EE 491 Weekly Report #11 **Date:** 11/18/2013

Group Project: Garmin - Energy Harvesting in Fitness Electronics
Website: http://seniord.ece.iastate.edu/may1417/index.html
Project Number: May14-17
Client: Adam Rasmussen
Advisor: Dr. Degang Chen
Group Members:

Tyler Chenhall – Project Leader & Foot-Pod Team Member
Rebekah Dejmal – Communications & Webmaster & Foot-Pod Team Member
Catherine Homan – Research & HR Monitor Team Member
Allison Sapienza - Research & HR Monitor Team Member
Omer Vejzovic – Research & Foot-Pod Team Member
Jeramie Vens - Research & HR Monitor Team Member

Accomplishments in the Past Week

- Held a meeting with our advisor & client
- Held separate meetings for the thermo & piezo groups
- Continued researching energy harvesting strategies
  - Focusing on Piezoelectric, Peltier & Seebeck effect
  - The group is also working to organize
- Developed designs for the two energy harvesting prototypes
  - The mechanical (foot pod group) has completed the prototype layout, and ordered the board. Additionally, the group performed thorough characterization of several mechanical harvesting components, including: Mide's V21BL energy harvester, a shake generator from Adam, and some testing on a piece of piezoelectric film from Measurement Specialties.
  - The thermo team has submitted the layout for board manufacturing, and is finishing up part selection in order to be ready for assembly and initial testing when the board arrives
- The team also began distributing surveys on energy harvesting in order to learn more about a typical consumer's interest in 'battery-less' devices and pricing

Plan for the Upcoming Week

- Work on the research document for Adam
- Prepare for end of semester presentations for the Senior Design class
- Meet with Dr. Chen (& Adam Rasmussen via conference call) on Monday
- Continue collecting survey results
- If one or more boards arrive, the two prototype groups may begin soldering & assembly

Pending Issues

- none

Individual Contributions

- Tyler
  - Took meeting notes & created the weekly report
  - Thoroughly tested the Mide V21BL device using various tip masses & resistive loads. One test showed that the device can produce an average of 622μW into a 100kΩ load with a 15 gram tip mass while attached to a shoe during jogging in place
  - Helped perform various other tests on the piezoelectric parts and the shake generator, with both resistive and capacitive loads
  - Began drafting a first revision of the mechanical section to the research document
- Rebekah
  - Managed communications with Adam and others
  - Created the layout for the foot pod energy harvesting circuit
  - Helped distribute energy harvesting surveys at State Gym
  - Helped test piezoelectric parts and the shake generator with basic loads
- Catherine
  - Helped distribute energy harvesting surveys at State Gym
  - Researched thermoelectric generator parts for the heart rate monitor circuit
- Allison
  - Summarized thermoelectric research
- Omer
  - Reviewed the layout for the foot pod energy harvesting circuit
  - Helped distribute energy harvesting surveys at State Gym and a DOT office
- Jeramie
  - Created the energy harvesting survey, helped distribute copies to athletes at State Gym, and compiled the results
  - Reviewed Catherine's research on thermoelectric generators
  - Checked up on the order status of the energy harvesting circuit boards

Individual Hourly Contributions

- Tyler – 10 hours
- Rebekah – 9 hours
- Catherine – 5.8 hours
- Allison – 4 hours
- Omer – 5.3 hours
- Jeramie – 8.75 hours