**Metagenomics and beyond: ecological analysis of complex microbial communities**

**Microbial community metagenomics, and beyond!**

August 13 - August 20th, 2014 (tentative dates)  
Kellogg Biological Station, MSU

Please apply [HERE](https://docs.google.com/forms/d/1kuYr7WyuHKzHTcXLnu_JGJbOhxKdfxmcQdUKYMqbkmE/viewform) if you are interested in taking this workshop.

Instructors: Dr. Ashley Shade, Dr. Tracy Teal, Dr. Joshua Herr

**Course Description**

This intensive one-week summer workshop will guide attendees in ecologically analyzing microbial communities that have been observed using short-read tag- and shotgun metagenomics sequencing data.

No prior experience is necessary. 2 years or more of graduate school in a biological science is **strongly** suggested. **Faculty, postdocs, and research staff are more than welcome!**

Students will gain practical experience in:

* Getting around in Terminal - Introduction to linux/unix commands and executing Python scripts
* Installing and using QIIME and MOTHUR for processing and quality control of microbial tag-sequences, generating a taxon-table, and exploratory analyses
* Microbial metagenomes: quality control, gene assignment, and assembly
* R (vegan package) for multivariate analyses of microbial diversity and ecological interpretation
* Overview of online tools and databases with public microbial data: RDP, MG-RAST, CAMERA, VAMPS
* Last Day Choose Your Own Adventure: Networks analysis, Scripting in Python, Working with markers other than 16S rRNA

Materials from similar, previous courses are available at http://ashleyshade.tk/

**Learning Objectives**

Workshop attendees will:

* Analyze microbial communities from an ecological perspective.
* Explain the process of high-throughput sequencing, provide an overview of data-handling specific to these technologies, and discuss their biases.
* Differentiate quantitative and categorical contextual data associated with microbial observations, and choose appropriate analysis strategies for each in interpreting community patterns. This includes:
  + Visualizing community data
  + Testing for statistically significant patterns
  + Linking environmental or experimental treatment data to microbial data
  + Assess the contributions of individual taxa to community patterns
* Develop a working proficiency with QIIME, MOTHUR, R, and TRACY’S/JOSH’S FAVORITE SOFTWARE(S), cite alternatives available, and identify resources for troubleshooting and further reading
* Become familiar with publicly accessible microbial sequence database and the tools that they offer for deposition and analyses

**Location, dates, and course structure.**

The course will be held at the [W.K. Kellogg Biological Station](http://www.kbs.msu.edu/) on Gull Lake in western Michigan from 10 am on Wednesday, August 13rd through 3 pm on Wednesday, August 20th. Morning and afternoon lectures will be interspersed with practical hands-on tutorials. Tutorials will use existing datasets for demonstration, but students also will have opportunity to apply these tools to to their own datasets. The final day will include a Choose Your Own Adventure, during which students will opt into one of several available special interest topics.

Room and board will be provided on-site (see enrolling, below). Sunday, August 17th, will be a (half?) day of rest & relaxation. Students should expect to arrive at KBS by Wednesday, August 13rd at 9 am and stay at KBS through Wednesday, August 20th at 3 pm. KBS is several hours away from the nearest airports and students coming from out of state should plan on arriving on Tuesday.

**Applying for the course**

An application is required, and we can accommodate only 24 attendees. We welcome people unaffiliated with MSU, and "students" of any career stage, including postdocs and faculty. Applicants are not selected on a first-come-first-serve basis, and we try to create a balanced class of participants.

**Tuition, course cost, and enrolling**

All students must pay for on-site room and board (see [Orchard Dorms](http://www.kbs.msu.edu/visit/conference-center/student-rates)) prior to arrival. It should be about (~$226 lodging + $125 workshop fee? = $350) $650. We will make arrangements for housing \*after\* choosing students; please do not contact KBS directly.

**Taking the course for-credit**

There is no formal option for taking the course for credit at MSU or elsewhere.

**Supplies**

Please plan to bring a laptop (Mac OS X, Windows, or Linux are all OK). We will not have any additional laptops available.

**Lodging and family**

In 2014, we plan to have housing available for family groups, and expect to also make child care options available for children in the 3-10 age range.

**Instructors**

Ashley Shade (<http://ashleyshade.tk>) holds a Ph.D. in Microbiology from the University of Wisconsin-Madison. She is currently an Assistant Professor at Michigan State Microbiology and Molecular Genetics, where her lab uses multidisciplinary tools to understand the ecology of microbial communities in soils, waters, and plants. She has a particular interest in understanding temporal patterns of diversity, the role of rare taxa in driving community changes, and community responses to extreme disturbances.

Tracy Teal…

Joshua Herr….