



Spring 2022
Dr. Christal Sohl

CHEM 362: Confronting Cancer

Tues/Thurs
11:00am-12:15pm
PG 242

Weekly help hours:
Thurs 1-2pm, via Zoom

We will explore humankind's efforts to understand, diagnose, and treat cancer. I designed this class in the spirit of a math class that teaches you how to do your taxes and make a budget – I will provide you with useful tools to understand the complexity of cancer that will allow you to help your family and communities. You will engage in discussion about the successes and limitations of treatments, practice helping someone navigate a diagnosis, critically research treatments, advocate to reduce cancer disparities, and discuss reasons for hope in our efforts to cure cancer. This class is intended for science enthusiasts, but not necessarily science majors, though science majors are welcome.

Required course materials

Access to canvas during class (via a tablet or laptop) for quizzes and groupwork is required. You will need to obtain [The Immortal Life of Henrietta Lacks, Unabridged edition](#), by Rebecca Skloot, ISBN: 979-81400052189 (electronic or paper). To keep everyone engaged in class discussion, we will often use Poll Everywhere. This allows students to text responses for free during class.

About Dr. Sohl (she/her)

I study how proteins work – and how they run amok in cancer. My lab, made up of curious, kind, and hard-working undergraduate, graduate student, & postdoctoral scientists, works on the biochemical features of metabolic enzymes and polymerases that drive tumor growth. One of my favorite parts of my job as a professor is facilitating learning and discovery in the lab and in the classroom. I am grateful for the unique and diverse perspectives and expertise of my student colleagues!

When not teaching or in the lab, I enjoy hiking and traveling with my partner, Hans, and early-morning workouts, reading, and pretending that having backyard barn owls that barf up digested rodents all over the yard is almost as fun as having a dog.

When you need to contact me, use the messaging system in Canvas (preferred) or email me at csohl@sdsu.edu (I usually respond within 2 business days) or attend weekly zoom help hours on Thursdays from 1-2pm.

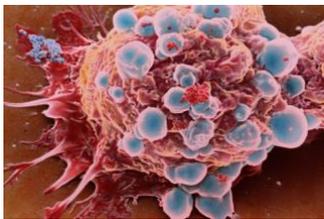
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*It is hard to look at
the tumor and not
come away with the
feeling that one has
encountered a
powerful monster in
its infancy –*

Siddhartha
Mukherjee, Emperor
of All Maladies



Metastatic breast cancer cell, Memorial Sloan Kettering Cancer Center.

Fast Facts on Course Structure and Features

- **This is a mostly flipped class, so attendance is required**
Though a lot of lecture content is delivered online, and will discuss, debate, design, practice, explore, and take short quizzes during class. We are also still in a pandemic...so if you are not feeling well or suspect Covid-19 infection, please stay home from class and instead attend and participate via zoom. I will have zoom running every class period, but you need to message me before class so I can ensure you can participate in the in-class quizzes and groupwork. If you are feeling too ill to participate via zoom, contact me ASAP and see the below absence policy. I am happy to work with you, but you must contact me ahead of time so we can work out a solution; otherwise, you might not be able to make up points.
- **Active participation in this class is critical**
I want you to participate fully in groupwork assignments, and to engage in class discussion and debate by contributing your ideas, perspectives, and questions. Every member of this class is vital – you bring a unique and valued set of ideas, experiences, expertise, and perspectives from which we all can learn and benefit.
- **I am committed to creating a supportive, safe, and multiculturally affirming environment for everyone**
You all belong in this class, and we are grateful to benefit from your perspectives, experiences, and expertise. We will create a safe environment that everyone can respectfully contribute their thoughts and questions.
- **This is an Explorations in General Education course**
Courses that fulfill the requirement for Explorations in General Education take your skills to a higher level with more interdisciplinary and complex concepts and activities. More reading, writing, and complex analysis should be expected.
- **We cover many disciplines, so there will be something for everyone**
We will explore cancer from a scientific, medical, ethical, political, and social lens.
- **Please contact me immediately if you foresee or are experiencing challenges that threaten your success in this class**
You and I are on the same team – we both want you to be successful in this class and in your educational career. Let's work on solutions to keep you on track.

Course Student Learning Outcomes (SLOs)

- | | |
|---|--|
| 1. Think critically and argue/defend a point. | 7. Debate some of today's salient issues, like genetic testing and gene patenting. |
| 2. Connect scientific concepts to your life and the world around you. | 8. Describe the path a drug takes from conceptualization through FDA approval. |
| 3. Discuss and relay scientific information to wider audiences. | 9. Learn about the social, societal, and personal implications of a cancer diagnosis, and practice advocating for patients at risk for disparate treatment |
| 4. Define the basic molecular and cellular features of cancer, and how this disease develops and advances. | 10. Debate features of effective and ethical drug company and clinical trial. |
| 5. Describe how cancer treatments and diagnostics can turn cancer's superpowers into Achilles' heels. | 11. Research and present topics on cutting-edge discoveries in cancer research. |
| 6. Practice researching a diagnosis, oncology reports, and treatment strategies while critically assessing knowledge sources. | 12. Learn about the diverse cancer researchers committed to combatting this complex disease |

Assignments Details

 Why? To gain the knowledge to participate in class activities & discussion!

 Why? To tackle real-life scientific problems with your student colleagues!

 Why? To research and teach your peers about cutting-edge advances in cancer!

 Why? To connect content to your life!

 Why? To learn how medicine, science, ethics, racism, business, and politics collide in a compelling, tragic, and inspiring true story!

 Why? To practice your knowledge and help motivate you to hang out with us in class ('cause you'll learn a lot!)

Online embedded lecture quizzes: You'll view lectures prior to class and take the embedded quiz. I want you to be comfortable with the material and learn at your own pace, so you can take these quizzes as many times as you like within the allotted time window, and only the highest score is retained. This is an individual (not group) assignment. Details are on canvas. SLO #1, 2, 4, 5, 8, 9, 10, 12. *Due by the dates listed in the calendar below.*

Group assignments: You will have the opportunity to apply the ideas and content presented in class and online lectures in small teams. Please make sure you come prepared for groupwork by watching the required online lectures. More details are on canvas. SLO #1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12. *Due by the end of the class period as listed in the calendar below.*

Group video presentation: Your group will design, develop, and film a 10 minute video in the style of a podcast, documentary, newscast, or play on new breakthroughs in cancer treatment or cancer diagnostics. You can bring in your own expertise and interests as well as apply the concepts discussed in class. More details are on canvas. SLO #1, 2, 3, 4, 5, 11. *Video due May 5 at the end of class, reviews due May 10 @ 11:59 pm*

Reflections: In three different reflections, you will be asked to reflect on ways in which what you've learned applies to your own lives, interests, hobbies, etc. It has been shown that assignments that give you the freedom to put material within your own greater purpose and relevance boost motivation and interest. This is an individual (versus group) assignment. More details are on canvas. SLO #1, 2. *Due by the dates listed in the calendar below.*

Reading reactions: You will read "The Immortal Life of Henrietta Lacks" and discuss your thoughts on the intersection of science, medicine, race, and ethics. You may choose either an electronic or paper copy of this book. You will document your reactions to every chapter throughout the semester. This is an individual (versus group) assignment. More details are on canvas. SLO #1, 2, 4, 7, 9, 10. *Dates are suggested below to keep you on track; all reactions due May 1 @ 11:59 pm.*

In class quizzes: There will be short quizzes (3 questions) related to recent material for most class periods, and you must be in class to take the quiz (see absence policy/Covid accommodations). They are open note, and you get two tries (highest score kept) There are no makeups, but the lowest three scores are dropped. You will need access to canvas to take these quizzes, so bring your tablets/laptops and make sure you come to class! ☺ This is an individual (versus group) assignment. More details are on canvas. SLO #1, 2, 4, 5, 8, 9, 10, 12. *Dates listed in the calendar below.*

Grading and Points Information

All assignments turned in late will lose 15 percentage points per day – don't wait until the last minute! See pg. 7 for absence policy details. Subject to change.

Online embedded lecture quizzes: 90 points (10 points per lecture, 9 lectures total)

Group assignments: 240 points (40 points per assignment, 6 assignments total)

Group video presentation: 170 points (70 points as a group and 100 individual points)

Reflections: 60 points (20 points per reflection, 3 reflections total).

Reading reactions: 76 points (2 points per chapter, 38 chapters total).

In class quizzes: 84 points (6 points per quiz, 17 quizzes total, lowest 3 grades dropped)

Extra credit: up to 20 points (10 points per extra video review, 2 extra reviews max)

The following tentative schedule provides the topics, readings, and important dates.
Dates/content subject to change, look for Canvas announcements describing any changes!

Date	In class activities	Suggested reading timeline
Module 1: How does cancer work?		
1/20	Discussion #1: What is cancer?	
Deadline of 1/23 @11:59 pm to watch Online Lecture #1: Class layout/details		
1/25	Discussion #2: A few biology basics; Quiz 1	Chapters 1,2 reading responses
1/27	Discussion #3: Genetics and cancer; Quiz 2	Chapter 3 reading responses
Deadline of 1/30 @ 11:59 pm to complete Reflection #1		
Deadline of 1/30 @ 11:59 pm to watch Online Lecture #2: Basic cancer terminology		
2/1	Assignment #1: Normal cells vs cancer cells (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapters 4,5 reading responses
2/3	Discussion #4: Analyzing the complexity of a tumor; Quiz 3	Chapter 6 reading responses
2/8	Discussion #5: Responsibly researching a diagnosis; Quiz 4	Chapters 7, 8 reading responses
2/10	Assignment #2: Helping a friend (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapter 9 reading responses
Module 2: Historic and modern cancer treatments		
Deadline of 2/13 @ 11:59 pm to watch Online Lecture #3 – Traditional cancer treatments		
2/15	Discussion #6: The story of Iressa; Quiz 5	Chapters 10,11 reading responses
2/17	Discussion #7: Precision medicine; Quiz 6	Chapter 12 reading responses
Deadline of 2/20 @ 11:59 pm to watch Online Lecture #4 – Cancer diagnostics and heredity testing		
2/22	Assignment #3: Should I get genotyped? (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapters 13,14 reading responses
2/24	Discussion #8: Cancer treatment types: benefits and risks; Quiz 7	Chapter 15 reading responses
Deadline of 2/27 @ 11:59 pm to watch Online Lecture #5 – Immuno-oncology		
3/1	Assignment #4: Diagnose your patient (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapters 16,17 reading responses
3/3	Film: The Emperor of All Maladies, Episode 1: Magic Bullets; Quiz 8	Chapter 18 reading responses
Deadline of 3/6 @ 11:59 pm to watch Online Lecture #6 – What is the process of drug discovery/development? (Prep for Module 3!)		
3/8	Film: The Emperor of All Maladies, Episode 1: Magic Bullets, cont., Quiz 9, in-class discussion	Chapters 19,20 reading responses
Module 3: Science and ethics of testing cancer treatments		
3/10	Discussion #9: Point/counterpoint on drug companies; Quiz 10	Chapter 21 reading responses
Deadline of 3/13 @ 11:59 pm to watch Online Lecture #7 – How is a drug tested before it goes into patients?		
3/15	Discussion #10: What are clinical trials?; Quiz 11	Chapters 22, 23 reading responses

3/17	Assignment #5: Design an ethical clinical trial (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapter 24 reading responses
Deadline of 3/20 @ 11:59 pm to complete Reflection #2		
3/22	Discussion #11: How can I assess scientific research/read a scientific paper?, Quiz 12	Chapters 25, 26 reading responses
3/24	Discussion #11, cont.: How can I assess scientific research/read a scientific paper?, Quiz 13	Chapter 27 reading responses
<i>Cesar Chavez Day/Spring Break 3/28-4/1...no class! Have fun, be safe!</i>		
Module 4: Societal, cultural, political, and personal implications of cancer		
4/5	Film: "A Journey Through Breast Cancer"; Quiz 14 <i>If you missed the class viewing of the film, you must watch it here: https://www.kpbs.org/news/2020/oct/06/journey-through-breast-cancer/ before 4/7</i>	Chapters 28,29 reading responses
4/7	Discussion #12: Film response and discussion; Quiz 15	Chapter 30 reading responses
Deadline of 4/10 @ 11:59 pm to watch Online Lecture #8 – Racial, socioeconomic, and geographic cancer disparities		
4/12	Discussion #13: The complexities of cancer disparities; Quiz 16	Chapters 31,32 reading responses
4/14	Discussion #14: HPV vaccines: a homerun and a controversy; Quiz 17	Chapter 33 reading responses
Deadline of 4/17 @ 11:59 pm to watch Online Lecture #9 – Who are scientists and what motivates them?		
4/19	Assignment 6: Cancer researchers that inspire us (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	Chapters 34,35 reading responses
Module 5: Reasons for hope		
4/21	Work on group video presentation <i>Bring a laptop/tablet to class if possible</i>	Chapter 36 reading responses
4/26	Work on group video presentation <i>Bring a laptop/tablet to class if possible</i>	Chapter 37 reading responses
4/28	Work on group video presentation <i>Bring a laptop/tablet to class if possible</i>	Chapter 38 reading responses
Deadline of 5/1 @ 11:59 pm to submit semester-long reading journal responses		
5/3	Work on group video presentation <i>Bring a laptop/tablet to class if possible</i>	
5/5	Work on group video presentation (due at the end of class!) <i>Bring a laptop/tablet to class if possible</i>	
<i>5/5 is the last day of class; there is no final exam</i>		
Deadline of 5/6 @ 11:59 pm to complete Reflection #3		
Deadline of 5/10 @ 11:59 pm to review videos, including extra credit reviews		

*Information in this syllabus, including the calendar, content, and grading scheme, is subject to change.
Changes will be reported and described in Canvas announcements.*

Diversity and Inclusion Commitment

Effort and persistence in this course matters, and it is through these things, not innate ability, that define our ability to grow and learn. I look forward to joining you in your journey of learning!

Land Acknowledgment

For millennia, the Kumeyaay people have been a part of this land. This land has nourished, healed, protected and embraced them for many generations in a relationship of balance and harmony. As members of the SDSU community, we acknowledge this legacy. We promote this balance and harmony. We find inspiration from this land, the land of the Kumeyaay.

Equality/Equity Statement

I am firmly committed to diversity, creating and maintaining an inclusive community, and equality and equity in all areas of campus life, including specifically members of minoritized and historically excluded communities. In this class I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, and to explicitly call out and stop harassment or discrimination of any kind.

Safe Zone Statement

I am part of the Safe Zone Ally community network of trained SDSU faculty/staff/students who are available to listen and support you in a safe and confidential manner. As a Safe Zone Ally, I can help you connect with resources on campus to address concerns you may face that interfere with your academic and social success on campus as it relates to issues surrounding sexual orientation/gender identity. My goal is to help you be successful and to maintain a safe and equitable campus.

Undocumented & Mixed Status Inclusivity Statement

I and SDSU in general value diversity and are committed to creating and maintaining an inclusive community, which includes members of the Undocumented and Mixed Immigration status community. I will work towards promoting an anti-discriminatory environment, which may be direct or indirect that take place in the class, at the institution and on a personal level. I will treat your disclosure with the utmost confidentiality permitted and value your trust. I will work with you on a one-to-one basis should you encounter barriers to your academic and developmental success.

Preferred Name & Gender Pronouns

My preferred gender pronouns are she/her/hers. Class rosters are provided to me with only your legal name, and I will gladly honor your request to address you by an alternate name and/or gender pronoun. Please let me know so I may update my records.

Safe Learning Environments

As an instructor, one of my responsibilities is to help create a safe learning environment on campus. I am required to share information regarding sexual violence on SDSU's campus with the [Title IX](#) coordinator, Gail Mendez (619-594-6464), who will contact you to let you know about SDSU support services and possibilities for holding accountable the person who harmed you. If you do not want the Title IX Officer notified, you can speak confidentially SDSU's Sexual Violence Victim Advocate (619-594-0210) or Counseling and Psychological Services (619-594-5220, psycserv@sdsu.edu).



<http://content.time.com/time/covers/0,16641,20010528,00.htm>

Additional Course Details

“All sorts of things can happen when you’re open to new ideas and playing around with things.” –
Stephanie Kwolek,
chemist

Prerequisites

Any 100-level general science course. Non-science majors and science majors welcome.

Expectations

I expect you to attend class and participate actively in learning, and to help provide a positive and safe space for learning by being respectful to your colleagues and I. The [Student Conduct Code](#) prohibits conduct disruptive to instruction, including academic dishonesty and the unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.

Attendance and absences

Students are instructed to contact me in the event they need to miss class, etc. due to an illness, injury or emergency. All decisions about the impact of an absence, as well as any arrangements for making up work, rest with the course instructor (me), but I am committed to a fair and reasonable outcome provided you communicate the absence the timeframes described below. When a student is hospitalized or has a serious, ongoing illness or injury, [Student Health Services](#) (SHS) will, at the student's request and consent, communicate with the student's instructors and may communicate with the student's Assistant Dean. Class attendance is mandatory as this is a “flipped” class with most of your points coming from in-class activities. **If you have a medical or other emergency preventing you from completing assignments on time, contact me via canvas or at csohl@sdsu.edu as soon as possible so we can figure out a strategy for success in this class.** This includes Covid-19 infection or feared Covid-19 infection. If you are well enough to participate in class, alert me that you will be attending and participating via zoom for that day (Meeting ID: 897 8144 9123 Passcode: 376413). This zoom option is being offered to provide flexibility during the pandemic as this is an attendance-required course. If it is a known/planned absence, contact me at least one week before the missed day to arrange a makeup strategy. If it was unexpected/emergency absence, contact me no later than two days after the missed deadline/class period to arrange a makeup strategy. If you miss a groupwork day, you will be able to complete the assignment on your own only if you have previously arranged this with me. Students that don't reach out to me to arrange makeups will lose 15 percentage points each day after the deadline for this graded item, with a 0% issued after 1 week. There is no make-up possible for the video presentation or for the in class quizzes. **In sum, when you have an upcoming or recent absence, email me ASAP so we can find a solution – I can't help if I don't know, and if too much time passes, solutions may be very limited.**

Religious observances

By the end of the 1st week of class, notify me of any planned absences for religious observances, and then we can work together to reasonably accommodate students.

Students with disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to [contact the Student Ability Success Center](#) (SASC) at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from SASC. Your cooperation is appreciated and to your benefit.



<https://singularityhub.com/>

Additional Course Details, cont.

*“But maybe I’ll
come back as some
HeLa cells like my
mother, that way we
can do good
together out there
in the world” – The
Immortal Life of
Henrietta Lacks*

Mental Health and Wellness

I see and interact with you as bright, creative, and hard-working students in my class. However, I know that sometimes life's circumstances can be intense, and as a result, you may have a hard time prioritizing coursework due to mental health, economic stability, or other challenges. You're not alone -- we all experience periods at some point in our lives where circumstances demand too much of our mental resources. It is really tempting to disengage during these times, and not let anyone know you need help -- but please resist this temptation! It takes courage to reach out for help, and I and others on campus are here to help -- and we want to. This is because we know how much potential you have, and we want to empower you to ensure you can achieve anything you want! I've included a list of resources on Canvas if you find you're grappling with things beyond the classroom (if it's course content...just ask me for help during class or request help hours!) You can also reach out to me, and I will help you connect to services you need. To prepare myself to better guide you to resources, I have trained to be an Adult Mental Health First Aid (MHFA) and Economic Crisis Response Team (ECRT) advocate. I'd be happy and honored to help you find help -- I've done so for students in the past, and know I will for years to come.

- [Counseling and Psychological Services](#) offers confidential counseling services by licensed therapists. Students can talk with a therapist by calling (619) 594-5220 between 4:00pm and 4:00pm. For after-hours services, students can call the San Diego Access and Crisis Line 24-hours a day at (888) 724-7240.
- [ECRT](#): If you or a friend are experiencing food or housing insecurity, or any unforeseen financial crisis, visit sdsu.edu/ecrt or email ecrt@sdsu.edu

Campus Safety

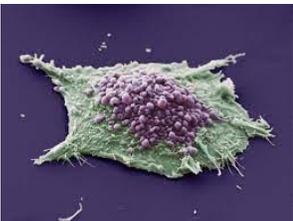
To be prepared for emergencies, each student is responsible for becoming familiar with the evacuation plan specific to each classroom. The evacuation plan is posted within each classroom and should be examined on the first day of class. Campus police can be reached by dialing (619) 594-1991 or call 911 in the event of an emergency.

Student privacy and intellectual property

The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will use Blackboard to communicate with you, and I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

Pandemic-related requirements

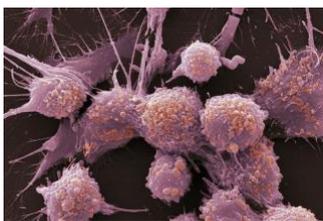
Compliance with [CSU / SDSU vaccination and facial covering policies](#) is required at all times. Please refrain from eating or drinking during class so that you may keep your mask on. If you need to step out briefly to quickly eat or drink, you are free to do so without asking my permission. If you are attending via zoom, I will never require you to have your video on, though you may need to periodically share your screen.



Lung cancer cell,
Wellcome Collection.

“Down to their innate molecular core, cancer cells are hyperactive, survival-endowed, scrappy, fecund, inventive copies of ourselves.” –

Siddhartha Mukherjee, *The Emperor of all Maladies*



Prostate cancer cell,
Memorial Sloan Kettering
Cancer Center

Additional Course Details, cont.

Statement on Academic Honesty

Students agree that by taking this class they will uphold the principles of academic integrity. Academic integrity is one of the fundamental principles of a university community. San Diego State University expects the highest standards of academic honesty from all students. Cheating and plagiarism represent violations of academic integrity and will not be tolerated in this class. San Diego State University defines [cheating and plagiarism](#) to include: (1) unauthorized assistance on an examination, (2) falsification or invention of data, (3) unauthorized collaboration on an academic exercise, (4) submitting work, either in part or in whole, completed by another as one's own, (5) misappropriation of research materials, (6) unauthorized access of an instructor's files or computer account, and (7) any other serious violation of academic integrity as established by the instructor. For this class specifically, cheating can include plagiarizing/copying answers from others or from online or other resources for assignments. Instead, work individually unless it is specified groupwork, and make sure your assignments represent your own thoughts and ideas, with guidance from what you've learned in class. Your writing must be in your own words. If you have questions, consult the [policy](#) (<http://www.sa.sdsu.edu/srr/conduct1.html>). Cheating can derail your bright future – it's never worth it. If you feel overwhelmed, please make an appointment with me. If you cheat, you will receive a 0 on that assignment and will be referred to the University for disciplinary measures. A second instance of academic dishonesty results in an F in the course. Please [click here](#) to read the University policy.

Student Concerns, Problems, and Complaints

If there are ever issues with the conduct of this course, including lectures, assignments, quizzes, etc., please see me immediately so we can work together to address your concerns. If we cannot resolve it, you must follow the appropriate [procedures for registering a complaint](#). Speak first to me, and if no resolution has been reached, contact Chemistry Dept. Chair, Dr. Andy Cooksey (acooksy@sdsu.edu). If you are still not satisfied, contact the Assistant Dean for Student Affairs Dr. Estralita Martin (esmartin@mail.sdsu.edu). If still no resolution is met, you may contact the University Ombudsman. Students must exhaust informal levels of redress before filing a formal grievance with the [Student Grievance Committee](#).