

# Benthic Invertebrate Taxonomy, Metagenomics, and Bioinformatics (BITMaB) Workshop

January 9-13 2017

Texas A&M University-Corpus Christi  
Harte Research Institute for Gulf of Mexico Studies  
6300 Ocean Drive, Corpus Christi, Texas 78412 USA

Background: Morphological identification of benthic meiofauna and macrofauna samples is labor intensive, time consuming, and costly. A more efficient method, using DNA markers from metagenomic sequencing of sediment samples to characterize benthic communities, is being developed. For this purpose, a reference library for whole genomes of widely distributed infauna species of the Gulf of Mexico is currently being populated. While still in its infancy, we are anticipating that this new methodology will become a standard procedure for ecological surveys and environmental monitoring procedures.

Purpose: The BITMaB workshop is designed to train graduate students and researchers in the full spectrum involved in this new cutting edge methodology, including sample preparation, taxonomy of common benthic meiofauna and macrofauna taxa of the Gulf of Mexico, metagenomics, and bioinformatics.

There are two objectives of this workshop. First, we intend to produce meio-and macrofaunal specimens from which we will generate draft genomes in support of the development of the eukaryotic genomes reference databases. We strive to include as many unique families/phyla represented in the GoM as possible. A complication for many groups is that fresh material will be required to find and identify individual specimens. As such this workshop will focus on samples collected each morning during the workshop from relatively shallow sediments. This aspect of the workshop will be led by taxonomic experts and provide an opportunity for training students, at all levels. The anticipated outcome for this activity is to provide valuable experiences for many students and to produce as many potential reference samples competent for genome sequencing analysis as possible during the week. The taxonomy experience will take place in the facilities at the Harte Research Institute.

Confirmed taxonomic participants:

- Alberto De Jesus Naverrete – Nematoda
- Rick Hochberg (Lowell, MA) -- Gastrotricha, Rotifera
- Julian Smith III (Winthrop, NC) – Platyhelminthes
- Martin Sørensen (Denmark) – Kinorhyncha, Tardigrada, Gnathostomulida, Loricifera
- Anja Schulz (TAMU-Galveston) – Polychaeta, Sipuncula
- Michael Reuscher (TAMUCC) – Polychaeta
- Jon Norenburg (SI) – Nemertea, soft-bodied mollusks
- Kim Larsen (Denmark) – Tanaidacea
- Melissa Rohal (TAMUCC) – Harpacticoida
- Francesca Leasi (SI, UNH) – Environmental samples, general taxonomy of meiofauna

The second objective of the workshop is to provide training in core bioinformatics analysis. These skills are critical to the effective use of genomic data for analyzing community structure and function. The bioinformatics workshop will take place every morning during the week. Students attending the workshop will emerge with core skills in UNIX (BASH), simple scripting tools and analyzing metagenomics data using open source bioinformatics programs, such as PhyloSift, iPython workflows, and data visualization software. This aspect of the proposal will be led by the UNH and UCR Genomics and Bioinformatics groups. The bioinformatics workshop will take place in the Harte auditorium. The bioinformatics portion will be led by Holly Bik, University of California-Riverside.

Outcomes: Participating students will (1) learn how to properly prepare benthic samples for morphological identification of invertebrates and DNA sequencing alike, (2) acquire taxonomic expertise about common invertebrate taxa of the Gulf of Mexico, (3) gain deeper understanding on the metagenomic sequencing approach to characterize the taxonomic composition of benthic samples, and (4) master the use of sophisticated bioinformatics tools needed for the analyses of genomic and metagenomic datasets.

Support: Travel support for the taxonomic experts including travel, room and board during their participation in the workshop will be provided from the Gulf of Mexico Research Initiative (GOMRI) grant. We anticipate being able to support the travel of a small number of international experts in 2018 also.

Travel support for students will be supplemented with fund from the National Science Foundation, Research Coordination Network (NSF-RCN) EukHiTS grant to Kelly Thomas and Holly Bik <http://eukhits.wordpress.com>.

Travel support for the BITMaB workshop will be limited. There is no registration fee. For travel support requests, please complete and submit the online application form: <https://goo.gl/forms/qjop3hkIVI3qFIQq1>.

Graduate and undergraduate students should also send a letter of support from their supervisory professor. The deadline for application is **Friday, November 18, 2016**. For any further questions, please email Michael Reuscher at [michael.reuscher@tamucc.edu](mailto:michael.reuscher@tamucc.edu).