

**Group Project:** Garmin - Energy Harvesting in Fitness Electronics

**Website:** [http://home.engineering.iastate.edu/~redejmal/senior\\_design/index.html](http://home.engineering.iastate.edu/~redejmal/senior_design/index.html)

**Project Number:** May14-17

**Client:** Adam Rasmussen

**Advisor:** Dr. Degang Chen

**Group Members:**

Tyler Chenhall – Project Leader

Rebekah Dejmaj – Communications & Webmaster

Catherine Homan – Research & Testing

Allison Sapienza - Research & Testing

Omer Vejzovic - Research & Testing

Jeramie Vens - Research & Testing

**Accomplishments in the Past Week**

- Held a conference call with our advisor & client
- Refined the specification for our project, including power output goal, size, weight, and use scenarios
- Continued researching possible energy harvesting strategies
  - Focusing on Piezoelectric, Peltier & Seebeck effect, and some solar
  - Considering power output, size, solution constraints, and which products might benefit
- Made substantial progress writing the Project Plan document
- Began measuring current on devices shipped from Garmin
- Completed NDA/IP paperwork

**Plan for the Upcoming Week**

- Continue research & focus on looking for parts that can be used in testing or prototyping
- Finish current measurements for all the devices sent to us from Garmin
- Perform accelerometer tests using a smartphone in order to characterize typical acceleration magnitudes & frequencies experienced by devices on the human body. (for piezoelectric energy harvesting)
- Meet with Dr. Chen (& Adam Rasmussen via conference call) on Monday

**Pending Issues**

- We still need to receive schematics from Adam. Until then, we are limited in the

testing we can perform on devices received from Garmin. Schematics should be arriving soon, but we will remind Adam if needed.

## **Individual Contributions**

- Tyler
  - Took meeting notes & created the weekly report
  - Researched piezoelectric energy harvesting parts, with a focus on finding parts for low frequencies and low cost
  - Helped fill out the project plan
- Rebekah
  - Organized getting NDA/IP paperwork signed
  - Managed communications with Adam and others
  - Helped fill out the project plan
- Catherine
  - Continuing energy harvesting research
- Allison
  - Researched the Seebeck effect
  - Looked at possible ICs for use in the project
- Omer
  - Researched piezoelectric energy harvesting
- Jeramie
  - Performed current measurements on the Forerunner 210 in various modes
  - Researched mathematical models of thermal-electric devices
  - Read IEEE articles on selecting energy harvesting based on application
  - Helped fill out the project plan

## **Individual Hourly Contributions**

- Tyler – 6.8 hours
- Rebekah – 5 hours
- Catherine – 2+ hours
- Allison – 3 hours
- Omer – 4.5 hours
- Jeramie – 9.25 hours