



TEXAS A&M UNIVERSITY
SAN ANTONIO

Texas A&M University – San Antonio
Department of Natural Sciences

BIOLOGY 5309, Section 001

Advanced Topics in Cellular and Molecular Biology (3 credit hours)

Fall 2025, T (Asynchronous), R (In Person): 7:00 – 8:15 p.m., STB 105

Contact Information: Dr. Liz Borda and Dr. Chris Mares (organizing instructors)

Email: eborda@tamusa.edu or Chris.Mares@tamusa.edu

Tel: 210-784-2811 (Borda); 210-784-2265 (Mares)

Office Hours: Our offices are located in the Science and Technology Building (STB).

Borda (STB 311P): Thursdays 5-6 pm (Zoom or in Person)

Mares (STB 311F): Monday 9 am-10:30 am; Tuesday and Wednesday 9 am-1 pm;
Thursday 11-1 pm.

You may also email either one of us to set up an appointment time.

Zoom Link (Tuesdays): <https://tamusa.zoom.us/j/84110279320>

Course Description: This advanced graduate-level course provides an in-depth and integrative exploration of modern cell and molecular biology, structured around two complementary modules—one focused on cellular and immunological mechanisms, and the other on evolutionary and genomic perspectives. Designed for students with a solid foundation in biological sciences, the course examines topics including cell signaling, immune system regulation, gene expression, molecular evolution, and the development and diversification of cellular systems across organisms.

Learning Objectives and Course Format: Throughout the semester, students will critically evaluate primary literature, connect molecular mechanisms to organismal processes, and explore cutting-edge research through a series of faculty presentations in microbiology, plant cell and developmental biology, and population genomics. Emphasis is placed on synthesizing core concepts across disciplines, understanding the molecular basis of adaptation and disease, and applying current research methods to biological questions. Assignments are designed to strengthen scientific communication, analytical thinking, and interdisciplinary integration. The course format will include weekly lectures, discussions, and integrated faculty research presentations.

Course Requirements:

Attendance: This will be a hybrid course. On Tuesday, the class will be held asynchronously via zoom. The Thursday class will either meet in person, online, or may also meet asynchronously. This allows a real time interaction between the faculty member and the graduate students. The mode of instruction will be up to the professor and may fluctuate from class to class.

There is no textbook requirement for this course; however, faculty may require you to read scientific (usually primary) literature to prepare for a presentation or discussion concerning original research. Each faculty member will provide the class with any required reading materials a week in advance of when it needed (typically posted to BB).

Course Grading: Course grades will be based on the following scale: >90% = A, >80% = B, >70% = C, etc.) and based on the following course Assignments.

- Module 1 Writing (Immune Case Study): **20%**
- Module 2 Writing (Evolutionary Synthesis): **20%**
- Faculty Talk Reflections (4 total): **15%**
- Mini Topic Presentations: **5%**
- Final Paper (integrative review): **30%**
- Participation & Presentation: **10%**

Assignments:

Module 1 Writing Assignment: Immune Case Study: Select a specific immunological condition (e.g., autoimmune disease, hypersensitivity, vaccine response, or immune evasion by pathogens) and analyze the underlying cellular and molecular mechanisms. The paper should incorporate recent primary literature and connect course topics such as cytokine signaling, antigen presentation, or immune cell differentiation. Format: 4–5 pages, double-spaced.

Module 2 Writing Assignment: Evolutionary Synthesis: Write a synthesis paper on a topic related to molecular or cellular evolution (e.g., endosymbiosis, molecular clocks, convergence in gene regulatory networks, or evo-devo). Students must compare at least two taxonomic systems or developmental strategies and highlight evolutionary innovations or constraints. Format: 4–5 pages, double-spaced.

Faculty Talk Reflections: Write a concise reflection after attending each of the three guest faculty research presentations. Each reflection should summarize the research presented, highlight how it relates to themes in the course, and pose one thoughtful question or critique.

Mini-Topic Presentations: Students will be assigned focused topics (selected by the visiting faculty). Each student will research their topic and deliver a 5-minute presentation to the class.

Final Paper: Integrative Review: Students will select a topic that bridges Modules 1 and 2 and integrates one or more faculty research presentations. The review should synthesize knowledge from cellular/molecular mechanisms, evolutionary frameworks, and current research trends. Example topics include: the evolution of immune system complexity, host-microbiome coevolution at the molecular level, or developmental pathways in immune cell lineages.

Table 1. Teaching Schedule for BIOL 5309 (Fall 2025).

Name	Dates
Chris Mares, Ph.D.	08/26-09/25
David Smyth, Ph.D.	09/30-10/02
Elizabeth Borda, Ph.D.	10/07-10/23
Utpal Smart, Ph.D.	10/28-10/30
Elizabeth Borda, Ph.D.	11/04-11/13
Thiya Mukherjee, Ph.D.	11/18-11/20
Borda and Mares	11/25, 12/2, 12/4

Participation & Presentation: Students are expected to actively engage in class discussions, deliver three brief (~5-10 min) in-class presentation on a selected topic, and provide constructive peer feedback. This component supports collaborative learning, strengthens oral communication skills, and fosters scholarly dialogue. Evaluation is based on the quality of contributions, clarity of presentation and writing assignments, and engagement with peers.

Other Policies:

Academic integrity is expected of all students at all times (see current Texas A&M University – San Antonio academic catalog).

Attitude and perseverance are everything! Have a great attitude! We are also willing to write letters of recommendation for students with great attitudes. Performance is more than just about grades. No one wants to work with someone with a bad attitude, not even one with great technical ability.

IMPORTANT POLICIES AND RESOURCES

Academic Accommodations for Individuals with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us <https://www.tamusa.edu/Disability-Support-Services/index.html> or email us at dss@tamusa.edu. Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services as soon as possible.

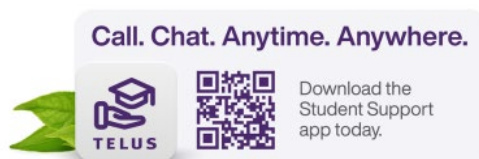
Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202.

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, call 210-784-1331 or visit Madla 120.

All mental health services provided by the SCC are **free and confidential** (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information on SCC services visit <http://tamusa.edu/studentcounseling>

Crisis support is available 24/7 by calling the SCC at 210-784-1331.

Additionally, the TELUS Student Support App provides a variety of mental health resources to including support for in the moment distress, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.



Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com>

More information about Emergency Operations Plan and the Emergency Action Plan can be found here: <https://www.tamusa.edu/about-us/emergency-management/>

Download the SafeZone App (<https://safezoneapp.com/>) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid

with an electronic notification if a student has not attended by the published Census Date (the first week of class). Any student receiving federal financial aid who does not attend prior to the published Census Date (the first week of class) will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. Tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. Students can schedule appointments through JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. The Center offers face-to-face, synchronous online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at <https://www.tamusa.edu/academics>.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a CARE referral (<https://www.tamusa.edu/university-policies/Student-Rights-and-Responsibilities/file-a-report.html>) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources.

Office Hours: All faculty with teaching assignments should include regularly scheduled office hours on each syllabus in addition to "by appointment." Please review your appointment letter for the number of weekly office hours you are expected to set. Regularly scheduled office hours should also be posted outside your office door (where applicable).

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided with an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual on our campus and within our state, nation, and world. All decisions and actions involving students and employees are to be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the University's Civil Rights Officer at 210-784-2061 or titleix@tamusa.edu.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking based on sex, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related sex-based misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable modifications to pregnant students as would be provided to a student with temporary medical condition that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K). Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer

for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Young Jaguars: can support parenting students with daycare who meet this criteria: Must be enrolled in classes at TAMUSA in the current semester. Must be Pell eligible or a single parent. They serve children ages 3 to 12-years-old. Children must be enrolled in Pre-K-3 through 6th grade. youngjaguars@tamusa.edu (210) 784-2636

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university students' rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, [Student Code of Conduct](#), on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.

5. A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation, or disability. Conduct that infringes on the rights of another individual will not be tolerated. Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/documents/Student-Handbook-2022-23.pdf>) or visit the resources available in the OSRR website (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/academic-integrity.html>).

Option 1 - No Use of Generative AI Permitted

[BIOL 5309] assumes that all work submitted by students will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

Important Dates: Fall 2025 Regular 16-Week Session

August 25	First day of class
September 1	Labor Day Holiday – No classes
September 10	Census Date
November 14	Last day to drop with an automatic “W”
November 25	Last day to withdraw from the University
November 26	Study Day – No classes
November 27- 29	Thanksgiving Holiday – No classes
December 4	Last day of classes
December 5	Study Day – No classes
December 6-12	Final exams
December 16	Commencement

The complete academic calendar is available online:

<https://www.tamusa.edu/academics/academic-calendar/index.html>