentations to not overlap; Dr. Katritch will choose dates and distribute this information.

Literature databases: http://scholar.google.com

- **PubMed** (biological or biomedical papers)**:** http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed
- **Web of Science** (all science related papers) http://www.webofknowledge.com/

Preparing the presentation:

- **Background information:**
  What are the scientific questions? What have been done? What are the challenges? etc.
- **What are the investigators' approaches and results?**
  Explain every important figure and table. Indicate the data source and how the data were obtained experimentally, etc.
- **Critique of the study**
  The advantages and limitations, what would you do to improve their methods? How did this set the stage for future work? Why do you choose this paper? etc.

What you should learn from this class:

- Literature search skills
- Scientific thinking
- Presentation skills

Topics

1. comparative proteomics
2. hybrid methods in macromolecular structure prediction
3. modeling of cell structure and function
4. modeling of biological pathways
5. structural systems biology
6. computational neurobiology
7. comparative structural biology
8. molecular modeling and molecular dynamics
9. Machine learning approaches and applicaitons
10. genome editing
11. single-cell genomics
12. transcriptomics and alternative splicing
13. epigenomics
14. assembly, variant identification, and genotype calling
15. metagenomics
16. cancer genomics
17. personal and medical genomics
18. gene regulatory networks
19. protein-protein and genetic interaction networks
20. population genetics and natural selection
21. databases, data mining, visualization
22. scalable algorithmics: searching, streaming, and randomized or parallel algorithms
23. ancient DNA and human history

Name:_____

First choice:_____

Second choice:_____

Are there any class dates you won't be available to present?