

Computational Genomics and Molecular Biology

Instructor: Dannie Durand

TA: Alan Shteyman

Fall 2015

Course overview

Course web page:

<http://www.cs.cmu.edu/~durand/03-711>

Syllabus:

<http://www.cs.cmu.edu/~durand/03-711/2015>

Class notes, problem sets and solutions, and reading assignments will be posted on this page.

Index of /maguk... 03-327/727 Learn... Computational... Courses Offered... 15-351/15-650/0...
www.cs.cmu.edu/~durand/03-711/

Computational Molecular Biology and Genomics - Fall 2015

[\[Syllabus\]](#) [\[Reading\]](#) [\[Learning objectives\]](#) [\[Prerequisites\]](#) [\[Course work & policies\]](#) [\[2014 course page\]](#)

Course Summary

An advanced introduction to computational molecular biology, using an applied algorithms approach. The course will review established algorithmic methods, including pairwise sequence alignment and dynamic programming, multiple sequence alignment, hidden Markov models for molecular modeling, phylogenetic trees, and emerging computational problems in genomics.

2023-711

Administrative Information

Lectures: T,Th 10:30am - 11:50am, Location: Doherty Hall 1217

Instructor: **Dannie Durand**, durand@cmu.edu, 8-6036
Office hours: TBA

Teaching Assistant: Alan Shteyman, ashteyma@andrew.cmu.edu
Office hours: [Doodle poll for office hour scheduling](#)

Click here to see the syllabus week by week and vote on times for office hours.

Index of /maguk... 03-327/727 Learn... Computational Mol... Courses Offered-Co... 15-351/15-650/02-6...
www.cs.cmu.edu/~durand/03-711/index.html

Computational Molecular Biology and Genomics Syllabus - Fall 2015

The materials in the "Assigned Reading" column are directly related to the topics covered in class. Readings under "Additional Topics" are strictly optional and will not be covered on the exams.

In some cases, the same material is covered in more than one textbook. You have the choice of selecting the text that presents a treatment of the material most to your liking. It is your responsibility to make sure that you understand the material covered in class and you may read as many or as few of these texts needed to achieve that goal.

CLASS	DATE	TOPICS	ASSIGNED READING	ADDITIONAL TOPICS
1.	Sep. 1	Introduction to computational biology and genomics: PS0, due September 8th	Review biology and algorithms background	
2.	Sep. 3	Global pairwise sequence alignment	Global sequence alignment notes , courtesy Dr. M. Singh, Princeton University • Setubal and Medinas 47-55, 89-92, 96-98 (electronic reserve) • Durbin, pp. 17-22 (electronic reserve)	• Saving space: Setubal and Medinas, 58-60; (physical reserve) • General gap penalty functions: Setubal and Medinas, 60-64 (physical reserve)
3.	Sep. 5	PS0 DUE		
4.	Sep. 10			
5.	Sep. 15			
6.	Sep. 17			
7.	Sep. 22			
8.	Sep. 24			
9.	Sep. 29			
10.	Oct. 1			

Administrative Information

Lectures: T,Th

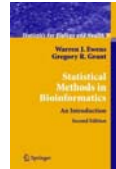
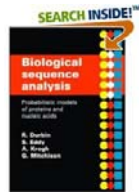
Instructor: **Dannie Durand**

Office hours:

Teaching Assistant:

Office hours:

Recommended text books (No required textbook)



Reading materials are available electronically

Some materials are password protected for access from an off-campus network.

CLASS	DATE	TOPICS
1.	Aug. 26	Introduction to computational biology and genomics: PS0 (due Sept. 2)
2.	Aug. 28	Global pairwise sequence alignment Global sequence alignment notes courtesy Dr. M. Singh, Princeton University • Setubal and Meidanis 47-55, 89-92, 95-98, (electronic reserve) • Durbin, pp. 17-23, (electronic reserve)
3.	Sep. 2	PS0 DUE
4.	Sep. 4	
5.	Sep. 9	
6.	Sep. 11	
7.	Sep. 16	
8.	Sep. 18	
9.	Sep. 23	
10.	Sep. 25	
11.	Sep. 30	

Course overview

Materials available on Electronic Reserves:

<http://www.library.cmu.edu/>

Electronic reserves:

<http://www.library.cmu.edu/>

Click on: Course Reserves
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Type: "Durand"
Select: 03-711

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Select: 03-711

Click on: Course Reserves
Select: Look up items on reserve by instructor
Type: "Durand"
Select: ES-CIRCDK 03-711

Reserve Desk	Course	Instructor
MRESAREA	03-511 Computational Genomics & Molecular Biol	Durand, Danie
MRESAREA	03-711 Computational Genomics & Molecular Biol	Durand, Danie
MRESAREA	02-711 Computational Genomics & Molecular Biol	Durand, Danie
ES-CIRCDK	03-511 Computational Genomics & Molecular Biol	Durand, Danie
ES-CIRCDK	03-711 Computational Genomics & Molecular Biol	Durand, Danie
ES-CIRCDK	15-495 Computational Molecular Biology and Geno	Durand, Danie
ES-CIRCDK	15-856 Computational Molecular Biology and Geno	Durand, Danie
ES-CIRCDK	02-711 Computational Genomics & Molecular Biol	Durand, Danie
ERESERVE_	03-511 Computational Genomics & Molecular Biol	Durand, Danie
ERESERVE_	03-711 Computational Genomics & Molecular Biol	Durand, Danie
ERESERVE_	15-495 Computational Molecular Biology and Geno	Durand, Danie
ERESERVE_	15-495 Computational Molecular Biology and Geno	Durand, Danie
ERESERVE_	02-711 Computational Genomics & Molecular Biol	Durand, Danie
MRESAREA	15-495 Computational Molecular Biology and Geno	Durand, Danie
MRESAREA	15-856 Computational Molecular Biology and Geno	Durand, Danie

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Click on: Course Reserves
Select: Look up items on reserve by instructor
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Select: ES-CIRCDK 03-711

The screenshot shows the library catalog interface with a search result for "Amino Acid Substitution Matrices from Protein Blocks". A green circle highlights the "Internet" link in the "Holdings" section, which points to a URL: <http://www.library.cmu.edu/reserves/2/resdurand24.pdf>.

Note that different sections of the same book appear as separate items.

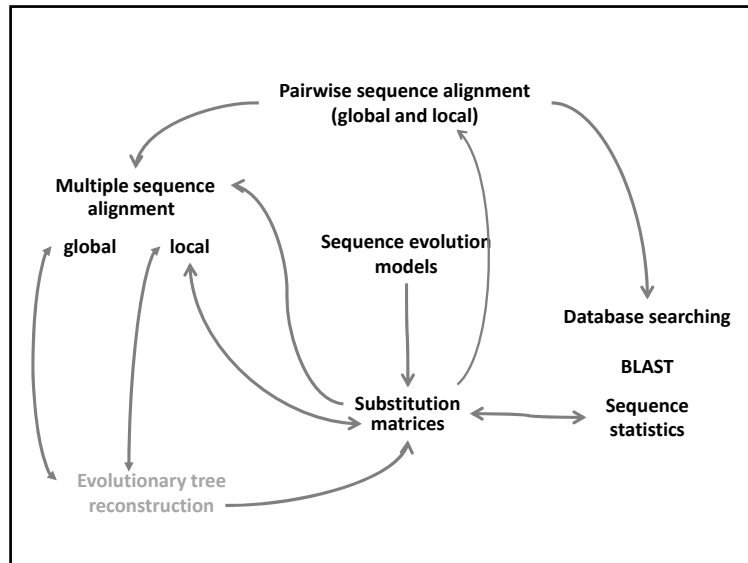
The screenshot shows a list of search results. Two entries for "Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids" are circled in green. The first entry is for pages 28-71 by Durbin, et al. (Call Number: ER DURAND-25) and the second is for pages 28-30 by Durbin, et al. (Call Number: ER DURAND-27).

If you don't see the document you are looking for, go to the next page

The screenshot shows a list of search results. A green arrow points from the text box to the "Next" button in the pagination controls at the bottom of the results list.

Course overview

Coursework and policies:
<http://www.cs.cmu.edu/~durand/03-711/2014/policies.html>



How to do well in this course

- Come to class
- Take notes
- **Come to office hours**
- If something isn't clear, ask me!
- Preparing for exams
 - Homework is more focused on working problems
 - Exams are more focused on concepts
 - Study from your notes as well as your homework

I speak quickly.
 My handwriting is terrible.
 Please interrupt and ask questions.