

Excellence in Research

SCHOOL OF BIOLOGICAL SCIENCES

TO: FACULTY AND STUDENTS PARTICIPATING IN BIO. SCI. 199

FROM: Raju Metherate, Associate Dean for Undergraduate Affairs

RE: **Undergraduate Research Symposium, 2019-2020 Excellence in Research Program (<http://www.bio.uci.edu/undergraduates/research/excellence-in-research/>)**

The School of Biological Sciences believes that successful participation in creative research is one of the highest academic goals undergraduates can attain. Students enrolled in Undergraduate Research, **Bio Sci 199**, and who meet eligibility requirements have an opportunity to present their scientific data to the academic community at the Undergraduate Research Symposium by participating in the Excellence in Research Program. Those students who successfully complete the program will be awarded with Excellence in Research in Biological Sciences.

PLEASE NOTE: Information contained in this packet is subject to change. Students will be notified via e-mail if updates/revisions are necessary. I will use e-mail to communicate/confirm details regarding the program and task deadlines so check often!

TIMETABLE

All students who intend to participate in Excellence in Research must attend the following workshop. The same workshop is offered twice – it is mandatory that you attend only one. If you do not attend a workshop you will not be eligible to participate in the Excellence Program. There are no exceptions. If at this time you are not certain that you will participate, but you think you might, you should attend a workshop as there will be no additional workshops beyond those listed. All aspects of the program will be explained at this time. Each workshop is scheduled for 1.5 hours. You must arrive on time and stay for the entire workshop to receive credit for attending. Location is HSLH 200 for both workshops. Times are as follows:

Mandatory workshops in HSLH 200 – Students are required to attend one:

Monday, November 18, 2019, 4:00 – 5:30 PM

OR

Tuesday, November 26, 2019, Noon – 1:30 PM

After you attend a workshop you will be invited to participate in the Excellence in Research Program through the Excellence in Research Dashboard. Check “Eligibility” (page 5 of packet)

to make sure you meet all requirements before proceeding. The dashboard will enable you to track progress in the program and prompt you to meet deadlines. It is important to note that all deadlines are firm! Once a task deadline passes it is no longer accessible on the dashboard. Late, incomplete or unsigned work will not be accepted. If a deadline is missed, you will not be allowed to continue in the program. No exceptions are allowed. **Plan ahead** - Communicate with your Faculty early in this process regarding deadlines for paper review/evaluation, signatures etc. Any required copies need to be made in advance.

The following designations are used for scheduling for the Excellence in Research Program.

Please note if you are **SOM** or **BIO SCI** (this is determined by the location of your research lab as follows):

School of Medicine, Medical Center locations and/or working with Human Subjects (SOM) – UCIMC, UCI Bldg 200, SOM Bldg 55, Gottschalk Med Plaza, Joslin Diabetes Center, Santa Ana Family Health Center, Anaheim Clinic, Centerpoint Child Dev Center, Hewitt Hall, Long Beach VA Center, Fairview Dev Center, FOR OC KIDS Neurodevelopment Center, Med Sci I, Med Surge I, Med Surge II, Gillespie Neuroscience Research Facility, Sprague Hall.

Main Campus departments or buildings (BIO SCI) – Ecology and Evolutionary Biology, Developmental and Cell Biology, Molecular Biology and Biochemistry, and Neurobiology and Behavior.

DUE DATES ARE AS FOLLOWS:

ALL PARTICIPANTS (BIO SCI and SOM) – At this time you must fill out both the “**Personal and Research Profiles**”. These tasks will be available on your dashboard beginning January 6 and must be completed no later than January 21, 2020 if you plan on participating in Excellence. The forms are to be completed by **ONLY** those students who meet eligibility requirements and have attended a workshop. Keep answers BRIEF – a few sentences per question is all that is required.

ALL PARTICIPANTS (BIO SCI and SOM) - Wednesday, February 26 OR Thursday, February 27, 9:00 am – noon, 1:00 pm - 3:00 pm.

The “**Student Profile**” (1 copy) will be due in the Bio Sci Student Affairs Office, 1st Floor Conference Room 1120, Bio Sci III, per the specified dates/times. Work will not be accepted at any other time/place. This is the same on line form you completed in January. **Log on, update if necessary, print a copy and have it signed by your Faculty of Record.**

One copy of a complete, **current transcript** (*unofficial ok*) through Fall quarter 2019 must also be submitted at this time.

No late or incomplete submissions will be accepted.

ALL PARTICIPANTS (BIO SCI and SOM) – “Excellence in Research Paper”

Upload due Monday, April 6, 8:00am - Tuesday, April 7, 11:59pm. Log onto your Excellence Dashboard where you will be prompted to upload your paper (PDF format). PLEASE NOTE: This is considered your FINAL paper and will be evaluated as such by the Honors Committee. This is not a draft. You will not have an opportunity to rewrite your paper.

IMPORTANT - You are also required to submit the following 3 items in the BSSA Office, Bio Sci III Lobby, at this time:

Excellence in Research Paper – One (1) copy.

Certification Sheet – Available to download from the Excellence Dashboard. Must be completed and signed by Faculty of Record.

One (1) additional copy of page 1 of your paper (with abstract).

I will have a separate folder for each department available in our office – place these 3 items in your department’s folder then sign by your name to confirm submission. Items are due during regular office hours (9:00-noon and 1:00-4:00pm), Monday, April 6 – Tuesday, April 7. **The absolute deadline is April 7, 4:00pm.**

Plan ahead and give your Faculty ample time to review your paper prior to this deadline. They will want revisions made!! *All papers must follow the Excellence guidelines and format per the information and sample in this packet, pages 6-12.* **No late or incomplete papers/paperwork will be accepted. No exceptions.**

Week of April 13 Finalize your Poster**

Week of April 20 Posters uploaded to the dashboard. PDF format required.**

Poster display and judging completed per department instructions. “Individual” judging sessions where you will stand at your poster to entertain questions from judges is determined by your department. A specific departmental schedule will be given to participating students after the research paper is submitted. Set-up/take-down times must be strictly adhered to. Plan to arrive at

least 15 minutes in advance! Once again, you are expected to be at your assigned time for judging. See details on pages 13, 14.

April 29, April 30 "Finalist" Poster Session** presented by selected students. All posters should be placed on display Wednesday, April 29, 10:00 am through Thursday, April 30, 4:00 pm, **Bio Sci III, Lobby**. Easels will be provided. Students are assigned a judging time, either Wednesday afternoon or Thursday morning. In addition to receiving "Excellence", these students may be eligible for additional awards. See details on page 15. Please remember, appropriate dress required.

Week of May 11 – Review Evaluator Comments for Paper from your dashboard. Discuss the requested revisions with your Faculty and make appropriate changes prior to Uploading. ONLY revisions requested by your Evaluator may be made at this time. You may not rewrite/revise your paper other than this as it is not re-evaluated.

BIO SCI & SOM – Week of May 18

Final Paper "Upload"- All final papers must be uploaded at this time to the on line Journal. You must make all appropriate revisions requested by your evaluator and submit a Final Certificaton Form signed by your Faculty advisor. **Papers must meet all guidelines and format requirements or they will not be published. Details for uploading will be provided at this time.**

****PLEASE NOTE: ALL DATES, TIMES, AND LOCATIONS WILL BE CONFIRMED AND MAY BE CHANGED DUE TO ROOM AVAILABILITY IN SPRING.**

ELIGIBILITY

Undergraduate students must be enrolled in independent research in Biological Sciences (**MUST BE A BIO SCI 199 – other School’s 199s are not accepted**) and have completed a minimum of four (4) quarters of research on the same project by the end of Spring Quarter, 2020. At least one quarter must be taken during the 2019-2020 academic year. Students must also be enrolled at UCI through Spring quarter and graduate no earlier than Spring of the year they are participating. Students must be in good academic standing with an official, cumulative **UCI GPA of 3.0** or better by Fall quarter 2019 end. There can be NO record of Academic Dishonesty. Those students who have earned Excellence in Research previously are eligible again, provided that all the requirements are met and the research project is different. Papers and posters must be done individually. They may not be co-authored. Please speak to your Faculty if there are several students in your lab participating in Excellence. Your project needs to be divided so that each student has their own, unique part to report on. If there is any question regarding your eligibility, you are urged to contact Susan Schafer in the Biological Sciences Student Affairs Office (824-5318) prior to attending workshops. **Eligibility requirements are strictly adhered to. Exceptions are not permitted.**

To be considered for Excellence in Research in the Biological Sciences, eligible students must, according to program standards: 1) attend November workshop*, 2) submit the appropriate forms, 3) complete a scientific paper and 4) present a research poster. **Based on the students’ work in its entirety “Excellence” is then determined and awarded by the Honors Committee.** Students awarded with “Excellence” will have their paper published in the on line *Journal of Undergraduate Research in the Biological Sciences, 2019-2020.*

If awarded, Excellence in Research will meet the requirement for the third Upper Division Bio Lab for the general Bio Sci major. Three (3) Upper Division Bio Labs must be completed to meet the requirements for graduation in the Biological Sciences. May be any 3 from D111L, E106L, E112L, E115L, E131L, E140L, E161L, E166L, E179L, E186L, M114L, M116L, M118L, M121L, M127L, M130L, N113L. Please see the Bio Sci Degree Requirement Sheet for unique requirements for Bio majors other than general Bio Sci as a petition may be required. Please keep in mind that health professional schools will require one year (3 quarters) of labs. Check with the schools you are applying to should you have questions or concerns regarding their admission requirements.

*The same workshop will be given twice – **it is mandatory to attend one.** Additional workshops are NOT given at a later date. Details will be available on the Bio Sci Student Affairs web site, <http://www.bio.uci.edu/students/undergraduates/research/>, October, 2019.

PLEASE NOTE: Beginning Fall 2012, four (4) quarters of research on the same project is required in order to participate in the Excellence Program. No exceptions are allowed.

REFERENCE TEXTS

Students are strongly encouraged to refer frequently to the recommended texts for this program.

Recommended Text:

Pechenik, Jan A., A Short Guide to Writing About Biology. 7th ed. New York: Longman. 284 p.

Additional Reference Cited:

[CSE] Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers. 7th ed. 2006. (Formerly - [CBE] Council of Biology Editors. 1994. Scientific style and format. 6th ed. Cambridge: Cambridge University Press.)

RESEARCH PAPER GUIDELINES

1. STYLE

Write in a clear, logical and concise style. Scientific writing should not be misunderstood. Communicate your findings at the level of those who are familiar with the material covered in our Biological Sciences Core curriculum.

The paper in **TOTAL** (abstract, text sections, illustrations, acknowledgments, and literature cited) may not exceed 12 typewritten or be less than 8 typewritten pages. Papers less than 8 pages or exceeding 12 pages will not be accepted. Utilize the space on each page in its entirety – continue text or graphs/figures rather than starting a new page for a new section. The papers should be printed single-sided on 8 1/2" x 11", using **Times, 12-point font**. Leave one-inch margins on all sides as well as top and bottom. **Type the abstract, literature cited, acknowledgments and figure legends single-spaced. Text is double-spaced.** Do not use footnotes. **Make certain that the paper is free of typographical, spelling, punctuation, and grammatical errors.**

2. ABSTRACTS

An abstract is an accurate and informative summary of a research project. In the case of a Research paper, it allows the reader to identify the essentials of the work, including: 1) the research question, 2) the methodology, 3) the results, 4) the conclusions. Each of these aspects of the paper should be presented in a sentence or two and the entire abstract should be presented succinctly in a single paragraph as a part of your final paper and poster. Although the abstract appears as the first section of your paper, it should be written last so you can include the necessary information.

- a. Begin with a topic sentence that states the research question.

- b. Avoid jargon and abbreviations; those unfamiliar with the details of the research area in which you have been working may read your work.
- c. Type your abstract **single-spaced** in Times 12 point font, .3 indent, one-inch margins
- d. Abstract should contain no more than 250 words.
- e. FOLLOW THE EXAMPLE OF THE ABSTRACT SHOWN IN THE SAMPLE PAPER ON PAGE 9 OF THIS PACKET.

3. ILLUSTRATIONS AND TABLES

Place the text describing the graphs or tables on the same page as the figure if possible. Figure legends go below the figures, table legends go above tables. Use space as efficiently as possible.

4. PAGE NUMBERS

Page numbers should be centered on the bottom of each page. Begin numbering on page 2.

5. ORGANIZATION OF THE PAPER

- a. The title of the paper should be typed in Times, 12-point, **ALL CAPITAL LETTERS, BOLD TYPE, CENTERED** at the top of the first page. The title should be a short, clear statement of what is interesting in your paper. "**RESEARCH ON PINE TREES**" would be too general, for example. *If your title is two lines long, do not leave a space in between line #1 and line #2.* Then type author name (your name, last name first), the department in which the work was done, the Faculty of Record's name, and the abstract on that page according to the required format. Remember, the abstract is single-spaced.
- b. Start your introduction on that same page **without** typing the section heading, "Introduction". The introduction should establish why you are doing your research.
- c. These section headings should be typed in Times, 12-point, capital letters, bold type, left-justified:

MATERIALS AND METHODS

RESULTS

DISCUSSION

ACKNOWLEDGMENTS

LITERATURE CITED

- d. See writing references for examples of scientific paper style and organization.
- e. **A sample paper follows that demonstrates the required format and spacing and further describes the contents of each section of the paper. YOUR PAPER MUST LOOK LIKE THE SAMPLE PAPER BEGINNING ON PAGE 9 – NO EXCEPTIONS.**

THE INITIATION OF CALLUS IN *PINUS PONDEROSA*

(3 single spaces)

Student's Name (Last Name First) i.e., Smith, John

Department

(1 single space)

Faculty of Record's Name

(4 single spaces)

(Begin the abstract here. Remember to type the abstract single-spaced. Indent the first line of each paragraph 0.3 inches (3 spaces). The intent of this study is to develop a method of vegetative propagation for the conifer, *Pinus ponderosa*. The air pollutants from the Los Angeles basin have taken a severe toll on the stand of pines in the San Bernardino Mountains. Therefore, a more tolerant strain of tree must be bred. We have induced callus from excised meristems, long shoots, and branch sections and have grown them successfully for three months (they are still growing) on various derivations of Murashige-Skoog medium supplemented by auxins. Most of the callus cultures are white but still viable. Even though there have only been a few tree species reproduced from callus, the wide range of possibilities offered by this technique should be explored with much greater detail.

(4 single spaces)

Start the text of the paper here without typing the section heading **INTRODUCTION**. Again, the introduction establishes why you are doing your research. Focus on a clear hypothesis and provide the context of your work. Remember to type text double-spaced, and allow **one-inch margins** on all sides of each page. Center page numbers at the bottom of pages - begin numbering on page 2. Be sure to follow the directions contained in this manual. If you have any questions about the instructions please be sure to contact Susan Schafer in the Biological Sciences Student Affairs Office, Bio Sci III, 824-5318. Your work should be clean, clear, and concise.

Good writing takes time; start as soon as you can. You should write at least three drafts. After you have completed your first draft, ask another student in the program to review it. Your Faculty Advisor should review your second draft and your final manuscript. **Allow enough time for several rounds of revisions.** IMPORTANT – The Excellence in Research Paper due in April is considered your **FINAL paper** and will be evaluated as such by the Honors Committee. This is NOT a draft. You do not have an opportunity to rewrite your paper.

MATERIALS AND METHODS

This section details the way the research was accomplished. The importance of this section is that it allows someone else to read it and know exactly what needs to be done to replicate your research. Therefore, you must have as much detail as possible in this section so that any one, anywhere could do exactly the same research. Be sure to describe the steps taken and how you analyzed your data. **NOTE: THIS IS REQUIRED FOR ALL STUDENTS.** If you used animal subjects, the following sentence should appear in the first paragraph of this section: *All experiments were carried out in accordance with the Institutional Animal Care and Use Committee at the University of California, Irvine, and were consistent with Federal guidelines.* If you used human subjects and/or specimens, your sentence will be as follows: *All experiments were carried out in accordance with the Institutional Review Board at the University of California, Irvine, and were consistent with Federal guidelines.*

RESULTS

This section details and describes your findings in a written format and provides evidence of data. The results should present the outcome of your experiment. **Data should be able to be**

analyzed, reported and illustrated with findings presented in text, graphs, tables, etc. Do not start to explain your data in this section. Present "p" values here and refer to all graphs in the text by number (Figure 1). Your graphs should be self-explanatory; label lines and bars in the graph and don't use abbreviations. Legends should accompany each figure or table and be placed correctly – above for a table and below for a figure.

DISCUSSION

This section explains the implications of your findings: what the results mean. Describe any problems with the data and try to explain any unexpected findings. Finish this section by suggesting what further studies might be done on the project in the future.

ACKNOWLEDGEMENTS

This is a place to briefly thank those people (other faculty, lab personnel, etc.) who have helped you complete your project. This section should be **single-spaced**.

LITERATURE CITED

This section presents all the scientific literature to which you have referred in your paper. To refer to an article in the text, give the authors and year of the article in parentheses, for example, (DePolo and Villarreal 1991). For more than two authors, list only the first author and refer to the others as "et al", for example, (Casey et al 1991). Do not list references which you did not actually cite. **The style for references that you must use is that detailed in the CSE style manual, *Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers*. 7th ed., 2006.** It is recommended that you have 8-12 references with a **maximum of 1 page**. Please remember this is not a lab report or review paper – a primary source for references is needed (NO Wikipedia, for example).

References should be **single-spaced**, listed in alphabetical order by first author, and formatted with a 0.3-inch hanging indent (3 spaces) as shown below to distinguish between references. Examples of reference citations for three journal articles, a book, an electronic journal

with a print source and a chapter in a book follow. **ALL REFERENCES IN YOUR PAPER MUST FOLLOW THE FOLLOWING FORMAT (page 12).**

- Amalfitano A, Martin LG, Fluck MM. 1992. Different roles for two enhancer domains in the organ- and age-specific pattern of polyomavirus replication in the mouse. *Mol Cell Biol* 12:3628-35.
- Casey G, Lo-Hsueh M, Lopez ME, Vogelstein B, Stanbridge EJ. 1991. Growth suppression of human breast cancer cells by the introduction of a wild-type p53 gene. *Oncogene* 6:1791-7.
- DePolo NJ, Villarreal LP. 1991. E1A represses wild-type and F9-selected polyomavirus DNA replication by a mechanism not requiring depression of large tumor antigen transcription. *J Virol* 65:2921-8.
- Friedlander G. 1955. *Nuclear and radiochemistry*. New York: J Wiley. 468 p.
- Jones CC, Meredith W. Developmental paths of psychological health from early adolescence to later adulthood. *Psych Aging* [Internet]. 2000 [cited 2006 Jan 18]; 15(2):351-360. Available from <http://www.psycinfo.com>
- Pringle K. 1988. Viruses. In: Jones BB, Barnes CV, editors. *Advances in virology*. New York: J Wiley. p 112-35.

POSTER SESSION AND DISPLAY

Scientists often present their findings in posters, which are carefully organized and attractively displayed presentations of their research. The poster serves as a visual display to which the investigator refers in answering questions and discussing his/her work. Participants in the Undergraduate Symposium will present their work in this format.

Posters will be uploaded to the Excellence in Research Dashboard the week of April 20. PDF format is required. This, along with your research paper, will be available in the *Journal* if you are awarded Excellence.

Posters will be displayed and judged per department schedules the week of April 20. During this time each department will host an "individual" judging session where students stand at his/her poster to entertain questions from their judges. Easels are provided. Assigned dates, locations, and instructions will be available when the scientific paper is submitted. **Schedules vary according to department so make sure you know your specific information. Arrive early! All schedules are firm.** You are expected to attend your assigned time, late arrivals may not be considered. It is not possible to accommodate individual preferences due to the large number of participants.

The required poster size is 36" (height) by 48" (width). Posters should be mounted securely on foam core. *Image Works, located in 2112 Natural Sciences I, (949) 824-6414 can print and mount posters. They will have the correct size foam core. Turn around time is approximately one week.* If you have your poster printed/mounted elsewhere you are responsible for meeting all standards and deadlines. Posters will be judged on the basis of the quality of the science and its' presentation value. In preparation of the poster, standards must be followed and elements presented, as shown on the accompanying diagram:

1. At the top of the poster is the title of your project, followed by your name, the department in which the work was done, and the name of your faculty advisor in parentheses.
2. The Abstract, exactly as it appears in your paper, must be included on the poster, followed by Introduction, Methods, Results and Conclusions sections. The text of the poster should not be identical to your paper. Rather, the poster should be a brief, clear presentation of the critical information relating to your project. All of these sections and their subsections should be numbered consecutively, top to bottom, left to right (see sample poster).
3. Each illustration, table, figure, photograph, or diagram must have a "headline" which describes its content in a phrase or sentence. Do not title your data as "Results". Rather, describe the results in a headline sentence above the data. For example: "CD44 glycoprotein is abundant on normal epidermis, but scarce on cells of a basal-cell carcinoma" would be an appropriate headline, while "CD44 levels" would be an inadequate headline. Your poster serves as a display for discussion of the information.

“FINALIST” SELECTION AND AWARDS

“Finalists” from each department will be selected by the Honors Committee. Finalists are asked to participate in an additional poster judging session where projects are once again presented, this time to judges from all departments. Awards are decided from this group and are presented to the awardees at the Biological Sciences Honors Convocation in June. These awards are in addition to receiving “Excellence”. A description of awards are in the UCI Catalogue under *Biological Sciences Honors, Scholarships, Prizes, and Awards*. Availability may vary year to year.

All posters should be placed on display Wednesday, April 29, 10:00 am through Thursday, April 30, 4:00 pm, **Bio Sci III, Lobby**. Easels will be provided. “Finalist” judging sessions will be Wednesday, April 29, 2:00-4:00 pm, and Thursday, April 30, 10:00 am – 12:00 noon, Bio Sci III, Lobby. Students attend only one session and will be notified of their assigned time. All students should retrieve posters by 4:00pm on Thursday, April 30. Students must be present for judging to be eligible for prizes. Please dress appropriately (no jeans, shorts, etc.).

JUDGING AND AWARDS

1. Faculty from the School of Biological Sciences and from the College of Medicine comprise the *Honors Committee* and will meet to make selections regarding the papers and posters.
2. **In keeping with the standards of this program, the Honor's Committee may decide to award "Excellence in Research" in the Biological Sciences only if the student completes all requirements (workshop, Excellence in Research forms, research paper, and research poster) and the paper is deemed of the quality to be published in the *Journal of Undergraduate Research in the Biological Sciences*.**

JOURNAL OF UNDERGRADUATE RESEARCH IN THE BIOLOGICAL SCIENCES

Students will be notified when the on line Journal 2019-2020 is complete and available for viewing in June.