

GALBRAITH HALL 242: TUE + THUR, 2-3:20 PM

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.

INSTRUCTOR: DR. KATHERINE PETRIE

OFFICE HOURS: kpetrie@ucsd.edu
THURSDAYS 4:30-5:30 PM (via zoom)
see canvas for office hours sign-up link



IAS:

Nkechinyere Iroanusi Shane Samarasena
James Garza Bing Xi Rowan Hayes
Daniela Babazadeh Ashley Teo Uwaysah Ali
Hanna Gewaid Peter Nameh

SEE CANVAS FOR...

IA contact info
IA discussion section assignments
IA office hours

WHAT WILL YOU BE DOING IN THIS CLASS?

LECTURES: WE'LL HAVE IN-PERSON MEETINGS ON TUESDAY AND THURSDAY. 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: IAS WILL GO OVER QUIZ RESULTS AND QUESTIONS YOU HAVE FROM LECTURE. THERE WILL ALSO BE A WORKSHEET OR SMALL HOMEWORK ASSIGNMENT. SECTION ATTENDANCE IS REQUIRED. YOU MUST ATTEND THE SECTION YOU ARE OFFICIALLY ENROLLED IN.

ASSIGNMENTS: THERE WILL BE WEEKLY TAKE-HOME QUIZZES, AND WEEKLY DISCUSSION FORUM PARTICIPATION (AS WELL AS THE WEEKLY SECTION HOMEWORK).

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: THERE IS NO REQUIRED TEXTBOOK FOR THIS COURSE, BUT YOU ARE REQUIRED TO BRING AN ICLICKER TO LECTURE AND REGISTER IT ON CANVAS. ALTERNATIVELY, YOU CAN USE THE ICLICKER STUDENT APP.

PACKBACK ACCESS CODE: THERE IS NO REQUIRED TEXTBOOK FOR THIS COURSE, BUT WE'LL BE USING THIS AI-MODERATED DISCUSSION FORUM TO DIVE DEEPER INTO THE TOPICS WE COVER IN CLASS. BY ENROLLING IN THIS CLASS, YOU ARE AUTOMATICALLY SET UP TO PURCHASE PACKBACK (~\$30), VIA INCLUSIVE ACCESS AT THE BOOKSTORE. IF YOU DROP THE COURSE, BE SURE TO OPT-OUT OF PACKBACK TO AVOID BEING CHARGED. SEE CANVAS FOR MORE INFO.

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

LECTURE CLICKERS	4%
WEEKLY PACKBACK	10%
SECTION ATTENDANCE	4%
SECTION ACTIVITIES (WORKSHEETS)	10%
WEEKLY QUIZZES	12%
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 (4% 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. YOUR LOWEST 6 CLICKERS WILL BE DROPPED (SO YOU CAN MISS UP TO 6 LECTURES).

WEEKLY PACKBACK (10% OF GRADE) - DUE MONDAYS AT 12:00 PM (NOON)

THIS AI-MODERATED DISCUSSION FORUM WILL HELP YOU MAKE CONNECTIONS BETWEEN WHAT WE LEARN IN CLASS AND THE REAL WORLD. EVERY WEEK, YOU ARE REQUIRED TO: MAKE 2 POSTS, AT LEAST 1 OF WHICH MUST BE A RESPONSE. TO EARN CREDIT, YOUR POSTS MUST MEET CERTAIN GUIDELINES. PACKBACK WILL ASSIGN A SCORE BASED ON YOUR POST'S DEPTH, CREDIBILITY, AND PRESENTATION. HIGH SCORES ARE AN OPPORTUNITY TO EARN EXTRA CREDIT. YOUR LOWEST PACKBACK WILL BE DROPPED.

WEEKLY QUIZZES (12% OF GRADE) - DUE MONDAYS AT 12:00 PM (NOON)

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.

SECTION ACTIVITY WORKSHEETS (10% OF GRADE) - DUE AT BEG. OF NEXT SECTION
IN SECTION, IAS WILL TAKE ATTENDANCE (YOU CAN MISS UP TO 2 SESSIONS), REVIEW ANSWERS FROM THE MOST RECENT QUIZ, THEN, DURING MOST DISCUSSION SECTIONS THERE WILL BE TIME TO WORK ON A BRIEF WORKSHEET WITH IA SUPPORT. YOUR LOWEST WORKSHEET WILL BE DROPPED.

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:**ATTENDANCE:**

WE KNOW THAT LIFE IS COMPLICATED AND UNEXPECTED THINGS HAPPEN. WE ACCOUNT FOR THIS IN OUR ATTENDANCE POLICY.

FOR LECTURES, WE WILL DROP YOUR LOWEST 6 CLICKER DAYS, SO YOU CAN MISS UP TO 6 LECTURES AND STILL EARN FULL CREDIT FOR LECTURE ATTENDANCE.

FOR SECTION, YOU CAN MISS UP TO 2 SECTION MEETINGS AND STILL EARN FULL CREDIT FOR SECTION ATTENDANCE.

IF SOMETHING COMES UP AND YOU NEED TO MISS MORE THAN 6 LECTURES OR MORE THAN 2 SECTIONS, OR MORE THAN 1 QUIZ, 1 PACKBACK, OR 1 WORKSHEET, EMAIL DR. PETRIE TO DISCUSS YOUR OPTIONS; GENERALLY WE CAN BE PRETTY FLEXIBLE IN THE CASE OF UNEXPECTED ILLNESS OR EMERGENCIES. YOU DO NOT NEED TO EMAIL UNLESS YOU'VE ALREADY USED UP THE NUMBER OF ALLOWED MISSES.

WHAT IF I DON'T TURN SOMETHING IN ON TIME?

GENERALLY, NO LATE WORK WILL BE ACCEPTED. THE DROPS (LISTED ABOVE) ARE DESIGNED TO TAKE CARE OF UNEXPECTED SITUATIONS/TECH ISSUES, BUT PLEASE REACH OUT TO ME IF YOU HAVE ANY EXTENUATING OR SPECIAL 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 MISS AN EXAM?

IF YOU MISS THE MIDTERM, YOUR FINAL WILL BE WORTH 60% OF YOUR GRADE. IF YOU MISS THE FINAL, YOU MAY BE ELIGIBLE FOR AN INCOMPLETE.

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

WEEK 1. HOW DO WE SEQUENCE GENOMES?

SECTION: NO SECTION WEEK 1!

T - 4/4 "QUIZ" (SURVEY) OPENS, NO PACKBACK YET

T - 4/4 INTRODUCTION TO GENOMES AND COURSE

H - 4/6 OLD-SCHOOL GENOME SEQUENCING

INTRODUCTION
+
KEY GENOMIC
METHODS**WEEK 2. HOW DO WE SEQUENCE GENOMES (CONT)?**

SECTION: PRACTICE QUESTIONS FROM WEEK 1

M - 4/10 PACKBACK, "QUIZ," + QUIZ ON WEEK 1 DUE

T - 4/11 NEXT-GEN GENOME SEQUENCING 1 (ILLUMINA)

H - 4/13 NEXT-GEN GENOME SEQUENCING 2 (ASSEMBLY)

WEEK 3. EXTANT GENOME DIVERSITY (SPECIES)

SECTION: ANNOTATION ACTIVITY

M - 4/17 PACKBACK + QUIZ ON WEEK 2 DUE

T - 4/18 MEASURING DIFFERENCES + BUILDING TREES

H - 4/20 COMPARATIVE GENOMICS

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

SECTION: PRACTICE QUESTIONS FROM WEEK 2

M - 4/24 PACKBACK + QUIZ ON WEEK 3 DUE

T - 4/25 HUMAN DIVERSITY: RACE, RACISM, + GENOMICS

H - 4/27 GWAS + SCIENTIFIC BIAS

WEEK 5. EXTANT GENOME DIVERSITY (POPULATIONS)

SECTION: ACTIVITY VARIES BY SECTION

M- 5/1 PACKBACK + QUIZ ON WEEK 4 DUE

T -5/2 ANCESTRY V. RACE: HISTORIC LEGACY + FUTURE

H -5/4 POPULATION DIVERSITY AND CONSERVATION

PACKBACKS AND QUIZZES ARE BOTH DUE MONDAYS AT
NOON (QUIZZES OPEN 24 HOURS EARLIER, AT 12PM ON
SUNDAYS, BUT YOU CAN START PACKBACKS ANYTIME
AFTER TUESDAY'S LECTURE!)

WEEK 6. EXTANT GENOME DIVERSITY (COMMUNITIES)

SECTION: NO SECTION THIS WEEK, SEE IA OFFICE HOURS

M - 5/8 NO QUIZ + NO PACKBACK

T - 5/9 MIDTERM EXAM 2-3:20 PM

H - 5/11 METAGENOMES IN THE ENVIRONMENT AND HEALTH

MIDTERM!GENOME
DIVERSITY
IN TIME**WEEK 7. GENOME DYNAMICS OVER SHORT + MEDIUM TIME SCALES**

SECTION: REVIEW ANSWERS FROM MIDTERM EXAM

M - 5/15 PACKBACK + QUIZ ON WEEK 5 (H) + 6 (H) DUE

T - 5/16 PLASTIC RESPONSES AND RNA-SEQ 1

H - 5/18 PLASTIC RESPONSES AND RNA-SEQ 2

SHORT-TERM DYNAMICS:
CHANGES IN THE
"EXPRESSED"
GENOME**WEEK 8. GENOME DYNAMICS OVER MEDIUM + LONG TIME SCALES**

SECTION: PRACTICE PROBLEMS FROM WEEK 7

M - 5/22 PACKBACK + QUIZ ON WEEK 7 DUE

T - 5/23 DEVELOPMENT AND REGULATORY CASCADES

H - 5/25 STEM-CELLS, DIFFERENTIATION

LONG-TERM DYNAMICS:
CHANGES IN THE
GENOTYPE ITSELF**WEEK 9. GENOME DYNAMICS OVER LONG TIME SCALES**

SECTION: PAPER DISCUSSION: EPIGENETICS

T - 5/30 PACKBACK + QUIZ ON WEEK 8 DUE (EXTRA DAY)

T - 5/30 MECH. OF GENOME EVOLUTION - DE NOVO GENES

H - 6/1 EVO-DEVO + ALLELE-SPECIFIC EXPRESSION

WEEK 10. GENOME DYNAMICS WITHIN A SINGLE LIFETIME

SECTION: Q+A REVIEW FOR FINAL

M - 6/5 PACKBACK + QUIZ ON WEEK 9 DUE

T - 6/6 KEY MOMENTS IN GENOME HISTORY

H - 6/8 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.**FINAL EXAM:
TUESDAY
6/13 3-6 PM**