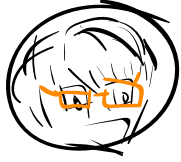


PETERSON HALL 108: TUE + THUR, 5-6:20 PM

INSTRUCTOR: DR. KATHERINE PETRIE

kpetrie@ucsd.edu



DR PETRIE OFFICE HOURS: TBA
see canvas for office hours sign-up link

IAS: Nkechinyere Iroanusi (lead IA)

Lily McCalmont Jane Huyne Kyle Tran

SEE CANVAS FOR... IA contact info
IA office hours

HOW ARE SCIENTISTS, DOCTORS, AND CONSUMERS USING BIG DATA TO UNDERSTAND HUMAN HEALTH AND THE ENVIRONMENT? WHY ARE "OMICS" TECHNOLOGIES KEY FOR UNDERSTANDING BIOLOGY IN THE 21ST CENTURY, AND HOW DO THEY WORK? WHAT SKILLS AND STRATEGIES WILL BE NEEDED TO MAKE SENSE OF THE MILLIONS OF GENOMES BEING SEQUENCED? DURING THIS COURSE WE'LL COVER ANSWERS TO THESE QUESTIONS AND MORE.

WHAT WILL YOU BE DOING IN THIS CLASS?

LECTURES: WE'LL HAVE IN-PERSON MEETINGS ON TUESDAYS AND THURSDAYS. THESE WILL BE INTERSPERSED WITH CLICKER QUESTIONS AND PEER DISCUSSION. LECTURE ATTENDANCE IS REQUIRED TO EARN PARTICIPATION POINTS, BUT LECTURES WILL ALSO BE RECORDED FOR YOUR REFERENCE.

COURSE STRUCTURE:

DISCUSSION SECTION: WILL BE HELD ON ZOOM ON MONDAYS FROM 2-2:50. (SEE CANVAS FOR ZOOM LINK). SECTION WILL START WITH A REVIEW OF QUIZ RESULTS. THEN, YOU WILL WORK WITH YOUR SMALL GROUP IN BREAKOUT ROOMS TO COMPLETE A BRIEF PROBLEM SET WORKSHEET. SECTION ATTENDANCE IS NOT REQUIRED, BUT WILL BE INCENTIVIZED WITH A SMALL AMOUNT OF EXTRA CREDIT.

ASSIGNMENTS: THERE WILL BE WEEKLY TAKE-HOME QUIZZES, AND THE WEEKLY PROBLEM SET FROM DISCUSSION SECTION.

MATERIALS NEEDED TO SUCCEED:

WHAT DO YOU NEED FOR THIS CLASS?

INTERNET ACCESS + CANVAS NOTIFICATIONS: ALL COURSE DOCUMENTS AND NOTIFICATIONS WILL BE POSTED ON CANVAS, SO BE SURE YOU HAVE CANVAS SET UP SO YOU RECEIVE CANVAS ANNOUNCEMENTS VIA EMAIL (OR BE SURE TO CHECK CANVAS ANNOUNCEMENTS REGULARLY!)

AN ICLICKER: STARTING IN WEEK 1, YOU WILL NEED A PHYSICAL ICLICKER REMOTE. THIS IS HOW WE WILL BE TAKING ATTENDANCE IN LECTURE. IF YOU DO NOT ALREADY HAVE ONE, THEY ARE ~\$59 NEW AND ~\$45 USED AT THE BOOKSTORE. THE BOOKSTORE ALSO HAS AN OPTION TO RENT ONE FOR A SINGLE QUARTER FOR ~\$27. THE MOBILE ICLICKER APP WILL NOT BE PERMITTED; THE CAMPUS WIFI IS NOT RELIABLE ENOUGH FOR IT TO WORK.

PIAZZA ACCESS: WE'LL BE USING PIAZZA AS A PLACE FOR YOU TO POST QUESTIONS. THESE ARE NOT GRADED OR REQUIRED, BUT OFTEN, MANY PEOPLE HAVE THE SAME QUESTION, SO CHECKING PIAZZA WILL BE A FASTER WAY THAN EMAIL TO GET YOUR QUESTIONS ANSWERED. THERE IS A PIAZZA LINK ON CANVAS. POSTS CAN BE LOGISTICS QUESTIONS OR QUESTION ABOUT SCIENCE CONTENT.

ASSESSMENTS AND BASIS FOR FINAL GRADE:**ASSESSMENT % OF GRADE**

LECTURE CLICKERS	15%
SECTION ACTIVITIES (WORKSHEETS)	10%
WEEKLY QUIZZES	15%
MIDTERM EXAM	25%
FINAL EXAM	35%

NO BELL CURVE:
YOU WON'T BE
COMPETING
AGAINST
EACH OTHER!

GRADING SCALE

97-100	A+	(4.0)
93-97	A	(4.0)
90-93	A-	(3.7)
87-90	B+	(3.3)
83-87	B	(3.0)
80-83	B-	(2.7)
77-80	C+	(2.3)
73-77	C	(2.0)
70-73	C-	(1.7)
60-70	D	(1.0)
<60	F	(0)

ASSIGNMENT REMINDERS
WILL BE ANNOUNCED IN
LECTURE AND VIA CANVAS
ANNOUNCEMENTS!

KEY ASSESSMENTS IN BRIEF:

CLICKERS (15% OF GRADE) - EACH LECTURE, THERE WILL BE MANY CLICKER QUESTIONS DURING CLASS. EACH DAY IS WORTH 2 POINTS, WHICH MEANS YOU NEED TO GET 2 CLICKER QUESTIONS CORRECT EACH DAY FOR FULL CREDIT. TO EARN FULL CLICKER CREDIT, WE ARE REQUIRING 28 CLICKER POINTS (2 POINTS X 14 LECTURES). SINCE WE HAVE 17 CLICKER LECTURES IN TOTAL, THIS MEANS YOU CAN FULLY MISS UP TO 3 LECTURES WITHOUT PENALTY (IN CANVAS, WE WILL DROP YOUR 3 LOWEST CLICKERS AT THE END OF THE QUARTER). WE WILL START COUNTING CLICKERS ON 10/3. IF YOU NEED TO MISS MORE THAN 3 LECTURES, PLEASE SEE THE ATTENDANCE POLICY ON THE NEXT PAGE.

WEEKLY QUIZZES (15% OF GRADE) - DUE TUESDAYS AT 4 PM

THESE QUIZZES TEST YOUR ABILITY TO APPLY WHAT YOU'VE LEARNED EACH WEEK. THEY WILL BE OPEN NOTE, BUT ONCE YOU START YOU WILL ONLY HAVE 30 MINUTES TO FINISH, SO YOU WILL NOT HAVE ENOUGH TIME TO LOOK UP EVERYTHING. YOU ARE NOT ALLOWED TO WORK WITH OTHERS OR ASK FOR HELP DURING THE QUIZ. TO DISCOURAGE COLLABORATION, QUESTIONS WILL BE PULLED FROM A BANK AND THEY WILL BE RANDOMIZED IN ORDER. YOUR LOWEST QUIZ WILL BE DROPPED. IF YOU NEED TO MISS MORE THAN 1 QUIZ, SEE THE EXTENSION SECTION ON THE NEXT PAGE.

SECTION ACTIVITY WORKSHEETS (10% OF GRADE) - DUE AT BEG. OF NEXT SECTION IN SECTION, IAS WILL REVIEW ANSWERS FROM THE MOST RECENT QUIZ, THEN, THERE WILL BE TIME TO WORK ON A WORKSHEET WITH IA SUPPORT. YOUR LOWEST WORKSHEET WILL BE DROPPED. SECTION ATTENDANCE IS NOT REQUIRED, BUT THE WORKSHEETS WILL BE EASIER IF YOU WORK IN A GROUP AND IT WILL HELP YOU PREPARE FOR THE QUIZ. SO ATTENDANCE WILL BE INCENTIVIZED. EACH SECTION YOU ATTEND YOU CAN EARN 1 'SECTION ATTENDANCE POINT', AND YOU CAN EARN UP TO 6 SECTION ATTENDANCE POINTS THROUGHOUT THE QUARTER. IF YOU EARN ALL 6, YOU WILL GET 1% EXTRA CREDIT ADDED TO YOUR OVERALL GRADE. THERE ARE NO MAKE-UPS FOR THIS EXTRA CREDIT.

EXAMS (60% OF GRADE)

EXAMS WILL BE IN PERSON + CLOSED-BOOK, AND CALCULATORS WILL NOT BE PERMITTED. YOU WILL BE ALLOWED TO BRING AN ONE-PAGE, SINGLE-SIDED 'CHEAT SHEET.'

LOGISTICS AND FAQs:

WE KNOW THAT LIFE IS COMPLICATED AND UNEXPECTED THINGS HAPPEN. WE ACCOUNT FOR THIS IN OUR ATTENDANCE + EXTENSION POLICIES, DESCRIBED BELOW.

LECTURE ATTENDANCE:

IF YOU MISS LECTURE, THERE IS NO NEED TO REACH OUT OR REQUEST APPROVAL, AS LONG AS YOU HAVEN'T MISSED MORE THAN 3 LECTURES. IF YOU HAVE GONE OVER 3 MISSED LECTURES, PLEASE REACH OUT TO DR. PETRIE TO DISCUSS YOUR OPTIONS FOR POTENTIALLY GETTING THAT DAY'S PARTICIPATION EXCUSED - GENERALLY, ANY CHRONIC CONCERNS WILL REQUIRE OFFICIAL ACCOMMODATION FROM OSD, AND ANY ACUTE OR UNEXPECTED ISSUES WILL REQUIRE VALIDATION FROM YOUR COLLEGE'S DEAN OF STUDENT AFFAIRS. UNLESS THE SITUATION IS AN EMERGENCY, YOU MUST CONTACT ME AHEAD OF TIME. PLEASE PRIORITIZE THE HEALTH OF YOURSELF AND OTHERS: IF YOU HAVE ANY COLD SYMPTOMS, TESTED POSITIVE FOR COVID, HAVE BEEN EXPOSED, OR HAVE BEEN ADVISED TO QUARANTINE, PLEASE STAY HOME! WHEN IN DOUBT - DON'T COME OUT!

EXTENSIONS:

IF YOU EXPERIENCE EXTENUATING CIRCUMSTANCES (ILLNESS, FAMILY EMERGENCIES ETC.) THAT WOULD PREVENT YOU FROM SUBMITTING WORK (QUIZZES, WORKSHEETS) ON TIME, PLEASE REACH OUT TO DR. PETRIE TO REQUEST AN EXTENSION. DOCUMENTATION (FROM OSD OR DEAN OF STUDENT AFFAIRS, AS DESCRIBED ABOVE) MAY BE REQUIRED.

WHAT IF I MISS AN EXAM?

IF YOU MISS AN EXAM, YOU MAY BE ELIGIBLE TO MAKE IT UP AT THE TRITON TESTING CENTER FOR A LIMITED AMOUNT OF TIME (UNTIL WE RELEASE THE GRADES). IF THAT TIME IS NOT SUFFICIENT, YOU MAY BE ELIGIBLE FOR AN INCOMPLETE, DEPENDING ON THE CIRCUMSTANCES.

IF HEALTH OR FAMILY EMERGENCIES RESULT IN YOU MISSING A SUBSTANTIAL AMOUNT OF COURSEWORK, YOU MAY BE ELIGIBLE FOR AN "INCOMPLETE". PER UCSD POLICY, YOU MUST BE IN GOOD STANDING BEFORE WORK IS MISSED TO BE ELIGIBLE.

WHAT IF I HAVE QUESTIONS ABOUT GRADES?

FOR QUESTIONS ABOUT WHY POINTS WERE TAKEN OFF, PLEASE CONTACT YOUR OFFICIAL IA. IF YOU THINK A GRADE MAY HAVE BEEN ASSIGNED IN ERROR OR IF YOU HAVE ANY CONCERNS, PLEASE CONTACT DR. PETRIE WITHIN 7 DAYS OF GETTING YOUR SCORE BACK.

INCLUSIVITY:

EVERYONE WILL COME TO THIS COURSE WITH DIFFERENT BACKGROUNDS, KNOWLEDGE, AND PERSPECTIVES. WE WANT TO CREATE A CLASSROOM CULTURE THAT RESPECTS AND REVELS IN THIS HUMAN DIVERSITY. IF YOU HAVE ANY CONCERNS RELATED TO INCLUSIVITY OR FEEL YOUR IDENTITIES (RACE, GENDER, SEXUALITY, RELIGION, ABILITY, ETC) ARE NOT BEING HONORED, PLEASE LET US KNOW! ACCOMMODATIONS CAN BE MADE FOR STUDENTS WITH A LETTER FROM THE OSD. FOR MORE INFORMATION ON CAMPUS + COMMUNITY RESOURCES, CHECK CANVAS.

ACADEMIC INTEGRITY:

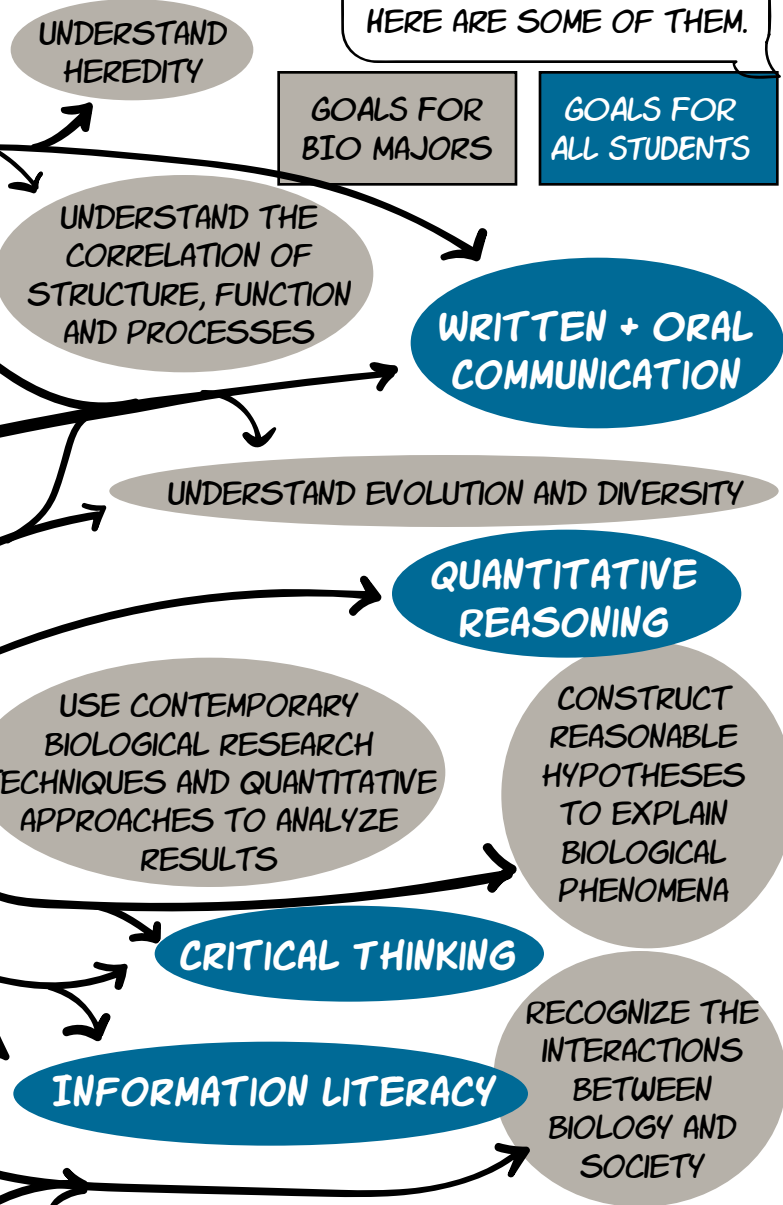
AN INCLUSIVE ENVIRONMENT IS ONE WHERE EVERYONE HAS AN EQUAL OPPORTUNITY TO SUCCEED. ACADEMIC DISHONESTY (INCLUDING, BUT NOT LIMITED TO: CHEATING + PLAGIARIZING) FRACTURES THE PLAYING FIELD BY GIVING SOME STUDENTS AN UNFAIR ADVANTAGE. ASSIGNMENTS WILL BE MONITORED VIA TURN-IT-IN, AND STUDENTS SUSPECTED OF ACADEMIC DISHONESTY WILL BE REPORTED TO THE ACADEMIC INTEGRITY OFFICE AND MAY RECEIVE A FAILING GRADE.

WHAT THIS COURSE WILL ENABLE YOU TO DO:

DID YOU KNOW UCSD HAS CORE SKILLS FOR ALL STUDENTS TO MASTER? HERE ARE SOME OF THEM.

LEARNING OUTCOMES AKA LO'S BY THE END OF THE COURSE YOU'LL BE ABLE TO:

1. EXPLAIN HOW PHENOTYPE = GENOTYPE + ENVIRONMENT + EXPRESSION
2. COMPARE AND CONTRAST EXTANT GENOMES AND CONNECT TO PHENOTYPIC DIFFERENCES
3. SUMMARIZE WAYS GENOMES CHANGE AT THE MOLECULAR LEVEL AND DISCUSS HOW EVOLUTION TAKES ADVANTAGE OF THOSE CHANGES
4. RECOGNIZE DIFFERENT LEVELS OF GENOME DIVERSITY: FROM WITHIN INDIVIDUALS TO WITHIN COMMUNITIES
5. RELATE SCALE OF GENOMES AND GENOMIC DATA TO FAMILIAR SCALES
6. SUMMARIZE OMICS TECHNOLOGIES: HOW THEY WORK AND WHAT QUESTIONS CAN THEY ANSWER
7. INTERPRET OMICS DATA TO DRAW CONCLUSIONS
8. EVALUATE MAINSTREAM MEDIA REPORTS OF OMICS DATA
9. RECOGNIZE UNKNOWNNS IN GENOMICS
10. VALUE THE POWER OF GENOMICS RESEARCH TO ANSWER BROADLY RELEVANT QUESTIONS
11. RECOGNIZE THE LEGACY OF SCIENTIFIC RACISM AND IT'S RELATIONSHIP TO MODERN GENOMICS



WHERE TO GET HELP IF YOU HAVE QUESTIONS?
PLEASE BE SURE TO WATCH EACH LECTURE. IF YOU WATCH THE RECORDING, OR IF YOU DIDN'T GET A CHANCE TO HAVE YOUR QUESTIONS ANSWERED VIA PIAZZA, YOU CAN ASK IAS DURING DISCUSSION SECTION OR OFFICE HOURS, OR YOU CAN EMAIL YOUR IA (IF YOU STILL HAVE QUESTIONS OR CONCERNS AFTER EMAILING YOUR IA, YOU CAN EMAIL THE INSTRUCTOR).

LETTERS OF RECOMMENDATION
DUE TO THE EXTREMELY HIGH VOLUME OF REQUESTS I RECEIVE, I AM ONLY ABLE TO WRITE LETTERS FOR STUDENTS WHO HAVE EARNED A'S IN TWO CLASSES WITH ME, OR WHO I HAVE WORKED WITH OUTSIDE OF ENROLLMENT AS A STUDENT IN THIS CLASS.

WEEK 0. INTRODUCTION

H - 9/28 INTRODUCTION TO GENOMES AND COURSE

INTRODUCTION
+
KEY GENOMIC
METHODS**WEEK 1. HOW DO WE SEQUENCE GENOMES?**

M - 10/2 SECTION: INTRODUCTION + PRACTICE FROM WEEK 0

T - 10/3 "QUIZ" (SURVEY) DUE 4PM

T - 10/3 OLD-SCHOOL GENOME SEQUENCING

H - 10/5 NEXT-GEN GENOME SEQUENCING 1 (ILLUMINA)

WEEK 2. HOW DO WE SEQUENCE GENOMES (CONT)?

M - 10/10 SECTION: PRACTICE QUESTIONS FROM WEEK 1

T - 10/11 QUIZ ON WEEK 0-1 DUE 4PM

T - 10/11 NEXT-GEN GENOME SEQUENCING 2 (ASSEMBLY)

H - 10/12 ANNOTATION + MEASURING DISTANCE

GENOME
DIVERSITY
IN SPACE**WEEK 3. EXTANT GENOME DIVERSITY (SPECIES)**

M - 10/16 SECTION: ANNOTATION ACTIVITY

T - 10/17 QUIZ ON WEEK 2 DUE

T - 10/17 BUILDING TREES

H - 10/19 COMPARATIVE GENOMICS

GENOME DIVERSITY
AMONG THINGS THAT
ARE ALIVE IN THE
BIOSPHERE TODAY.**WEEK 4. EXTANT GENOME DIVERSITY (POPULATIONS)**

M - 10/23 SECTION: PRACTICE TREE BUILDING QUESTIONS

T - 10/24 QUIZ ON WEEK 3 DUE

T - 10/24 HUMAN DIVERSITY: RACE, RACISM, + GENOMICS

H - 10/26 GWAS + SCIENTIFIC BIAS

WEEK 5. EXTANT GENOME DIVERSITY (POPULATIONS)

M - 10/30 SECTION: MIDTERM REVIEW

T - 10/31 QUIZ ON WEEK 4 DUE

T - 10/31 ANCESTRY V. RACE: HISTORIC LEGACY + FUTURE

H - 11/2 MIDTERM EXAM 5-6:20 PM

MIDTERM!QUIZZES ARE DUE TUESDAYS AT 4PM (QUIZZES OPEN
24 HOURS EARLIER, AT 4PM ON MONDAYS)

WEEK 6. EXTANT GENOME DIVERSITY (COMMUNITIES)

M - 11/6 SECTION: SCI COM ACTIVITY (DUE 11/20)

T - 11/7 NO QUIZ

T - 11/7 POPULATION DIVERSITY AND CONSERVATION

H - 11/8 METAGENOMES IN THE ENVIRONMENT AND HEALTH

GENOME
DIVERSITY
IN SPACE**WEEK 7. GENOME DYNAMICS OVER SHORT TIME SCALES**

M - 11/13 SECTION: REVIEW MIDTERM (CONT. WORK ON SCICOM)

T - 11/14 QUIZ ON WEEK 6 DUE

T - 11/14 PLASTIC RESPONSES AND RNA-SEQ 1

H - 11/16 PLASTIC RESPONSES AND RNA-SEQ 2

GENOME
DIVERSITY
IN TIMESHORT-TERM DYNAMICS
CHANGES IN THE
"EXPRESSED"
GENOME**WEEK 8. GENOME DYNAMICS OVER SHORT TIME SCALES**

M - 11/20 SECTION: PRACTICE QUESTIONS FROM WEEK 7

T - 11/21 QUIZ ON WEEK 7 DUE

T - 11/21 NO LECTURE - ASYNCH VIDEO + EPIGENETICS PAPER

H - 11/23 NO LECTURE - THANKSGIVING HOLIDAY!

WEEK 9. GENOME DYNAMICS OVER MEDIUM + LONG TIME SCALES

M - 11/27 SECTION: DISCUSS EPIGENETICS PAPER

T - 11/28 QUIZ ON WEEK 8 DUE (ASYNCH VIDEO)

T - 11/28 DEVELOPMENT, STEM-CELLS, DIFFERENTIATION

H - 11/30 MECH. OF GENOME EVOLUTON - DE NOVO GENES

LONG-TERM DYNAMICS:
CHANGES IN THE
GENOTYPE ITSELF**WEEK 10. GENOME DYNAMICS IN MULTICELLULAR ORGANISMS**

M - 12/4 SECTION: Q+A REVIEW FOR FINAL

T - 12/5 QUIZ ON WEEK 9 DUE

T - 12/5 EVOLUTION OF MULTICELLULARITY / EVO-DEV

H - 12/7 EVOLUTION OF CANCER + PERSONALIZED MEDICINE

FINAL!FINAL + MIDTERM WILL BE IN-PERSON. NO
CALCULATORS ARE PERMITTED, BUT YOU CAN
BRING A SINGLE-SIDED SHEET (8.5 X 11
INCHES) OF NOTES WITH YOU.**CUMULATIVE FINAL EXAM:
FRIDAY
12/15 7-10 PM**