A. Briefly describe overall research program at your laboratory.

My current research projects examine the biology of aquatic invertebrates. I use both field and laboratory techniques, but especially genetic techniques. My studies have implications for fisheries and other natural resources managers.

B. Briefly describe specific project(s) for your teacher

I am currently working on one project and plan to start additional projects soon.

1) My students are working on is cataloging parasites in burrowing mayfly larvae from western Lake Erie, Michigan. Burrowing mayflies are used by government agencies as a proxy for water quality. More specifically, their presence can be used to infer information about water nutrient levels, toxicant levels and general ecosystem health. However, little is known about the parasites of these mayflies or how the parasites affect mayfly populations. We are currently collecting basic information on parasites in mayflies such as species present, abundance of parasites and locations within Lake Erie. Since the parasite and mayflies are difficult to identify morphologically to species, we are using genetic techniques as part of our work.

2) The evolution of annelid worms has been largely neglected until very recently and the current paucity of genomic information of annelids remains an obstacle for understanding the evolution of this phylum. Mitochondrial genes are commonly used in evolution and population genetic studies but few annelid mitogenomes have been sequenced. Therefore, my lab will be working on sequencing the mitogenomes of a few polychaete species to facilitate future genetic studies.

3) The use of environmental DNA (eDNA) is currently gaining widespread use in ecological studies. eDNA is a tool with many ecological applications such as determining where a species has been, the composition of organismal assemblages, or the presence and range of particular species in a geographic location. My lab, along with several academic and governmental collaborators are initiating a study on the distribution of the Waccamaw crayfish. This organism is considered to be vulnerable due to its apparently small distribution in South Carolina, and natural resources managers are working on a conservation plan for the species. However, in order to develop an effective conservation strategy, the distribution of the Waccamaw crayfish must be better delimited. Therefore, the goal of our study is to develop an eDNA assay to supplement traditional sampling efforts to gain a more thorough understanding of the distribution of this crayfish in South Carolina.
C. Will any other people (grad students, colleagues, etc.) be involved directly with your teacher?

I will be mentoring an undergraduate student in lab over the summer. Since FMU is a primarily undergraduate institution, I personally take part in the mentorship of all of my students.

D. Will you require any advanced reading/preparation for the teacher? If yes, please briefly describe.

Teachers will be given articles to read to familiarize themselves with the laboratory techniques I use as well as the organisms I study. However, those materials can be read when the teacher starts in the lab.