Choreographing Genomics into Understanding

Biology 175: Fall 2021 Hybrid Class: IN PERSON, ZOOM, AND BLACKBOARD (9 ONLINE AND 6 IN PERSON SESSIONS).
https://us02web.zoom.us/my/jillbargonetti

DURING IN PERSON INSTRUCTION STUDENTS AND PROFESSOR WILL WEAR MASKS AT ALL TIMES.

THE NATURE OF THIS MOVEMENT BASED CLASS IS BEST ACHIEVED WITH SOME IN PERSON INSTRUCTION. Students need to understand how to choreograph movement in space, how to improvise in space and how to coordinate sound and images with movement to best express genome information flow. In essence students are enacting cellular processes through post-modern dance movement and spoken word. THIS CAN BE ACHIEVED BE MOVING IN DIFFERENT OUTDOOR AND INDOOR ENVIRONMENTS. WHEN WORKING TOGETHER ALL INSTUCTION WILL BE OUTDOORS. There will be a mix of in person and online instruction. IN PERSON INSTRUCTION MEETING WILL END BY 11/5. ON GOOD WEATHER DAYS A GREAT DEAL OF MOVEMENT WILL BE EXPLORED OUTDOORS. WE WILL MEET IN FRONT OF HUNTER NORTH ON GOOD WEATHER DAYS RATHER THAN HAVING STUDENTS AND THE PROFESSOR ENTER THE CAMPUS BUILDING. THIS CAN BE CHANGED SHOULD RAMP DOWN BE NEEDED.

Professor Jill Bargonetti: bargonetti@genectr.hunter.cuny.edu
Advising hours on Thursdays from 2pm to 4pm in Zoom room other time please email me.
Join Zoom Meeting https://us02web.zoom.us/my/jillbargonetti

BIOL 175 01 (88352) Choreographing Genomics occurs on Wednesdays from 9:30-12:00 and is taught AS A HYBRID CLASS DUE TO THE MOVEMENT BASIS OF THIS SCIENCE COURSE.

IF RAIN WE ARE Final Presentation will be ON FLIPGRID AND SHARED ON ZOOM.

A Scientific World 3-credit Course and can also count as Macaulay Honors credit.

A) Reading Requirements

Texts for the class:

1) **DNA: The Story of the Genetic Revolution ISBN 9780385351188**
2) **Terpsichore in Sneakers: Post-Modern Dance by Sally Banes ISBN-10: 0819561606**

B) Course Objectives and Content

This introductory biology course for non-majors studies the biological science of molecular genome information flow through readings, quantitative assignments, movement exercises and artistic lenses. Students explore a detailed examination of heredity and cancer with a focus on contributions of DNA. Students are expected to articulate gene information flow through problem solving, written assignments, oral contributions, and movement forms. Topics covered include the definition of a gene, recombination of genes, the central dogma of genetic flow in a biological system, the 1:1 Pair Rule (Chargaff's rules), DNA sequencing, functional genomics, polymerase chain reaction (PCR), and the relationships of genes to cancer and heredity, as well as ethical issues in medicine.

Each student is in charge of their own body and must recognize that they will have to use their body for assignments and in class participation work. **Students will DO MOVEMENT EXERCISES WHILE MAINTAINING SIX FEET DISTANCE AND WEARING MASKS.**

Students will be required to talk and move in class (comfortable clothes, flat shoes or bare feet, are required. A yoga mat is also recommended).

Students will have reflective assignments that include written work.

Students will be required to develop visual and movement-based models THAT WILL BE SHARED THROUGH BLACKBOARD AND ZOOM PLATFORMS.

Students will be required to have their work RECORDED for use in sharing materials.

C) A Working List of Learning Outcomes

1) Students will understand the process of scientific inquiry. They will gather and assess genetic information from valid internet resources, textbook science, current scientific layman press, artistic visuals of scientific expression and multiple viewpoints of gene-based outcomes. The Cancer Genome Atlas CTGA website will be the primary internet resource used for current genetic information.

https://www.cancer.gov/about-nci/organization/ccg/research/structural-genomics/tcga

2) Students will be able to express genetic information flow in a biological system and 1:1 Pair Rule (Chargaff's rules) through body movements. Readings for "DNA" and "Terpsichore in Sneakers" will be coordinated to increase understanding of the creative process.
3) Students will accurately use molecular biology vocabulary to describe concepts and the theoretical framework of genomics to evaluate concepts of gene information flow in health and disease.
4) Students will be able to evaluate news on gene-based evidence and arguments of disease associated genes by having a basic understanding of DNA and the central dogma of molecular biology.
5) Students will produce well-reasoned written, oral, and visual presentations on current gene studies using evidence to support conclusions about what a gene is and the structure and function of DNA.
6) Students will articulate and evaluate the impact of genomics on the contemporary world including issues of gene sequencing and expression studies for disease predisposition, as well as stem cells, reproductive cloning and therapeutic cloning.
7) Students will demonstrate how the collaborative tools and processes of biological research are similar and different from the collaborative artistic process of blending movement, music, and visual arts to understand abstract concepts in three dimensions.
8) Upon successfully completing this course students will understand the use of evidence-based science to evaluate genomic discoveries that relate to the contemporary world and will be able to creatively articulate new genomic discoveries in movement, verbal and written formats that accurately express abstract concepts in three dimensional as well as two dimensional space.

D) Assignments and Method of Evaluation

A written and quantitative mid-term examination and a final examination that is performance-and paper-based. (Worth 25 pts. each)

Homework (worth 30 points total). Six homework assignments (two problem solving, two movement assignments, and two written essays) that include gene flow problem solving for the interpretation of gene-based information for cancer formation and treatment options. Each worth 5 pts.

Class participation with evidence of preparation from 10 readings and participation IN ALL EVENTS AND SHARING. (Worth 20 pts based on attendance and participation in the 13 sessions without exams). Attendance is

part of the grade.

E) Course Sessions by weeks with associated topics:

Week 1: ONLINE BLACKBOARD 8/25: UNDERSTANDING IMPROVISATION IN THE ERA OF COVID-19S: An introduction to class with scientific overview, expectations, and initial movement assignment DNA replication.
Pre-HW#1 FLIPGRID DNA REPLICATION WITH OBJECTS and turn it in assignment describing what science and art have in common.

Continue to use these links for background.
"Contact Improvisation" Introduction to Postmodern dance.
https://www.dancespirit.com/contact-improv-2639152125.html
https://www.youtube.com/watch?v=9FeSDsmIeHA
https://www.youtube.com/watch?v=jcrbIdY3HZc
"Bodystorming"
https://www.youtube.com/watch?v=oJgwDpb0z-4&t=3s
An example of props and a discussion of using props to help show gene information flow regulators.
https://www.youtube.com/watch?v=2NnS2MhLLeU
Animated sheet music "Giant Steps" by John Coltraine
https://www.youtube.com/watch?v=2kotK9FNEYU
DNA Replication: Music and Dance
https://www.youtube.com/watch?v=qSxMeQVkFZQ
Introduction to genetics and the central dogma. Current events in cancer genomics.
http://cancergenome.nih.gov
Mitosis and Meiosis
https://www.youtube.com/watch?v=mKWxeMMFTEU

Week 2: IN PERSON 9/1: Understanding Chromosomal Independent Assortment and What Allignment in Choreography and Genetics Have in Common.
Assigned readings #1: **from "DNA" Chapter 1** From Mendel to Hitler and **from "Terpsichore"** Chapter on Steve Paxton and "Contact Improvisation".
HW#1 (Punnet Squares, Pedigrees, Sex Linkage, and gene segregation - Flipgrid assignment due before 9/22)

On your own view:
http://sciencechoreography.wesleyan.edu/dances-about-science/
Protein synthesis and the central dogma
http://www.youtube.com/watch?v=u9dhO0iCLww&feature=player_embedded

Week 3: IN PERSON 9/22: Choreopoem to Express Life and Death and Central Dogma.

Assigned readings #2 SHANGE'S CHOREOPOEM (PDF) and due **from "DNA"** Chapter 2 The Double Helix and **from "Terpisichore"** Chapter on Sources of Post-Modern Dance: The central dogma and an introduction to avant-garde, Cunningham/Cage and post-modern collaboration: movement and music/DNA and art. Assigned Shange article and spoken word call and response: Cancer and DNA-Is this life or death?

Week 4: IN PERSON 9/29: Proteins and DNA: Movement and Sound
Assigned readings #3 from "DNA" Chapters 3 Reading the Code: Bringing DNA to Life and Biotechnology and **from "Terpisichore"** Simone Forti: Dancing as if Newborn.
HW#2 due (Choreopoem for DNA Replication and CENTRAL DOGMA Flipgrid and Turnitin)- Movement/ Antiparallel movement:

Week 5: IN PERSON 10/6: Polymerase Chain Reaction and The Accumulation of Properties and Material.
Assigned readings #4 from "DNA" Chapter 7 The Human Genome: Life's Screenplay and **from "Terpisichore"** Trisha Brown: Gravity and Levity:
ACCUMULATION EXERCISE and PCR (accumulation!!!)

Week 6: ONLINE 10/13: Mutations in DNA: Tripping on the Sidewalk (how do cancer predisposition mutations change the choreography?)
Assigned readings #5 a) from "DNA" Chapter 4 Customized DNA and **b)** Scientific assigned readings on BRCA1 to and **c) from "Terpisichore"** Lucinda Childs: The Act of Seeing.
HW#3 due (Essay on Missense Mutations in the BRCA1 Gene and Consequences on the Mutant Proteins) due on turnitin

Week 7: IN PERSON 10/20: Cloning Genes and Reproducing Steps
Assigned Reading #6 from "DNA" Chapter 5 Biotechnology and **from "Terpisichore"** Meredith Monk. **What does sound mean and how does it help communicate concepts?**
Assignments 1)) TED ED lesson: I will track your work:
http://ed.ted.com/on/lM4njM6l
http://cancergenome.nih.gov/newsevents

Pick a cancer related gene (must be picked by the 21st) from one of the news highlight links and by searching through the TCGA website. I will post an assignment for your take home portion of the exam and you will have to answer the question in relation to the gene you pick. You will be developing this work as part of your final.
https://www.cancer.gov/about-nci/organization/ccg/research/structural-genomics/tcga

Week 8: ONLINE 10/27: Cancer Genes Unite The Human Family
MUST HAVE PICKED GENE FOR YOUR MIDTERM/FINAL EXAM BY THE

TIME CLASS BEGINS.
Assigned Reading #7

a. **from "DNA"Chapter 14 Cancer:War Without End?**

How Cancer Genes Associate with Tumorigenesis and the process of being touched by cancer.

b. The article by Francis Collins on Mapping the Cancer Genome.

Week 9: ONLINE 11/3: Exam 1-midterm: a portion is a take home that will be finished ON BLACKBOARD EXAM PLATFORM DURING CLASS MEETING. TURN IT IN TAKE HOME ALSO SUBMITTED ON THIS DATE.

Week 10: IN PERSON 11/10: ONCOGENES VERSUS TUMOR SUPRESSORS: FEROCIOUS BEAUTY. Structure in Motion

Gene presentations from midterm exam are shared in class. Watch before class: Genomics in the media and in performance: "Ferocious Beauty: Genome, a multi-media dance performance by the Liz Lerman.

Assigned Reading #8 from "DNA" Chapter 12 Disease Genes: Hunting and Treating Human Disease.

HW# 4 due- (DNA Sequence/ Polypeptide Amino Acid Problem for Huntington's Disease).

Week 11 ONLINE 11/17: Mapping the Human Genome. Disease Genes: Neurobiology and Cancer: Fast and Slow. Structure in Motion.

Assigned Reading #9 from "DNA" Chapter 9 Reading Genomes: Evolution in Action. **BLACKBOARD AND ZOOM MEETINGS (melding sound and movement).**

Week 12 ONLINE 11/24: Exploration of DNA sequencing; Human Gene Mapping.

HW# 5 due- (Movement and Vocals for Final works on Cancer Genes). I will have each student present their ideas for their final work on flipgrid and on turnitin. This is due by 12/1.

Assigned Reading #10 from "DNA"Chapter 14 Cancer:War Without End?

This is to be read again along with the articles that you are using for your final paper/presentation.

Week 13 ONLINE 12/1: Structure in Motion to consider the biochemistry of cancer genes and their protein products.

YOU will SHARE your work with the class from YOUR computer ON ZOOM.

HW# 6 due (essay on Cancer Gene and Choreography, Theme Movement and Sound Ideas being used in your choreography). Projects with Sound Choices. Run Through. Four scientific references from PubMed needed for the gene. https://pubmed.ncbi.nlm.nih.gov/

Use numbering to point to the references[1] (like this).

1. **This is the reference at the end of the document.**

This is due by 12/8 on turnitin.
An essay of at least two double spaced pages and no more than four double-spaced pages emailed to me. Prompts for the essay are the following. Describe the gene you have picked that associates with cancer formation. What chromosome is the gene on? What is the normal biochemical function of the protein product? Is the function altered in cancer cells? How does the protein product function in normal cells and how does it differ in cancer cells. What other gene pathways does it interact with? This will become part of your final

Week 14 ONLINE 12/8: We will be doing a flipgrid run through of the performance. Teams of Interacting Genes. How is this choreography in the cell? Exploring the interconnections for the cancer genes picked.

Week 15: ONLINE FINAL EXAM 12/15 ONLINE PERFORMANCE.
Performance begins at 10AM.
This is Exam 2- The Final Exam WILL BE A ZOOM PERFORMANCE PLATFORM and the final paper put back in turnitin. This is Performance-based works by the entire group choreography and individual student performance works. The final workshop is on 12/16.

The final paper must have a least three references. All information MUST be sited as citations in the text and then listed at the end of the paper in standard format (use the Journal *Cell (alphabetical), or Science (numbered)* as a model). **You must also turn in a written work that is no less than five double spaced pages and no more than 8 pages which expresses your ideas developed from HW#6. This should be also emailed to me anytime from 12/17 until 12/20 and submitted through turnitin. This is due as type written work that will be submitted to "turn it in" and is an explanation of the cancer-associated gene of choice (this is what you wrote for HW#6 with revisions and at least four scientific references) and the biological/social concept of the performance work. This final also incorporates the information from your midterm including the choreographic mode of inspiration. I expect you to discuss at least one of the choreographers from *Terpsichore in Sneakers or Ntosake Shange.* This concept section will describe your creative process for the work and your theme idea. This must also include the theme movement for your gene that will be used at the beginning of section two of the final workshop and how you are using the movement to express your gene. Please finish the paper with a brief statement about how the *Choreographing Genomics* class has influenced your creative process and your understanding of genomics and cancer.**

" Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of

records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures."