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Respondent

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Anonymous

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Time to complete

Application Information

1. Name: *

Eva Janečková

2. GCC Title/Position: *

Biology instructor

3. Department: *

Biology

4. Campus: *

Verdugo

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5. E-mail: *

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6. Phone: *

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7. Dean or Department Head's Name: *

Francisco Gago

Project Proposal

8. Name of Project/Program: *

Molecular analysis of Mendelian traits in pea plants (*Pisum sativum*) and developmental profiling of California sea hare (*Aplysia californica*)

9. Please select which category best describes your project: *

- Arts & Culture
- Athletics & Fitness
- Career & Work Training
- College Operations & Facilities
- Humanities/Social Sciences
- Science & Technology

10. Amount requested: *

\$9090

11. What do you propose to do? *

Project #1: This project aims to expand our ongoing pea plant (*Pisum sativum*) research by incorporating advanced molecular analyses to investigate the genetic regulation underlying classical Mendelian traits. Building upon previous morphological, microscopic, and SEM-based analyses, the proposed work will focus on RNA extraction, cDNA synthesis, and RT-qPCR analysis of genes associated with pigment production, growth regulation, and seed morphology in multiple *Pisum sativum* varieties. The project will continue integrating historical genetics with modern molecular biology techniques while providing Glendale Community College students with hands-on research experience.

Project #2: This project centers on the molecular investigation of the California sea hare (*Aplysia californica*), a large marine gastropod commonly utilized as a model organism in neuroscience. The study will examine eggs collected at two different developmental stages to characterize their molecular profiles and establish a foundation for future research. Planned work will focus primarily on single-cell analyses of the eggs, as well as exploration of early developmental stages, including the free-swimming trochophore and veliger larvae, which ultimately develop into the adult organism.

The requested funding will support the acquisition of essential reagents and laboratory supplies needed to carry out these experiments. Both projects are designed to generate data suitable for publication while providing students with meaningful research experience and opportunities for co-authorship.

As a result of BIOL 50 courses I previously led, we are currently revising a manuscript titled: "Spatiotemporal expression dynamics of CD73, CD90, and CD105 based on scRNA-seq and transcriptomic analysis of dental pulp toward establishing a triple-positive population." Five GCC students are listed as co-authors, as they contributed to data analysis. The manuscript has been submitted to *The Anatomical Record* (Impact factor: 2.1).

Furthermore, two additional students are co-authors on a manuscript currently in preparation titled: "Art Meets Genetics: The 2026 Mendel Day at Glendale Community College," which they co-wrote. This manuscript is intended for submission to *Folia Mendeliana*, a well-regarded journal specializing in Mendelian genetics.

Additionally, two different students presented their research at the Southern California Conference for Undergraduate Research (SCCUR). In both 2025 and 2026, two groups of my students presented our work at the GCC Research Symposium. The GCC College Foundation was acknowledged as a funding source in the *Folia Mendeliana* publication, as well as in all conference and symposium presentations.

12. Who will be involved in the project/program? *

The project will involve Glendale Community College biology students participating through BIOL 50 independent research experiences under my supervision (Eva Janečková, PhD). Students will engage in plant cultivation, tissue collection, molecular laboratory procedures, light microscopy, electron microscopy (in collaboration with Dr. Vendetti from the Natural History Museum), data analysis, and presentation of findings at research conferences and the GCC Research Symposium.

13. What are the benefits of this project/program to the students, college, and the community? *

This project provides students with meaningful experiential learning opportunities in molecular biology, genetics, microscopy, and scientific communication. Through hands-on laboratory work, students actively engage in the full research process, from experimental design and data collection to analysis and interpretation. They develop technical competencies in molecular techniques such as RNA extraction, cDNA synthesis, and RT-qPCR, as well as microscopy-based methods, including light and electron microscopy. In addition, students strengthen their ability to read and interpret primary scientific literature, collaborate in research teams, and communicate their findings through presentations and written contributions. These experiences directly support transfer success, research readiness, and preparation for careers in STEM fields.

For Glendale Community College, the project enhances the integration of authentic undergraduate research into the biology curriculum and supports innovative, high-impact teaching practices. Student involvement in publishable research and conference presentations elevates the college's academic profile and demonstrates a strong commitment to student-centered learning and scientific inquiry.

For the broader community, the project contributes to the dissemination of scientific knowledge through conference presentations and open-access publications. It also strengthens connections between the college and the community by linking modern molecular research to the historical legacy of Gregor Mendel, making foundational concepts in genetics more accessible and relevant through contemporary applications. Students involved in the project further serve as ambassadors of science, sharing their knowledge and experiences with peers and the local community.

14. How does this project/program support the College's Institutional Strategic Plan? *

View ISP at <https://www.glendale.edu/home/showpublisheddocument/68172>

This project strongly supports Glendale Community College's 2025–2030 Institutional Strategic Plan through the priorities of Inclusion, Success, and Support by expanding equitable access to authentic undergraduate STEM research opportunities and promoting innovative, student-centered learning experiences. The project provides students with hands-on training in molecular biology, genetics, light microscopy, electron microscopy, and scientific communication while fostering collaboration, mentorship, and experiential learning aligned with GCC's mission to empower students to achieve their educational, career, and life goals.

The project directly aligns with Priority B: Success, particularly Goal B.2, by implementing evidence-based and engaging instructional practices that enhance student success in STEM education, and Goal B.7, through the integration of emerging scientific technologies and molecular research methodologies into undergraduate learning experiences. Additionally, the project supports Goal B.8 by strengthening transfer preparation and research experience opportunities for students pursuing four-year institutions and STEM careers.

The project also supports Priority A: Inclusion by creating inclusive and equitable research opportunities for students from diverse and historically underrepresented backgrounds in STEM. Through collaborative undergraduate research experiences, conference participation, and mentorship, the project promotes a sense of belonging, academic engagement, and scientific identity among participating students.

Furthermore, the project aligns with Priority C: Support by strengthening instructional and research capacity within the biology program and fostering interdisciplinary collaboration, innovation, and academic excellence at Glendale Community College.

15. Timeline for the project/program. *

BIOL 50 in Fall 2026 and BIOL 50 in Spring 2027.

16. How do you propose to use the funds requested? Please include specific budget information. *

The requested funding will be used to support three primary areas: (1) the purchase of molecular biology reagents and laboratory consumables required for RT-qPCR analysis and ongoing research aimed at publication, (2) costs associated with manuscript publication, and (3) student participation in research conferences, including registration, travel, and poster production expenses.

Estimated budget: Funds for Fall 2026 (with estimated tax and shipping) = \$4190: RNA extraction kit (RNeasy Mini Kit by Qiagen, #74104 and DNase kit, Qiagen, #78254) = \$800, cDNA reverse transcription (Bio-Rad, #1725037 x 2) = \$600, qPCR reagents (Bio-Rad, #1725270 x 2) = \$550, other molecular work and laboratory supplies: reagents (such as primers, liquid nitrogen, ethanol, and pure water for molecular analysis, \$250), consumables (pipette tips and tubes, Eppendorf, \$500), SEM scanning (20 samples, 10 hours of SEM time at a discounted rate of \$35 per hour: \$35 x 10 = \$350, Natural History museum, collaboration with Dr. Jann Vendetti), plant cultivation supplies and maintenance (seeds, starter pots, regular pots, soil, bamboo stick to support the pea plants, etc., \$100), research conference student registration fee: \$200 (in case of two students), poster printing: \$120 x 2 = \$240 (one poster for each project), travel and lodging (hotel): two rooms, one for each gender = \$600 (for non-local conferences).

Funds for Spring 2027 (with estimated tax and shipping) = \$4900: RNA extraction kit (RNeasy PowerPlant Kit by Qiagen, #13500 and DNase kit, Qiagen, #78254) = \$800, cDNA reverse transcription (Bio-Rad, #1725037 x 2) = \$600, qPCR reagents (Bio-Rad, #1725270 x 2) = \$550, other molecular work and laboratory supplies: reagents (such as primers, liquid nitrogen, ethanol, and pure water for molecular analysis, \$500), consumables (pipette tips and tubes, Eppendorf, \$500), SEM scanning (20 samples, 10 hours of SEM time at a discounted rate of \$35 per hour: \$35 x 10 = \$350, Natural History museum, collaboration with Dr. Jann Vendetti), plant cultivation supplies and maintenance (seeds, starter pots, regular pots, soil, etc., \$100), research publishing costs (open access preferred): \$1500.

Total requested: \$9090.

17. Please list any other sources of funding you have applied for and include dollar amounts if already awarded. *

Last year's Glendale Foundation Grant, in the amount of \$5,000, was successfully utilized to support research activities and co-authorship opportunities for participating students in publications submitted to *Folia Mendeliana*, as well as to generate data presented at the Southern California Conference for Undergraduate Research (SCCUR) and the GCC Research Symposium.

18. How will the Foundation's support be recognized? *

The Foundation's support will be acknowledged in student presentations, conference posters and presentations, GCC Research Symposium materials, and any publications resulting from the project.

19. How do you plan to evaluate this project's success? *

The success of the project will be assessed through multiple measures, including the completion of planned molecular analyses, student engagement and retention in research activities, and the dissemination of findings at conferences and the GCC Research Symposium. Additional indicators will include the development of educational and research materials, the evaluation of student learning outcomes, and the growth of research-related skills.

20. If your project/program is successful, how will it inform your practice moving forward? *

Successful completion of this project will strengthen the integration of authentic undergraduate research into the biology curriculum and laboratory training at Glendale Community College. It will establish a foundation for future interdisciplinary STEM initiatives that combine classical genetics, molecular biology, light and electron microscopy, and scientific communication, while expanding opportunities for student-driven research experiences.

21. Please provide a 2 – 3 sentence summary of your project proposal. *

This project expands ongoing pea plant research inspired by Gregor Mendel's foundational work by incorporating molecular analyses, such as RT-qPCR, to investigate the gene expression underlying classical Mendelian traits. In parallel, it introduces a second research component focused on the molecular characterization of *Aplysia californica* (California sea hare) across early developmental stages. Through these interdisciplinary, hands-on research experiences, students will apply modern molecular biology techniques while connecting classical genetics with contemporary scientific approaches.

Signature and Acknowledgments

22. I hereby acknowledge/certify: *

- My Dean or department head is aware of this application and has authorized its submission.
- If my proposal involves the hiring of temporary/contracted professionals, I will obtain approval from Human Resources before proceeding and will provide documentation to the Foundation that the hiring/contracting has been reviewed and approved.
- If my proposal involves conference and/or other travel, I will complete the GCC travel approval process and adhere to GCC travel guidelines.