**MEng Design Project Announcement – 2018-19 AY**

**Project title:** Sensors for Wildlife Monitoring

**Brief Description of Design Project Goals:** Kionix, Inc has a large array of sensor modules for detecting changes in external environments. This project proposed to explore the use of sensor devices for use in wildlife monitoring. Exploring a variety of possible sensors:
- How could sensors be applied to detection of behavior in wildlife monitoring?
- How would sensors be integrated into wildlife tags?
- How would sensors be powered in the wild?
- How would sensors communicate collected data?

One example would be to use an accelerometer to record animal activity in a natural environment. The student team will work with researchers from Kionix, Inc during this project.

**Specific MEng Contributions:**
- Explore Kionix sensor devices and propose applications for wildlife monitoring
- For proposed applications
  - Develop a system to record and analyze data recorded from sensor
  - System must be developed with weight and power requirements considered.
  - Develop a prototype for testing
  - Characterize functional parameters of initial prototype
    - Accuracy
    - Power usage
    - Lifetime operation
- In addition to wildlife monitoring, the system should be adapted for use with domestic livestock and domestic pet monitoring.
- One example proposed for domestic animal monitoring would involve gait analysis. The system could be used to determine a variety of healthy gaits as well as alterations in gait that may indicate health issues. This type of analysis might also employ some machine learning to help differentiate subject gaits.
- The team should consult with Cornell labs (for example, Dr. David Winkler’s TABER group) to verify approaches to designed systems.
- The team must take direction from the customer as requirements evolve. Periodic meeting with customer including updates and demos. Working prototype delivered at end of the project

The MEng team will address the issues above and demonstrate prototypes for an example application within a selected wildlife population.

**ECE Field Advisor Name:** Joseph Skovira
- Email – jfs9@cornell.edu
- Phone – 607 255 6633
- Office – 211 Phillips Hall
Outside Field Advisor Name (if applicable):
- Jacob George, jgeorge@kionix.com

Number of MEng students needed: 2

Related web sites:
- This project uses an accelerometer for wildlife tracking: https://courses.cit.cornell.edu/ece5990/ECE5725_Spring2017_Projects/psb79Pangorometer/PangorometerProject.html
- This project uses a Kionix accelerometer for vibration measurements: https://courses.cit.cornell.edu/ece5990/ECE5725_Spring2017_Projects/iac28_mh866/index.html
- Kionix site: https://www.kionix.com/about-kionix/company-profile

Required Skills:
- Microcontroller programming and system design, sensor development and interfacing (including accelerometers), network communication, GUI and web site design

Estimated Project Time Frame: Fall 2017 + Spring 2018 semesters