



# THE CALIFORNIA PRE-DOCTORAL PROGRAM

*Commitment to Excellence with Diversity*

By Dr. Elizabeth Adams, Coordinator for the California Pre-Doctoral Program at CSUB



# CALIFORNIA PRE-DOCTORAL PROGRAM


Current CSUB CA Pre-  
Doctoral Scholar

Kenya Espinoza


# History and Purpose

California Pre-Doctoral Program:  
Founded in 1989, by the CSU and UC

The Chancellor's Doctoral Incentive Program (CDIP) provides an opportunity for aspiring professors who want to prepare for rewarding careers that balance student-centered teaching and research in the CSU or at institutions similarly focused on economic and social mobility.

 **The California State University**  
CALIFORNIA PRE-DOCTORAL PROGRAM

**I AM A CSU  
SALLY  
CASANOVA  
PRE-DOCTORAL  
SCHOLAR**



The California Pre-Doctoral Program is designed to increase diversity within the pool of university faculty by supporting the doctoral aspirations of students in the CSU.

# Pathways into Faculty Careers

## Current CSU Students

- California Predoctoral Program (Pre-Doc)
- Health Professions Scholars (HPSI)

## Doctoral Students

- Chancellor's Doctoral Incentive Program (CDIP)
- Pre-Professor Program (PREPP)

# Effects of antibiotics in the temperature-dependence of *Escherichia coli* growth.

Cardona, M<sup>1</sup>, Cruz-Lopez, M<sup>1</sup>, Lozano, M<sup>1</sup>, Savage, V.C.H., Vash, P.H.  
<sup>1</sup>Department of Chemical and Biomolecular Engineering, University of California, Los Angeles, CA  
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## Abstract

Resistance to temperature is thought to be one of the earliest essential adaptations in bacterial evolution. Antibiotics likely emerged later, as part of an arms race between organisms. However, antibiotic resistance has been observed in temperature-adapted bacterial populations, even in the absence of drug exposure. This suggests that shared stress responses. Here, we explore whether antibiotics can affect temperature response curves. We examine the growth of *Escherichia coli* fourteen temperatures, that range from 18°C to 48°C. We quantify how the optimal temperature for bacterial growth changes in response to drug concentration. We find that antibiotics substantially modify the optimal temperature for *E. coli* growth in a direction that might depend on their specific mechanisms of action.

## Background

**A.** *Escherichia coli* (E. coli) is a Gram-negative, rod-shaped bacterium. It is one of the most common bacteria found in the human gut. *E. coli* is a facultative anaerobe, meaning it can grow with or without oxygen. It is also a mesophile, meaning it grows best at moderate temperatures (around 37°C). *E. coli* is a model organism for studying bacterial growth and metabolism.

**B. Temperature Response Curves.** The temperature response curve (TRC) is a plot of bacterial growth (OD) versus temperature. The TRC shows the range of temperatures over which a bacterium can grow, and the optimal temperature for growth. The TRC is a key characteristic of a bacterium and can be used to study the effects of environmental factors on bacterial growth.

**C. Mechanism of Antibiotic (AB) action.** Antibiotics can affect bacterial growth in several ways. Some antibiotics inhibit cell wall synthesis, while others inhibit protein synthesis or DNA replication. The mechanism of action of an antibiotic determines its effectiveness against a particular bacterium.

## Methods

1. 96-well plate holding high to low drug concentration wedge  
2. Model organism: *Escherichia coli*  
3. Antibiotics with different mechanisms of action

4. Plates are incubated at different temperature ranges

5. Possible effect in temperature response

## Results

**Erythromycin: bacterial growth vs temperature**

**Streptomycin: bacterial growth vs temperature**

**Ampicillin: bacterial growth vs temperature**

## Discussion

Figure 1. A. *E. coli*. B. Possible effects of temperature response curves. C. Different mechanisms of antibiotic action.

Figure 2. Effect of erythromycin in the temperature response curve of *E. coli* at 0 (blue), 10 (orange) and 40 (green) µg/ml. Antibiotic (ERY) is shown at different temperatures. The optical density (OD) of the bacterial culture was measured as a proxy for absolute growth. Four biological replicates were measured for each temperature/concentration. Error bars represent two standard errors of the mean. The graph shows that ERY reduces growth at high temperatures more than at low temperatures, and shifts a right shift in the optimal temperature.

Figure 3. Effect of ampicillin in the temperature response curve of *E. coli* at 0 (blue), 10 (orange) and 40 (green) µg/ml. Antibiotic (AMP) is shown at different temperatures. The optical density (OD) of the bacterial culture was measured as a proxy for absolute growth. Four biological replicates were measured for each temperature/concentration. Error bars represent two standard errors of the mean. The graph shows that AMP reduces growth at high temperatures more than at low temperatures, and shifts a right shift in the optimal temperature.

Figure 4. Effect of streptomycin in the temperature response curve of *E. coli* at 0 (blue), 10 (orange) and 40 (green) µg/ml. Antibiotic (STR) is shown at different temperatures. The optical density (OD) of the bacterial culture was measured as a proxy for absolute growth. Four biological replicates were measured for each temperature/concentration. Error bars represent two standard errors of the mean. The graph shows that STR reduces growth at high temperatures more than at low temperatures, and shifts a right shift in the optimal temperature.

## Conclusion

Antibiotics can affect the temperature response curve of *E. coli*. The effect of antibiotics on bacterial growth is temperature-dependent. The optimal temperature for bacterial growth shifts in response to drug concentration. This suggests that shared stress responses between antibiotics and temperature adaptation exist.

## References

1. Cardona, M., Cruz-Lopez, M., Lozano, M., Savage, V.C.H., Vash, P.H. (2018) Effects of antibiotics in the temperature-dependence of *Escherichia coli* growth. *bioRxiv* preprint doi: <https://doi.org/10.1101/281111>; this version posted March 1, 2018. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

## Acknowledgments

We thank the Cardona lab for their support and the UCLA Center for Experimental and Computational Biology for their support.

## Supplementary Information

Supplementary Figure 1: Temperature response curves for *E. coli* at different temperatures and antibiotic concentrations.

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- 2,486 Scholars since 1989
- 40% of each cohort end up in fully funded Ph.D. programs
- Since 2014-15 AY, average of 13 Sally Casanova scholars are admitted each year into a Ph.D. program at a UC campus
- Since 2013-14 AY, approximately 24.7 percent of Sally Casanova Scholars receive funding for their Ph.D. program through the Chancellor's Doctoral Incentive Program

# Program Details

- Supports the doctoral aspirations of CSU students who have experienced economic and educational disadvantages
- Special emphasis is placed on increasing the number of CSU students who enter Ph.D. programs at one of the University of California campuses
- Applicants who are selected are designated a Sally Casanova Pre-Doctoral Scholar and will work closely with a CSU faculty mentor
- The Scholar and mentor will develop an overall plan that leads to enrollment in a doctoral program
- CDIP helps doctoral students turn their faculty aspirations into reality through CSU Faculty **mentorship, professional development, and financial assistance.**

# CDIP Program Details

Provides student loans to individuals pursuing full-time doctoral degrees at accredited universities within the U.S.

Faculty Mentor supports degree completion and enhances potential CSU employment through collaborative teaching, research, and service

Offers Mini-Grants and Travel Grants to support Scholar and Faculty Mentor

Upon receiving doctoral degree and obtaining a faculty position in the CSU, up to 20% of loan will be forgiven every year of qualifying employment



# Program comparison

## Pre-doctoral

- Must be CSU student and have CSU mentor
- Juniors and first-year master's students
- \$5000 to explore and prepare for applying to doctoral programs
- California forum for diversity in graduate education
- Possible summer research experience

## CDIP

- Must have CSU mentor
- Seniors, second-year master's, and doctoral students
- \$30,000 forgivable loan for doctoral study
- Possible mini-grants and travel grants
- Enrolled or admitted to full time Ph.D. Program for 2026-2027 A/Y



# The Program Provides:

- Travel Funds for the student to visit U.S. doctoral-granting institutions and/or to attend professional meetings appropriate to the student's development.
- Development Funds for other related activities, such as student membership in professional organizations, subscriptions to academic journals, graduate school applications and test fees, GRE preparation, and the cost of minor research materials.
- A Summer Research Experience opportunity at a University of California campus or other U.S. major research university, fully funded by the Pre-Doctoral Program, so that the scholar can participate in doctoral-level research prior to applying to a Ph.D. program.

# Loan Details

- Loans of up to \$10,000 per year over 5 years and up to a total of \$30,000.
- Loans are repayable over a 15-year period, starting one year after completion or withdrawal from fulltime doctoral study.
- If participant completes doctorate and is hired by CSU in an instructional faculty position:
  - Full time - 20% of the loan each year will be forgiven
  - Part time - 10% of the loan each year will be forgiven

# Participant Eligibility

- Applicants to the California Pre-Doctoral Program must be upper-division or master's degree students who are enrolled at a CSU institution as of Spring 2026 and who will also be enrolled at a CSU campus for at least one semester during the academic year 2026-2027.
- Any CSUB student may apply. Each applicant must have a faculty sponsor who will be available for the duration of the plan specified in the application. The program is designed for students interested in obtaining research doctorates.
- Unfortunately, the program isn't open to: international students, students interested in obtaining professional masters or doctoral degrees, and current and previous award Pre-Doctoral scholars.

# Health Professions Scholars Initiative

This track support students aspiring to careers in health professions, including public health, health psychology, human development (with an emphasis on health), kinesiology, nursing, social work and speech/language/hearing sciences.

Our Doctor of Nursing Practice degree qualifies!



Global Health Initiatives

# Application Details

- Only applications that have been viewed and approved by the campus coordinator are eligible for submission
- Components of the application include:
  - Personal Information
  - Educational Information
  - Three Essays
  - Faculty Mentor Letter of Recommendation
  - Student Budget Plan
  - Transcripts



# Selection Criteria

- Applicants will be evaluated on the basis of five major criteria: Doctoral Field of Study Interests and Plans; Doctoral Field of Study Preparation Experiences; Faculty Career Interests and Plans; Faculty Career Preparation Experiences; Commitment to Collaboration and Preparation with CSU Faculty Mentor.
- If you are interested in applying, you need to let us know! The CSUB application deadline is **February 10, 2026**. After we receive and approve your approved application, (including transcripts, projected budget, faculty mentor letter of recommendation, and your essays) we'll clear you to submit the packet to the CSU online no later than **11:59 A.M. on Friday, February 13, 2026**

# Important Dates

- **November 15, 2025:** Application period opens
- **Early February 2026:** Interested students meet with campus coordinator
- **February 10, 2026:** CSUB Pre-Application deadline
- **February 13, 2026:** Applications due via the online site
- **Mid-March 2026:** Applicants are informed of the status of their application
- **March/April 2026:** Applications are reviewed and scored
- **May 2026:** Eligibility of potential scholars are verified
- **July 2026:** Applicants who are selected as Sally Casanova Scholars and Honorable Mentions are identified





# Additional Information

- California Pre-Doctoral Website:  
<https://www.calstate.edu/predoc/apply>
- Chancellor's Office Staff
  - Dr. Katy Pinto, Faculty Director
  - Ms. Elizabeth Sanchez, Program Manager
  - Ms. Rocio Hidalgo, Program Coordinator
  - Dr. Christopher Murphy, Graduate Education Access Specialist
  - Dr. Estela Balon, Faculty Fellow
- CSUB Coordinator: Dr. Elizabeth Adams, Dean, Antelope Valley, Interim AVP for Academic Affairs and Dean of Academic Programs [eadams6@csub.edu](mailto:eadams6@csub.edu)
- CSUB GSC Coordinator: Martha Manriquez [mmanriquez@csub.edu](mailto:mmanriquez@csub.edu)

# CSU Info Sessions

## 2025

- [November 17, 2025 | 10am -11am](#)
- [November 24, 2025 | 10am -11am](#)
- [December 1, 2025 | 1pm-2pm](#)
- [December 8, 2025 | 1pm-2pm](#)
- [December 15, 2025 | 1pm-2pm](#)

## 2026

- [January 15, 2026 | 3pm-4pm](#)
- [January 22, 2026 | 3pm-4pm](#)
- [January 29, 2026 | 3pm-4pm](#)
- [February 2, 2026 | 10am-11am](#)
- [February 9, 2026 | 10am-11am](#)

# Questions?

**Please provide us with your  
feedback through this survey.**



# Thank you!



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PRE-DOCTORAL  
PROGRAM**