BIOL 358

Forensic genetics: Math matters

Fall 2021

Instructor:	Rori Rohlfs (she/her)	
Email:	rrohlfs@sfsu.edu	
Student hours:	Mon 3-5pm	zoom link
Lab:	T,Th 2:00-3:15	zoom link
Class:	T,Th 3:30-4:45	zoom link

Forensic genetics: Math matters (FGMM) addresses the intersection of statistics, genetics, forensics, and public policy. You belong in this course! Our goal in FGMM is to use statistical tools to critically investigate questions in forensic genetics, identifying the connections between technical decisions and social impact.

We have no doubt that you will bring important insight to this course because of who you are as a person and the values you bring with you from your culture, family, and life experiences. We invite you to bring your whole self into our FGMM learning community. The diversity of cultural assets and personal perspectives in this class is what will make our technical and social investigations more powerful. Please be don't hesitate to come to us with your questions, concerns, challenges, confusions, victories, and requests for help. Together, we will do great things!

Course description

In FGMM, we will learn and practice the computer programming language R, as we investigate the inner workings of the statistics behind forensic genetic identification. You will progressively gain technical skills through laboratory assignments. Your skills will culminate in a collaborative computational forensic genetics research project of your own design. All the while, we will investigate the social impacts of technical statistical decisions through class discussions about articles from the popular press. Our social investigation will culminate in policy proposals to improve social outcomes tied to forensic genetics. In all of this, we will support each other and collaborate to learn from each other's experiences and perspectives.

Pre-requisites: BIOL 230 and Math 199, or consent of instructor
Course intended for: biology, chemistry, math, and computer science majors. Other majors are very welcome as diverse perspectives enrich the class.
Course credit: FGMM fulfills many biology degree requirements including

- a quantitative course requirement for general biology, CMB, microbiology, and physiology majors (as an alternative to calc II, for example)
- an upper division laboratory requirement for all majors except physiology (but check with advisor)
- an upper division elective in any biology major

Don't hesitate to check with Rori to make sure you're getting all the credit you earn for this course.

Student learning goals

While we expect students to learn a host of different things during their time in BIOL 358, we aspire for students to...

- critically evaluate forensic genetic scientific process based on empirical evidence
- apply appropriate statistical methods and reasoning to evaluate questions in forensic genetics
- articulate analytical assumptions and discern how they impact results
- develop technical policy recommendations to achieve a desired social impact
- formulate scientific questions in forensic genetics and address them using empirical evidence based approaches
- use current media to critically appraise forensic technologies and applications on technical and social levels

Course culture

This course aims to offer a joyful, meaningful, and empowering experience to every participant; we will build that rich experience together by devoting our strongest available effort to the class. You will be challenged and supported. Please be prepared to take an active, critical, patient, and generous role in your own learning and that of your classmates.

- We formulate ideas/questions from our own experience and share them in class as part of a respectful dialogue.
- We listen to understand, not to respond. This way we focus on learning, not debating.
- We change our minds! (This is how we learn)
- Students are encouraged to interrupt class with questions, especially clarifying questions.
- Students who find it difficult to speak up in class challenge themselves to speak/move up, while students who find it easy to speak up in class challenge themselves to move back to make space for others (move-up, move-back).
- To cultivate a classroom active learning environment, we will all keep our attention focused on the material. To support everyone's learning, we discourage multi-tasking with off-topic computer use.
- To support everyone's learning during class, we actively participate zoom in lab and class. This includes turning cameras on when possible, responding to zoom polls, contributing to collaborative google docs, and actively participating in breakout rooms.
- Students are encouraged to seek out additional information through resources like Stack Overflow, Wikipedia, YouTube, etc.

Accessibility

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).
If your learning experience can be improved by an accommodation, please talk to me so your needs can be met.

Getting help

Everybody needs help and can get frustrated, no matter how experienced we are. I am really excited to help you learn about forensic genetics! Please don't hesitate to visit student hours, or send a message over slack to work through challenging concepts or bounce ideas.

It may be good to think about different strategies you can use for when you are stuck, including: using Google, asking a colleague in the class, or taking a five minute walk break outside.
You yourselves are an excellent resource. I strongly encourage you to exchange contact information with each other and set up regular study group meetings.

Course rhythms

The first 9 weeks in FGMM will feature progressively more sophisticated work to interrogate forensic genetic methodology, understand how these technologies are applied, and to use computer programming answer statistical questions in forensic genetics.

Weekly rhythm

day	meetings	assignments	support
Monday			Rori's student hours
Tuesday	lab, class	lab assignment due	
Thursday	lab, class	article reading due	

The last 6 weeks in FGMM will be focused on two projects: a policy proposal, and a technical research project. These projects will be broken down into smaller components to support you create thoughtful and creative projects that you can brag about at job interviews and in your resume.

Assignments

Lab assignments

Lab reports require technical skills, creativity, and thoughtful reflection. Of the 9 lab assignments due through the semester, one grade will be dropped. Since lab assignments build on the skills practiced in previous assignments, students will have the most success when they complete each lab report on time.

Participation

Participation is based on your in-class discussions and problem solving work in solo, pair, and group activities.

Article discussions

We will discuss a forensics media article for 15-20 minutes each Thursday. A random student will be chosen to lead the discussion by providing a 1-minute synopsis of the article, posing questions to stimulate conversation, and facilitating an equitable conversation. Rori will only observe the discussion (*i.e.* not talk), but will comment afterwards.

Policy proposal

You will identify an undesirable social outcome associated with forensic genetics, and propose a policy to govern technical decisions that will improve the social outcome. Students will present their proposals to the class on 4 November.

Research project

The last 4 weeks of the semester, you will propose, carry out, and report on your own forensic genetics research project based on scientific questions you develop through the semester. The last class will culminate with a scientific poster session where students will present their work and perform peer evaluations on 9 December.

Extra credit

Help me understand pop culture! Find a <5 minute video clip from a series, movie, or newscast that illustrates an example of a concept we talk about in class. Write a paragraph (max 300 words) explaining how the concept was applied and evaluating the scientific accuracy. Full credit adds 1% to your final grade in the class. You can submit up to three through the semester.

Grading

Lab assignments	40%
Participation	20%
Policy proposal	15%
Research project	25%

Lab assignment grading: In a new experiment this semester, lab assignments will be self-graded. Your self-grading form will include a reflection on your experience of the assignment (effort, confusion, growth, aspirations, etc), as well as your self-assigned quantitative grade based on the answer key. Instructor may adjust self-assigned grades if needed.

Due dates: Assignments are due at the beginning of class on the stated day. We are learning and growing in a time of compounded crises. If you are not able to make an assignment deadline, please contact Rori to create a feasible plan. Simultaneously, you are strongly encouraged to turn

in your assignments on time as classes and assignments build on each other.

Re-grades: Answer keys and rubrics will be posted (or co-created) for all graded assignments. Upon comparing your graded assignment to the answer key or rubric, if you have concerns about the grading, turn in your assignment with an attached page explaining specifically where and how you may have been misgraded. Your assignment with regrade sheet are due one week after your receive your graded assignment.

Presentation days: Both the policy proposal presentation day and the research project presentation day are celebratory events when we will reflect on each other's work, growth, and creative accomplishments. To gain the full experience of FGMM, please plan to be prepared and present for both days. If you will miss one day for a scheduled event, talk to Rori by 2 September. If you find yourself unable to present on those days, contact Rori ASAP.

Words of wisdom from previous students

What advice would you give future students in this Forensic genetics: Math matters?

"Future students: don't be afraid to ask for help, go to office hours, email your professor and TA, make friends, do the work, you'll be fine."

"Definitely spend time reviewing how each function works and do multiple test runs of the practice sheets before tackling the lab assignments."

"Always ask your peers and your professor for help. I'm a very shy person and I can very stubborn to ask for help, but this class taught me to speak up and ask for help. I learned that I don't have to do this alone and some of my peers are willing to help too."

"Get an early start on your policy proposal and research project"

Health and safety commitments

Your health and safety are our paramount concern at SF State. We ask every member of our campus community to join a pledge to make and follow plans to keep fellow students, faculty, and staff safe and well. Feeling confident, safe and well will help you focus on your academic success. To participate in this class, all students are expected to:

- stay informed on the most up-to-date information related to SF State's COVID-19 response and Campus Comeback plan
- plan ahead for possible class disruptions due to COVID-19 or other unexpected events, such as unhealthy air quality caused by smoke
- take care of yourself and others by staying home when you aren't feeling well or believe you have been exposed to COVID-19, and

- follow all required health and safety guidelines, including verifying your proof of vaccination or exemption status before coming to class and wearing a multilayered mask over your nose and mouth at all times when indoors on campus.

For more information about SF State's response to COVID-19 and how you can keep yourself and others safe and well, visit the Campus Comeback Website. To plan for how you will maintain your academic success when unexpected events disrupt regular teaching and learning activities, follow the information on the course syllabus and consult the Keep Learning guide.

Cheating and plagiarism

I highly encourage you to work in groups and collaborate for this course. However, I expect all written assignments to be your own work (*i.e.* write it up solo). Any cheating or plagiarism (defined as either 1) direct copying or loose paraphrasing of text or code from a published work or from an online source without appropriate referencing, or 2) use of another student's work or ideas without appropriate attribution) will result in zero grades for all parties.

Student disclosures of sexual violence

SF State fosters a campus free of sexual violence including sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. If you disclose a personal experience as an SF State student, the course instructor is required to notify the Title IX Coordinator by completing the report form available at http://titleix.sfsu.edu, emailing vpsaem@sfsu.edu or calling 338-2032. To disclose any such violence confidentially, contact:

- The SAFE Place - (415) 338-2208; http://www.sfsu.edu/ safe_plc/
- Counseling and Psychological Services Center - (415) 338-2208; http://psyservs.sfsu.edu/
- For more information on your rights and available resources: [http://titleix.sfsu.edu]

Food and Housing Insecurity and Support

Students experiencing economic hardships resulting in food insecurity, housing insecurity, or homelessness are encouraged to reach out to us or other faculty and staff members. SFSU has programs and resources in place to provide support with housing, food and other emergencies. In particular Food+Shelter+Success. Please reach out to us. We are eager to support all of you!

Academic calendar policy

The Academic Calendar can be found at https://webapps.sfsu.edu/public/webcal/acadcalendar. Faculty are required to provide the equivalent of 15 weeks of instruction. Final examinations are not part of the 15 weeks of instruction and cannot be given the last week of instruction. Use of the finals period by faculty is optional and can be used to replace lost time due to holidays, class cancelation by faculty, unexpected campus closures or fire alarm if not being used for final examinations. Please see the Academic Senate website at http://senate.sfsu.edu for more information on Senate policies.

Accommodating religious holidays

The faculty of San Francisco State University shall make reasonable accommodations for students to observe religious holidays when such observances require students to be absent from class activities. It is the responsibility of the student to inform the instructors, in writing, about such holidays during the first two weeks of the class each semester. If such holidays occur during the first two weeks of the semester, the student must notify the instructor, in writing, at least three days before the date that he/ she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. (SFSU Policy F00-212)

Drop and withdrawal dates

13 September: Last day to add/drop classes. As a courtesy, please notify the instructor that you are dropping.
16 November: Students may withdrawal from a class in the case serious and compelling reasons with approval from the Instructor and Department Chair.
10 December: Students may withdrawal from a class in exceptional verified cases of accidents or serious illnesses with approval from the Instructor, Department Chair, and Associate Dean. Ordinarily, withdrawals in this category involve a total withdrawal from the University.