

## Biology 495 (research I) and 499 (research II) Directed Senior Research Fall 2012

### 1. Meetings and Faculty

**1.1. Meetings** Wednesday 3:30-420 Henry 203

#### 1.2. Faculty

<b>BI495/499 facilitator</b>	Dr Mike Dohm	mdohm@chaminade.edu
<b>Internship coordinator</b>	Dr. Jolene Cogbill	jcogbill@chaminade.edu

#### Research Mentors

Dr Helen Turner	hturner@chaminade.edu	Obesity and Immunology
Dr Mike Dohm	mdohm@chaminade.edu	Genomics & Environmental Toxicology
Dr Joel Kawakami	jkawakam@chaminade.edu	Cancer Drug Design
Dr Alexander Stokes	astokes@hawaii.edu	Cardiovascular Biology
Dr Abby Collier	acollier@hawaii.edu	Pediatric Pharmacology
Dr Joan Kuh	joan.kuh@chaminade.edu	Liver Disease
Dr. Hank Trapido Rosenthal	rosenthl@hawaii.edu	Marine Microbiology
Dr. Claire Wright	claire.wright@chaminade.edu	Reproductive Tissue Biology
Dr. David Carter	david.carter@chaminade.edu	Forensic Taphonomy
Dr Michael Weichhaus	michael.weichhaus@chaminade.edu	Cancer and metabolism

#### 1.2. Office Hours.

Office hours with Dr Dohm are by appointment. Office hours for research mentors should be established individually.

### 2. The Course.

#### 2.1. Overview.

Directed Senior Research is a culmination of the course of study in biology. The steps that you follow here are quite similar to steps taken by biologists in a wide variety of research labs, from generating ideas and research proposals to collection and analysis of data and finally to the presentation of results to other scientists (including those at granting agencies) through a written publication and or a public presentation. The weekly meetings with the facilitator will be used to review project progress and to perform exercises that aim to increase your knowledge of topical issues in the realms of biological discovery, scientific ethics and recent technical advances.

You should be registered in **BI495** if this is your **first** research semester at Chaminade

You should be registered in **BI499** if this is your **second** research semester at Chaminade

#### Catalog descriptions

**BI 495 Research I (3)** Weekly seminar course accompanying research project (approximately 10 hours per week) performed in Chaminade or other research laboratory under supervision of a practicing research scientist. Prerequisites: BI 308 and BI 308L. Materials intensive fee applies.

**BI 499 Research II: Honors Research (3)** Second semester of research project (approximately 10 hours per week) performed in Chaminade or other research laboratory under supervision of a practicing research scientist. Offered annually. Prerequisites: BI 495. Materials intensive fee applies

**The course has three components:**

- **#1. Hands-on Laboratory Research Project**

You may complete this on or off-campus. Off-campus internships are typically during the summer prior to your registration in 495 or 499. Students who complete this component off campus are still required to perform #2 and #3 below. If you wish to perform on campus research you must be accepted by a research mentor from the list above by the end of week 2 of the semester. You should aim to spend at least 10 hours per week on your research project. Be aware that this is a minimum and the nature of biological research means that it is sometimes time-consuming and unpredictable.

- **#2: Weekly class meetings and assignments, including a final research paper.**

- **#3: Poster presentation to faculty and staff in week 13 of the semester.**

### **2.3. Learning Outcomes.**

Successful completion of this course should provide students with the following learning outcomes:

1. Demonstration of the ability to organize and perform biological research using the scientific method.
2. Demonstration of the ability to complete a library search of biological literature.
3. Demonstration of understanding problems involved in conducting research in biology.
4. Demonstration of the ability to critically analyze data.
5. Demonstration of competency in using biological techniques and instruments
6. Completion of writing up research as a scientific paper formatted for submission to a peer-reviewed journal.
7. Completion and presentation of a poster documenting the research project for an audience of peers and professional scientists.

### **3. Requirements and Grading**

#### **3.1. Grading Scheme**

Attendance and participation in weekly meetings and forum	100 points
Final Poster Presentation	200 points
Final written paper	100 points
Written assignments	100 points
A Outstanding scholarship and an unusual degree of intellectual initiative	>90% 450 points or more
B Superior work done in a consistent and intellectual manner	>80% 400-449 points
C Average grade indicating a competent grasp of subject matter	>70% 350-399 points
D Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite course work	>60% 300-349 points
F Failed to grasp the minimum subject matter; no credit given	<60% 299 points or less

A poster documenting your literature research project which you are required to present in our mini-symposium. A single sheet poster will be required. The poster will include title, authors and affiliations, abstract, background, methods, results and data, discussion, literature cited and acknowledgements. Powerpoint templates for poster design are recommended and will be provided on request by Dr Dohm.

At the mandatory poster presentation session you should be prepared to give a brief oral presentation of your poster and answer questions from faculty and your peers. This will be held on campus in week 13 of the semester. The date of this symposium will be announced in class.

All research papers or essays should be formatted in accordance with the guidelines for submission to the Journal of Biological Chemistry (see <http://www.jbc.org/site/misc/ifora.xhtml>)

**Required elements of the paper are:**

- **Title page:** title of your research project, your name, course and date of submission.
- **Abstract:** standard abstract form that presents your research (including results) in less than 200 words.
- **Introduction:** a review of literature, hypothesis and rationale of your research project. What is known about your area of interest and about your specific question(s)? What is not known? Where does your work fit in and contribute?
- **Methods and Materials:** a detailed description of techniques, instruments, experimental and control groups and flow-charts if needed.
- **Results:** data tables, figures, photographs and brief narrative of each.
- **Discussion and Conclusion:** a careful analysis of results, error analysis and proposals for additional work.
- **Literature Cited:** provides a complete list of work cited. Comply with the style of the Journal of Biological Chemistry.
- ***Additional element and formatting requirements apply and will be discussed in class.***
- The research must comply with the Chaminade University *Writing Across the Disciplines* standards.
- The research paper must be submitted as pdf by 4PM on Wednesday December 2<sup>nd</sup> to Dr Dohm's website ( <http://www.letgen.org/chaminade> – BI495/499 Seminars). Printed copy must be submitted to Dr. Dohm's NSM mailbox by the same deadline.

**3.4. How to keep a laboratory notebook**

- Completely number pages before recording data/writing in it.
- Use permanent ink.
- Include a complete Table of Contents at the beginning; all experiments should be dated and page numbers indicated. Include your mathematical calculations.
- Cross out errors—do not erase or use Liquid Paper.
- If data for a given experiment is to be collected periodically, leave sufficient space to enter the data over time. A data table might be appropriate in this case.
- Record data directly and do not tear pages out.
- The notebook is the property of the supervising investigator and should be surrendered to them upon completion of the project.
- Although a backup copy of the laboratory notebook is a standard procedure, do not make a duplicate without permission from the supervising investigator.

**4. Policies**

1. Late assignments will not be accepted without prior written approval from the instructor.
2. Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. BI495/499 Electronic devices policy: You are encouraged to bring and use your laptops and tablets to seminar provided your use is not a distraction to others.
3. All other academic policies specified by the University Catalog and Student Handbook 2015-2016 apply to this course.
4. Students performing research at off-campus locations are required to perform all applicable safety trainings prior to starting work

5. ADAA Statement. Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information.
6. Title IX Declaration. Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following:
  - Chaminade Counseling Center| 808 735-4845.
  - Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role.
7. Details of the course, including syllabus and schedule, may be subject to change by instructor.

### **Tentative Class Schedule**

<b>Week 1</b>	<b>Orientation and Overview</b> <i>Homework: Key Scientific Questions Written Exercise</i> 250 words "What is the most important question scientists should be addressing today?" Due to Dr. Dohm (forum posting) by 4PM Monday, Aug 31
<b>Week 2</b>	<b>Discussion of Key Scientific Questions Written Exercise</b> <i>Name of Research Project Supervisor due to Dr. Dohm (forum posting) with project title by 4PM Tuesday, Sep 8<sup>th</sup>.</i> <i>Homework: How do we know what we know? Exercise</i> <i>Prepare 10 minute white board presentation on the assigned question.</i>
<b>Week 3:</b>	<b>Discussion of How do we know what we know? Presentations</b> <i>Homework: Prepare project hypothesis with you research supervisor.</i>
<b>Week 4:</b>	<b>Research hypothesis and experimental plan discussion</b> <i>Be prepared to discuss the work you are planning to do or have done in the lab</i>
<b>Week 5:</b>	<b>What makes a good project? Exercise and group discussion</b>
<b>Week 6:</b>	<b>Role models: the PhD, MD-PhD and postdoctoral experience</b> <b>External panel discussion</b> <i>Homework: prepare project abstract and methods section for poster and paper</i>
<b>Week 7:</b>	<b>Review of Research Progress</b> <i>Homework: "Bad apples" exercise</i> <i>Prepare 10 min whiteboard presentation on you assigned scientific misconduct case</i>
<b>Week 8:</b>	<b>"Bad apples" Research Ethics discussion</b> <i>Homework: first drafts of paper and poster</i>
<b>Weeks 9-12</b>	<b>Paper and Poster preparation</b>
<b>Week 13:</b>	<b>Poster Symposium, also submit poster copy to website</b>
<b>Week 14:</b>	<b>Paper due to Dr. Turner at 4PM on Wednesday December 2<sup>nd</sup> (hard copy and PDF)</b>

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