**Project title:** Digital Turnstile Tag (DTT) Ground Station Development

**Brief Description of Design Project Goals:**

**Overview:** This project will develop a ground station capable of receiving logged geolocation data from a tag long after it is deployed, dramatically increasing the scope of studies using geolocation by eliminating the need to recapture the tagged birds. Ground stations located at concentration points in migratory routes ("digital turnstiles") will be able to collect logged data from a large number of tagged birds as they pass by on their regular migration.

The conservation of migratory bird populations requires detailed knowledge of individual migration routes and timing. For birds too small to carry tags containing GPS receivers, tags that perform solar geolocation logging are being used instead. Solar geolocation involves recording light level and time data throughout the migration period so that times of sunrise and sunset can be reconstructed. By analyzing data on the rate of change of light level at twilight, the individual’s location can be estimated on a daily basis.

**Specific MEng Contribution:** In close coordination with the Digital Turnstile Tag project, provide the following function using the CC1310 wireless microcontroller with the SimpleLink real-time operating system (RTOS):

- Broadcast interrogation signal when tags (DTT) are likely to be in range.
- Assign a data download time slot for each tag that responds with its unique ID. At times multiple tags maybe in range.
- Check each data packet for errors and request retransmission as necessary.
- Upload each logged tag’s data to a remote server.

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**Project Web Site:** TABER: Technology for Animal Biology and Environmental Research

[http://www.eeb.cornell.edu/winkler/wordpress/?page_id=335](http://www.eeb.cornell.edu/winkler/wordpress/?page_id=335)

**Number of MEng Students Needed:** 1

**Required Skills:** C-language microcontroller programming, algorithm development, Microcontroller interface experience, reliable low-power RF communication, data compression

**Estimated Project Time Frame:** 2018-19 Academic Year, Two (2) Semesters