**Project title:**  Tracking a small fish and understanding how it makes sound.

**Brief Description of Design Project Goals:**

**Overview:**  Danionella dracula are a species of miniature fish closely related to zebrafish, a genetic model organism in behavioral neuroscience. Adults measure less than 20mm in length. Male D. dracula exhibit dimorphic morphology and behaviors from females, where males form territories and defend the territories from other fish using a robust, stereotyped aggressive display, featuring a series of postural movements with the jaws and fins and producing a buzz-like sound. We are looking to collaborate with researchers interested in producing a machine-learning based behavioral assay that automatically tracks the aggressive posturing and sound production of a male fish, recording instances of sound production and the position of body parts during the display. This assay would then be used to quantitatively compare the aggressive displays of male fish under different hormonal treatments/genetic modifications to study the effect of certain neuromodulators on the complete aggressive display.

**Specific MEng Contribution:**  The student(s) will design a video recording system to capture fish motion, develop automatic motion analysis software, and possibly make CGI models of the fish to use as displays for the real fish to watch. Student(s) will not be required to handle live fish.

**ECE Field Advisor Name:**  Bruce Land  
Email - bruce.land@cornell.edu  
Phone – 2557994  
Office – 214 phillips hall

**Consultant/advisor:**  Mert Sabuncu, ms3375@cornell.edu

**Outside Clients:**  Andrew Bass, ahb3@Cornell.edu  
Rose Tatarsky, rlt235@cornell.edu

**Number of MEng Students Needed:**  2 or 4

**Required Skills:**  
Skills necessary include video recording, acoustic interfaces, matlab/python video analysis, computer graphics. Ability to work with a scientist to produce a research product.

**Estimated Project Time Frame:**  2017-18 Academic Year, Two (2) Semesters