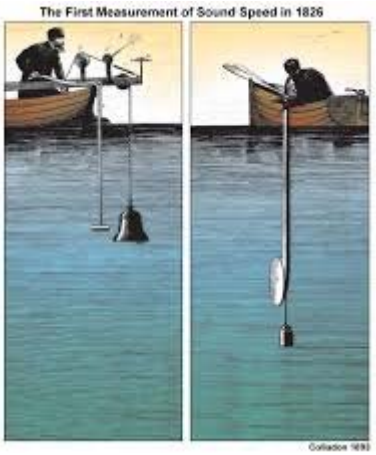
2017 DISL Summer Program Course

Ocean Acoustics and Its Applications in Oceanography



Course description: This course gives a practical guide to learn acoustic propagation basics and acoustical applications in oceanography. It focuses on basic principles, usage of acoustic models and tools, and hands-on practices, instead of lengthy theoretical development. A Matlab software package will be distributed to the students. The software package includes 1) a ray-based acoustic model, 2) acoustic signaling methods, and 3) acoustic processing tools. Centered on the software package, the course utilizes a mix of teaching strategies: lectures, computer demonstrations, and field trips, to build students' knowledge and skills. Two research cruises in the Gulf of Mexico are planned for the students to practice their learned skills. The first trip will collect acoustic measurements for ray-based modeling when the research vessel is anchored at a few stations. The second trip will collect acoustic measurements when the research vessel moves around for Doppler effects and echo sounding.

Course content: The course covers 1) acoustic propagation basics, 2) ray-based model, 3) signaling and processing methods, 4) ocean ambient noise, 5) sound impacts on marine mammals, 6) Doppler effects and eco-sounding, which are the principles of two common oceanographic instruments, ACDPs and multi-beam SONARs, respectively.

Instructor: Dr. Aijun Song (Assistant Professor in the Department of Electrical and Computer Engineering, University of Alabama, Email: song@eng.ua.edu; Website: http://ajsong.people.ua.edu/)

Schedule: July 3-Aug 4 (five weeks); Lecture: M/T (9-11:30); Lab: M (1-4)

Textbook: None Required. Course materials will be distributed to the students in class.

Major activities:

Lab practices: 1) Ray-based modeling of acoustic wave propagation, 2) acoustic transmission, 3) acoustic reception and matched-filtering, 4) using acoustic systems and environmental sensors, 5) Doppler effects, and 6) echo sounding

Computer assignments: 1) Using BELLHOP model, 2) acoustic transmission and reception in the deep ocean, 3) acoustic transmission and reception in the coastal ocean

Field trip 1 – Research cruise to the Gulf of Mexico: Ray-based modeling of acoustic propagation measurements

Field trip 2 – Research cruise to the Gulf of Mexico: Understanding Doppler and echo sounding

How to register: Please visit http://www.disl.org/university-programs/undergraduate-summer-programs/ for details