

# MBL Physiology Course Handbook 2015

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**Welcome to the 122<sup>nd</sup> consecutive year of the Physiology course at the Marine Biological Laboratory (MBL) in Woods Hole MA.** This intensive laboratory course has been revamped to meet the new challenges in biology by providing a unique interdisciplinary training environment at the interface between cell biology, computational biology and the physical sciences.

The Physiology Course will bring together biological and physical/computational scientists, both in the faculty and the student body, to work together on cutting-edge problems in cell physiology.

## **General Course Organization:**

**Theme:** The theme of the '15 course is experimental and thinking approaches to understanding cell structure, function, and physiology across scales.

**General Schedule:** The course is seven weeks beginning with a meet-and-greet at 5pm Sunday June 14 and ending on Saturday Aug 1. We work six days a week (M-S) with every Sunday off (although labs are open). The seven-week course is temporally divided into 4 sections, a one week Bootcamp followed by three 2-week experimental rotation sessions:

- Week 1: June 15-20: Bootcamp
- Weeks 2-3: June 22 - July 4: Session I
- Weeks 4-5: July 6-18: Session II
- Weeks 6-7: July 20 - Aug 1: Session III

**Bootcamp** is a week designed for basic training in Biochemistry, Microscopy, and Matlab programming to get all students from diverse backgrounds “on the same page” in terms of basic skills. Each student will go through three 2-day rotations, one in each area. Obviously, different students will already possess advanced skills in different areas. However, students still must do each of the three rotations, and those who are skilled can help unskilled ones learn. **You will be randomly assigned to one of three groups for this period**, with an eye to balancing the skill-set and gender composition of each group.

The Bootcamp faculty are as follows:

- Microscopy: Andy York (NIH), Maria Ingaramo (NIH), Heun Jin Lee (Caltech), Hesper Rego (Harvard), Robert Brewster (Caltech)
- Biochemistry: Bob Fischer (NIH-NHLBI) and Sabine Petry (Princeton)
- Matlab: Hernan Garcia (UC Berkeley), James Boedicker (USC)

The three **experimental sessions** (I-III) will give you the chance to work with a variety of faculty on a wide range of questions. To get the most out of this experience you should try new areas that take you “outside the box” or outside your comfort zone to learn new approaches and ways of thinking that are different than what you do at your home institution.

This letter ends with the experimental plans provided by each research group, a table with the time each faculty member will teach in the course, and a form on which to list your rotation preferences. You can find short biographies of each faculty member at: <http://www.mbl.edu/physiology/faculty/>. You will be asked to submit your choices for each session during the preceding session. In the case of the first session, you will be

asked to submit your choices during the bootcamp week.

## Nitty-Gritty

- Course information can be found at the course web site:  
<http://www.mbl.edu/physiology/>
- There are 27 students, 67 experimental faculty and teaching assistants, and 19 additional invited lecturers.
- The Head Course Coordinator is Carolyn Ott (NIH)
- The Head Microscopy Coordinator is Joseph Brzostowski (NIH)
- The course assistants are Daniel Gau and Adam Catching. The course assistants are present throughout the entire course in order to make sure the course is running smoothly. This means everything from ordering chemical supplies to planning course barbecues.
- On Sunday, June 14 2015, we will have a “meet and greet” event to welcome everyone to the course. This will start at Lillie Auditorium at 5:00 pm, where we will hand out nametags (for the first day only) and give a few words of welcome. Afterwards, we will have a BBQ together to give everyone a chance to get further acquainted.
- On Monday morning 9:00 am, June 15 in the Lillie Auditorium, we are going to have a “lightning symposium” in which each of you has 90 seconds to present a single-slide. **Please send us your single slide by 5pm, Sunday afternoon June 14.** Email it to Rob ([phillips@pboc.caltech.edu](mailto:phillips@pboc.caltech.edu)) and he will compile all the slides into one presentation. Please send the slide as a pdf (and no movies). We will do this as a continuous act in which each student’s slide is projected and you have 90 seconds to explain what you are up to. At the end of 90 seconds, we will advance to the next slide and the next speaker will begin their presentation as they come to the front of the room. Probably it is best to go for a simple concept: My name is XXX and I am from YYY. The question I am trying to answer is...., the reason we think it is important is.... and the methods we are using are.... After the lightning symposium, the bootcamp instructors will introduce themselves, and we will then walk over to the Loeb building to get started!
- Each day there is a 9 am lecture in Lillie Auditorium, that is open to the MBL community. We will start promptly at 9 am. **Lecture attendance IS REQUIRED EVERY DAY.** There will also be a few 4pm lectures here and there, and there will be lectures going on all the time on campus from totally awesome scientists in the Neurobiology, Embryology, Zebrafish, etc, etc, etc courses. The lecture schedule for Physiology 2015 is available at <http://www.mbl.edu/physiology/schedule/> After each lecture, students will have time to meet as a group with the lecturer for more details discussion. Participation in these after-lecture sessions is mandatory.
- On the first Monday of each two-week experimental session, the faculty for that session are introduced. Students then break out into groups of ~nine each with the faculty leading their rotation for that session.
- Each faculty will offer a choice of 4-6 projects for the ~nine students assigned to their rotation group. The projects are designed to answer cutting edge questions that the faculty really wants the answer to. The Physiology course has proven to be an excellent proving ground for exciting new ideas, and many of our course projects have become important publications, not to mention a Nobel Prize for the discovery of Cyclins!!!!
- Students in each rotation will pair off, and each pair will work on one experimental project.
- Some faculty will hold regular journal clubs or other types of activities as part of their session.
- Faculty will bring prepared reagents in enough supply that the students can spend

their full time doing experiments, not preparing stuff.

- On the Saturday at the terminus of each two week session, there is a research symposium where students present to one another what they learned and their experimental results from the previous two weeks. After the research symposium, students help to clean up the lab area in preparation for the next session. That evening, there will be an End-of Session PARTY!!!!!!

- At the end of the course after the final Research Symposium, students help pack up the whole lab and put everything away for the course next year.

- The MBL has a strict policy on alcohol consumption that will be explained at the beginning of the course.

## **Equipment/resources**

Through the GENEROUS support of scientific equipment vendors, we typically have ~5 million dollars worth of state-of-the-art specialized equipment lent to the course for your use. This is for Physiology use exclusively, and is not shared with the campus or other courses!!! The labs are recently renovated and have all the trappings of a modern research lab. Computer equipment is leased each summer and thus is totally up to date.

The MBL is equipped with a full array of general cell biology/biochemistry lab equipment including centrifuges, rotors, chemical and tissue culture hoods, fridges/freezers, gel stuff, autoclaves, balances, Bunsen burners, pipettes, etc. When using all equipment and lab areas, please clean up after yourself and don't leave a mess, because there is nobody to clean things up for us. We all have to take responsibility for keeping the lab in order.

## **Computers:**

You are encouraged to bring your own laptop computers but there are also a number of computer systems dedicated to the course. These are available for data analysis, literature searching, word processing, email, etc.

## Physiology Rotation Selection

This is the schedule for when the faculty will be present at MBL. **Each student will only do 3 two-week rotations.** You have already been sent the research descriptions for each faculty. We will do our best to match you with your choices, while still maintaining a balance of biological/physical scientists and gender in each group. Every effort is made to assign students to their first choice groups. In cases where that is not possible, students who don't get their first choice in a given session are given higher priority for their first choices in the next session.

Once the bootcamp week gets started, you will be asked to submit your choices for the first session. Please submit your ranked choices by email to Wallace (email: [Wallace.marshall@ucsf.edu](mailto:Wallace.marshall@ucsf.edu)) by the evening of Tuesday June 16. You will be asked to submit choices for session II by tuesday evening of the second week of session I (June 30), and for session III by tuesday evening of the second week of Session II (July 14). Please do not submit all your choices at the beginning since it is highly likely that your preferences will change as the course proceeds. You can use the form below to mark down your choices, or else just email them to Wallace when he asks for your choices.

Session I	Session II	Session III
Jennifer Lippincott-Schwartz (NIH)	Wallace Marshall (UCSF)	Nicole King (Berkeley)
Rob Phillips (Caltech)	Bob Goldstein (UNC)	Alison Sweeney (U Penn)
Joe Howard (Yale)	Dan Fletcher ( Berkeley)	Ethan Garner (Harvard)
Orion Weiner (UCSF)		Jane Kondev (Brandeis) + Rob Phillips

### Rotation Preferences

Session I	Session II	Session III
1st Choice _____	1st Choice _____	1stChoice _____
2nd Choice _____	2nd Choice _____	2ndChoice _____