DISCOVER THE MICROBES WITHIN!: THE WOLBACHIA PROJECT
Professional Development Workshop at Bridgewater State University, Bridgewater, Massachusetts
Feb. 13-14 and 20-21, 2016

INFORMATION AND APPLICATION PACKET
The application deadline is Jan. 1st, 2016. Please send completed applications to:
Program Coordinator Christine Bizinkauskas
Marine Biological Laboratory
7 MBL Street, Woods Hole, Massachusetts 02543

If you have any questions, please contact Program Coordinator Chris Bizinkauskas at 508-289-7693, or by email to cbizinkauskas@mbl.edu.
Project Website: http://discover.mbl.edu
Call for Applications to Discover the Microbes Within!

The Marine Biological Laboratory (MBL), with support from the Arthur Vining Davis Foundations, is offering a professional development workshop in science education as part of The *Wolbachia* Project for pre-service and practicing high school teachers.

Join scientific experts in the study of symbiosis; the infection of insects by the *Wolbachia* bacterium. The project is constructed to serve as a vehicle for introducing high school teachers and their students to a wide range of issues in the biological sciences such as:

1. The concepts and approaches used by scientists to address real world questions.
2. How different fields of biology ranging from ecosystem studies and taxonomy to cell and molecular biology and bioinformatics can all contribute to a meaningful scientific investigation.

The objectives are (i) to provide discovery-based, contemporary science content (ii) to supply year round technical assistance and intellectual support for participants through teacher-scientist partnerships, site-based partnerships between the MBL, BSU and school districts, and among local schools forming a geographic nexus and (iii) to immerse selected teacher participants in summer "envisionships" in a *Wolbachia* scientist's laboratory.

In-service teachers who successfully complete all requirements of the workshop will be awarded 30 Professional Development Points.

What is *Wolbachia*?

*Wolbachia* is a genus of bacteria that infect arthropods. The symptoms of infection vary between host species, but include a
skewing of the sex ratio of offspring from infected organisms toward females. Although the extent of the infection of arthropods by Wolbachia is unknown, it has been found infecting a wide variety of organisms and in a wide range of geographic areas.

During the workshop, held on Bridgewater State University's campus (BSU), participants will identify arthropod samples or bring samples from their local insect fauna. We will use molecular methods (PCR) to detect Wolbachia infections in the collected specimens. We will review sequencing procedures and conduct bioinformatics analyses. Using Wolbachia 16S rDNA sequences, we will construct a phylogenetic tree of the bacteria. Sequencing of positive insect DNAs will be completed at the MBL and made available to participants after the workshop.

You will develop the labs in your classroom to become part of a national network of high school students contributing to a single research effort

What will happen during the “Discover the Microbes Within” Program?

The goal of the project is to establish partnerships between scientists and teachers in ways that stimulate student creativity, analytical thinking, and performance in real-world research. The project calls on resident scientists from the Woods Hole community and visiting scientists to present background information and current research developments on topics related to symbiotic microbes in insects. Teachers will engage in hands-on activities to study the diverse ways that bacteria evolve and symbiotically interact with other forms of life in an environment that promises close interactions with leading research scientists and other teachers. The workshop
paradigm is that students naturally want to learn science as it is practiced. This process will enhance their skills in inquiry, increase understanding of what a scientist does, and contribute to new scientific discoveries. Topics will cover insect collection, insect biodiversity, the symbiotic bacteria that live within insects, DNA extraction, Polymerase Chain Reaction, Gel Electrophoresis, and bioinformatics.

**Who can be a participant?**

Half of our annual workshop attendees will be students from nearby institutions with teaching training programs. BSU College of Education and Allied Studies and the BSU Biology Department will select these participants from its pool of enrolled students interested in teaching high school science. The remaining attendees will be practicing teachers seeking to improve their comfort levels in teaching "discovery science". They will partner with the pre-service teachers in a mentoring role.

Any teacher who has interest, enthusiasm and a commitment to science education can participate in Discover the Microbes Within. We encourage teachers to apply who will network with their colleagues and help spread this project within their own schools and beyond. We welcome teachers in any stage of their careers. The instructors are willing to help teachers at all levels of ability. However, please be aware that the program is very science intensive and so a willingness to learn new terms, techniques and material in a fast pace is key. 24 selected participants will attend the workshop on Feb. 13-14, and 20-21, 2016. Our requirement of you is your willingness to learn and implement the molecular survey of *Wolbachia* symbionts in your local insect fauna.
Costs?

Lodging, meals, and all education materials will be covered. Participants should make every effort to secure their own funding for travel. In the event that travel support is not available, we can support travel for a limited group of teachers. The week-long workshop includes 4 days of intensive scientific training and the last day is an optional trip to tour the Marine Biological Laboratory in Woods Hole.

For more information, contact Program Coordinator Chris Bizinkauskas (email: cbizinkauskas@mbl.edu). Arrival are on Sunday evening and departures will be on Friday afternoon or Saturday morning.

What opportunities are available to you and your students beyond the workshop?

1. Summer Research Envisionships: Six-week long summer research experiences are available for selected high school students and teachers who conduct the Discover the Microbes Within! lab series in their classrooms. These paid summer research experiences are mentored by a Wolbachia or entomology research lab at an institution near your own location.

2. Travel: The program will provide travel assistance for teachers willing to promote the lab series at state or national teacher meetings.

3. Free Loaner Equipment Program: Classes can borrow a BioRad MyCycler (Thermal Cycler) from the MBL for the week that they will be running the labs at no charge. Please plan in advance to coordinate scheduling and shipping. Our objective is to integrate
this cutting edge technology into your classroom. Students versed in PCR will appreciate high standards and be well-equipped to take on research and training opportunities in college or summer lab experiences.

4. DNA Sequencing Collaboration: Teachers can coordinate a free sequencing collaboration with the MBL. In this effort, you will mail aliquots of either *Wolbachia* PCR products or DNA templates to the lab. The sequence will be sent back to you or uploaded on a website for retrieval so that you and your students can use them in the DNA Sequence Analysis Lab using NCBI and BLAST.

*Deadline for application submissions is Jan. 1, 2016.*
DISCOVER THE MICROBES WITHIN!
Teacher workshop on real-world research in symbiosis, microbes and evolution

APPLICATION

Applications should be returned by Jan. 1. 2016 to Program Coordinator Christine Bizinkauskas, Marine Biological Laboratory, 7 MBL Street, Woods Hole, Massachusetts 02543. Email: cbizinkauskas@mbl.edu.

Name__________________________________________________________

School__________________________________________________________

School address__________________________________________________

Phone____________________

Home address (optional)__________________________________________

Phone____________________ Email address__________________________

Current grades taught _______________________ Years teaching___

Subject(s)______________________________________________________

Total number of students in your class(es)__________________________

Please respond to the questions on the following pages.
1. Please tell us briefly why you’re interested in the workshop.

2. To what extent are these research activities typical or representative of the overall school program? (Teachers only)
3. Please describe school resources (computer labs, molecular biology equipment, supply budget) that could enable your school to be successful in this project. (Teachers only)

4. How would you describe the status of your school’s science curricula (i.e., nonexistent, newly revised, needs revision) and how do you participate in statewide and national efforts to reform science education? (Teachers only)