UCONN
UNIVERSITY OF CONNECTICUT

MCB 3843W
Research Literature in Comparative Genomics

Syllabus – Spring 2021

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: MCB 3843W Research Literature in Comparative Genomics.
Credits: 3
Format: Remote
Prerequisites: ENGL 1007 or 1010 or 1011 or 2011; MCB 2400 or 2410; open only with consent of instructor. Not open for credit to students who have passed MCB 3841W when offered as "Comparative Genomics."

Professor: Dr. Mark Longo, Ph.D.
Pronouns: him, her, his
Email: mark.longo@uconn.edu
Telephone: N/A
Office Hours/Availability: You may reach me through email. WebEx video sessions can also be arranged if necessary.

Course Materials

REQUIRED- All required readings can be found as a link or in PDF format on HuskyCT. All other material (such as required videos) will be found in HuskyCT or linked in HuskyCT.

Course Description

Comparative genomics assumes that functionally important genomic elements are conserved across species. These elements are thought to be evolutionarily constrained by selective pressures to maintain their sequences. Comparative genomics uses a 'comparative' approach using both model and non-model species to identify these functionally relevant regions of the genome.

This course will introduce you to 'the Genome' of different organisms. We will examine how this comparative approach can answer many questions such as how do genomes and species evolve? What makes up a typical genome? How do alterations in genome structure or behavior result in human disease? You will gain an appreciation for the eukaryotic genome as a fluid, dynamic and complex three-dimensional system acting not in isolation but as part of a larger whole, the organism.

We will use current reviews and primary research literature to learn about contemporary molecular genetic techniques and how these new techniques and technologies have allowed for the 'Age of Genomics'. We will discuss how these rapidly changing technologies will profoundly affect both human health and society in general. Over the course of the semester we will critically evaluate current literature to illustrate the scientific method at work, as well as to further develop your ability to read and write scientific material.

Course Outline

Module 1: Genome Evolution and Genome Sequencing (Weeks 1-4).
Module 2: The Mobile Genome (Weeks 5-9).
Module 3: Genome regulation with Small RNAs (Weeks 10-11).
Module 4: Current findings in Genomics (Weeks 12,14-15).

Course Goals

We will focus on improving your fluency in reading research literature and improving your ability to **use experimental data to support arguments** in the written communication of scientific information.

Class Meeting Schedule

A detailed course schedule can be found at the end of this syllabus and on HustyCT.

As a remote course, there are no required meeting times. Several lectures will be recorded and posted to HuskyCT (PDFs of the power points will also be available). For each research article, I will post a recording of me going over the details of the paper. Unless otherwise stated, due dates are by the end of the designated day. In addition to reading, there will be several videos assigned. Links to these v

Course Requirements and Grading

Summary of Course Grading:

Course Components	Weight
Quizzes	25%
Discussion	15%
Paper 1	15%
Paper 2	20%
Paper 3	25%

Note: All assignments and assessments are due by the end of the day designated on the schedule.

Quizzes: There will be seven short (10 point) quizzes on any material covered on the indicated weeks (see course schedule). These will be administered through HuskyCT. They will be short answer questions aimed at assessing your understanding of the material. These will be made available each Wednesday and will need to be completed by the Friday of the indicated weeks Late submissions will be penalized 1-point per day. The lowest quiz score will be dropped. As this is a writing course, be sure to proofread your responses. Points will be deducted for obvious errors in punctuation, grammar, spelling, etc in addition to answering the question correctly.

***Discussion Board*:** You will be required to participate in four Discussion Boards over the course of the semester, also on HuskyCT. For each indicated Friday, you must an write original post about the given topic (minimum 250 words) and by the next Friday you need to respond to at least 3 other students' posts (each response minimum 125 words each). Again, as this is a writing course, you should proofread your posts before submission and try to write as accurately and concisely as possible.

Papers: As a 'W' course, UConn requires 15 pages of written material for the semester. **If you do not pass the written portion of the class**, as per University policy, **you can not pass the class.**

All papers will be submitted electronically on HuskyCT in Word format (*.docx). **Filenames should include *your name* as well as the assignment name (e.g. StudentName_Summary1_RoughDraft.docx)**.

You will write three summaries. The summaries will first be submitted as rough drafts for edit by me.

Rough drafts will be graded and counted as quizzes (10 points – these scores will not be counted as your dropped quiz). Drafts should be complete and well proof-read. Editing and revision are part of the writing process. You therefore are not expected to hand in a polished finished version for your draft. You are, however, expected to proofread your draft and fix obvious errors in punctuation, grammar, spelling, etc. Failure to fix these simple errors in your draft will result in points lost. Points will also be deducted for incomplete drafts and possibly for other issues typically stemming from an obvious lack of effort. You are not expected to be experts in the material, but you are expected to put forth your best effort in all work turned in.

For each summary, you will summarize one article (see list below). **The goal of each summary is to give you practice concisely *reporting scientific data* and its relevance**. The summary will be evaluated both for content (do you clearly and accurately summarize the information) as well as for writing quality (grammar, punctuation, etc.).

You should identify the question the authors are trying to answer. What is their hypothesis? Briefly explain the background and context for why the particular study is relevant in the context of a larger picture. You should then summarize what experiments were performed and the significant findings of the paper are. You do not need to give detailed descriptions of the methods used but they should be indicated in your description of the results. You should then conclude with a summary of the findings and why these results are significant. When writing these and all of your papers **use your own words (see Academic integrity statement below)**. Be sure to include a full citation of the paper you are summarizing and your name. You can assume your audience has a level of background education comparable with yourself.

You should try and write as concisely and accurately as possible. Do not try to 'sound' scientific. Stating things simply and directly works best. Avoid long wordy sentences (often with multiple commas). Instead, break long sentences into smaller concise statements. You also do not need to repeatedly refer to 'the authors', 'the researchers', 'they', etc. throughout your paper. Attributing credit to who did the work is accomplished with your citation.

Most research articles take a general format of:

- State what is not known.
- Explain what experiment was performed.
- Report the results.
- Explain or interpret those results. Often those results will identify another question.
- Another experiment is performed to answer that question.
- Explain what experiment(s) were performed.
- Report the results …… etc. etc.

So, your papers should start with a brief (~¾-1 page) introduction that explains the background and sets up the question or hypopthesis. Then report what experiments were performed, what the results were and **how those results answer the question**. You should then finish with a conclusion (approximately ¾ page) that recaps the major point and findings of the research.

Paper Formatting: Papers are to be double-spaced typed in **11 or 12-point Times New Roman Font** with **one-inch margins**. Include **only your name** and the title of the assignment at the top of the page.

*** **Note that submitted papers will be screened for similarity to already published material by *SafeAssign* on HuskyCT** ***

Please be sure to check your Similarity Report after you upload all drafts and final versions and adjust any sections of your papers that too closely resemble the source.

Paper Topics:

- **Review 1 –** Choose any ***article*** from weeks 1-4 and write a **4-page** summary (PDFs available on HuskyCT).
- **Review 2 –** Choose any ***article*** from weeks 5-8 and write a **5-page** summary (PDFs available on HuskyCT).
- **Review 3 –** Choose any ***article*** from weeks 9-15 and write a **6-page** summary (PDFs available on HuskyCT).

Grading Scale:

Grade	Letter Grade	GPA
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
<60	F	0.0

Due Dates and Late Policy

All course due dates are identified in the Course Schedule on HuskyCT. Deadlines are based on Eastern Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

Late submissions: Quizzes will have a 1-point per day penalty for late submissions. Drafts will have a 1-point per day penalty for late submissions. Final papers will have -10% per day for late submissions.

Weekly Time Commitment

You should expect to dedicate approximately 10.5 hours a week to this course. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut's policy regarding credit hours. More information related to hours per week per credit can be accessed at the Online Student website.

Student Authentication and Verification

The University of Connecticut is required to verify the identity of students who participate in online courses and to establish that students who register in an online course are the same students who participate in and complete the course activities and assessments and receive academic credit. Verification and authentication of student identity in this course will include:

1. Secure access to the learning management system using your unique UConn NetID and password.
2. **I will meet with each individual student using WebEx during the first two-weeks of the course.** The student will show their student ID and I will also verify this against the student admin photos or government issued ID.
3. **Additionally**, I may, over the course of the semester, request to meet virtually in WebEx to discuss your work from the course and verify your identity.

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
  - Academic Integrity
  - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

- HuskyCT/Blackboard (HuskyCT/ Blackboard Accessibility Statement, HuskyCT/ Blackboard Privacy Policy)
- Adobe Acrobat Reader (Adobe Reader Accessibility Statement, Adobe Reader Privacy Policy)
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- WebCam

For information on managing your privacy at the University of Connecticut, visit the University's Privacy page.

NOTE: This course has NOT been designed for use with mobile devices.

Help

Technical and Academic Help provides a guide to technical and academic assistance.

This course is facilitated online using both the learning management platform, HuskyCT, and the online companion to your text **Sapling Learning**. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24x7 Course Support including access to live chat, phone, and support documents. If you have issues with Sapling Learning, please contact the MacMillan Learning tech support available through the Sapling Learning website.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.

University students are expected to demonstrate competency in Computer Technology. Explore the Computer Technology Competencies page for more information..

Evaluation of Course Experience

Students will be given an opportunity to provide feedback on their course experience and instruction using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

The University of Connecticut is dedicated to supporting and enhancing teaching effectiveness and student learning using a variety of methods. The Student Evaluation of Teaching (SET) is just one tool used to help faculty enhance their teaching. The SET is used for both formative (self-improvement) and summative (evaluation) purposes.

Additional informal formative surveys and other feedback instruments may be administered within the course.

Copywrite information

My lectures, notes, handouts, and displays are protected by state common law and federal copyright law. They are my own original expression and I've recorded them prior or during my lecture in order to ensure that I obtain copyright protection. Students are authorized to take notes in my class; however, this authorization extends only to making one set of notes for your own personal use and no other use. I will inform you as to whether you are authorized to record my lectures at the beginning of each semester. If you are so authorized to record my lectures, you may not copy this recording or any other material, provide copies of either to anyone else, or make a commercial use of them without prior permission from me.

Detailed Course Schedule.

MCB 3843W-001		Research Literature in Comparative Genomics		Spring 2021	
Week	**Day**	**Date**	**Topic**	**Reading**	**Assignments**
	Monday	1/18/21	*** No Class - classes start 1/19/21 ***		-------
1	Wednesday	1/20/21	Lecture: Review - Genetics 'a refresher.'	Bolker, 2012	-------
	Friday	1/22/21	Lecture: Methods of Modern Genetics.	-------	-------
	Monday	1/25/21	Genome evolution.	Mohammadi, et al. 2009	
2	Wednesday	1/27/21	Cross species comparison fills human genome gap.	Carbone, et al. 2009	-------
	Friday	1/29/21	Lecture: Science writing, Writing review articles	-------	-------
	Monday	2/1/21	Seahorse genome.	Lin, et al. 2016	-------
3	Wednesday	2/3/21	Long-read sequencing gorilla genome.	Gordon, et al. 2016	-------
	Friday	2/5/21	**Discussion Board Initial Post 1**	-------	**Quiz 1- Material from Week's 1 & 2**
	Monday	2/8/21	Mammalian enhancer evolution.	Villar, et al. 2015	
4	Wednesday	2/10/21	Movie: What Darwin never knew.	-------	-------
	Friday	2/12/21	**Discussion Board Response 1**	-------	**Rough Draft 1 - 4 page review of any article in weeks 1-4.**
	Monday	2/15/21	Lecture: The Mobile Genome	-------	-------
5	Wednesday	2/17/21	Primate regulatory sequences from TEs.	Jacques, et al. 2013	-------
	Friday	2/19/21	Primate specfic LINE1 ORF0.	Denli, et al. 2015	**Quiz 2- Material from Week's 3 & 4**
	Monday	2/22/21	Genome instability and TE's.	Longo, et al. 2009	-------
6	Wednesday	2/24/21	Gibbon genome.	Carbone, et al. 2014	-------
	Friday	2/26/21	**Discussion Board Initial Post 2**	-------	**Final Draft 1**
	Monday	3/1/21	Expressed pseudogenes in human cancers.	Kalyana-Sundaram, et al. 2012	-------
7	Wednesday	3/3/21	TE's and genome structural variation.	Huang, et al. 2010	-------
	Friday	3/5/21	**Discussion Board Response 2**	-------	**Quiz 3- Material from Week's 5 & 6**
	Monday	3/8/21	Active TE's in the human genome.	Beck, et al. 2010	
8	Wednesday	3/10/21	Movie: The evolution of viruses.	-------	-------
	Friday	3/12/21	Lecture: Small noncoding RNAs.	-------	**Rough Draft 2 - 5 page review of any article in weeks 5-8.**
	Monday	3/15/21	TE's in cancer.	Helman, et al. 2014	
9	Wednesday	3/17/21	Reconsstitution of an ERV.	Lee, et al. 2007	
	Friday	3/19/21	**Discussion Board Initial Post 3**	Cummings, et al. 2017	**Quiz 4- Material from Week's 7 & 8**
	Monday	3/22/21	Novel Small RNAs in frog embryos.	Harding, et al. 2014	-------
10	Wednesday	3/24/21	Cross kingdom miRNA.	Zhang, et al. 2011	-------
	Friday	3/26/21	**Discussion Board Response 3**	-------	**Final Draft 2**
	Monday	3/29/21	Small RNAs, TE's and human disease.	Kaneko, et al. 2011	-------
11	Wednesday	3/31/21	Repeated functional recruitment of LTRs.	Romanish, et al. 2007	-------
	Friday	4/2/21	**Discussion Board Initial Post 4**	-------	**Quiz 5- Material from Week's 9 & 10**
	Monday	4/5/21	Structural analysis of tumor genomes.	Alaei-Mahabadi, et al. 2016	-------
12	Wednesday	4/7/21	Movie: Genetics and Genomics: Today and Tomorrow.	-------	-------
	Friday	4/9/21	Movie: Genetics and Genomics: Today and Tomorrow.	-------	**Rough Draft 3 - 6 page review of any article from weeks 8-15.**
	Monday	4/12/21	****** Spring Recess - No Class ******		
13	Wednesday	4/14/21			
	Friday	4/16/21			
	Monday	4/19/21	Resequencing Great Ape Genomes.	Kronenberg, et al. 2018	-------
14	Wednesday	4/21/21	Environment induced alle-specifc expression.	Moyerbrailean, et al. 2016	-------
	Friday	4/23/21	**Discussion Board Response 4**	-------	**Quiz 6- Material from Week's 11 & 12**
	Monday	4/26/21	Mammalian sex-biased gene expression.	Naqvi, et al. 2019	-------
15	Wednesday	4/28/21	Ancient DNA sequencing.	Fu, 2016 & Slon, 2018	-------
	Friday	4/30/21	Life is complicated.	Hayden, 2010	**Quiz 7- Material from Week's 13 & 14**
	Monday	5/3/21	**Final's Week**	-------	
	Wednesday	5/5/21	**Final Draft 3 due by end of day Wednesday 5/5/21**		**Final Draft 3**
	Friday	5/7/21			