

What's Next

While this semester's IPRO has come quite far, we recognize that there is still work to be done.

In order to best prepare the spring 2011 edition of IPRO 324 for the challenges ahead, we will provide complete documentation of all activities, testing and results. We are assisted in our efforts through the use of IIT's iGroups which allows future teams to review the documents and communication of previous editions of their IPRO.

We also have a few recommendations for next steps.

- Next year's team would benefit from the addition of students from the Business and Industrial Technology and Management programs.
- Thought should be given to mass production of **iitorque** and the survey data should serve as a kickstart for cost and price analysis.
- Contacts should continue to be made within the cycling community



The Electrical Team worked on the circuitry and programming for the device.

both locally and nationally.

- Contact former members of the team early in the semester before they forget everything. While we've made every effort to prepare for the future team, our own experiences have shown that there will always be matters that require greater clarification.



The Team

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Advisors

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MISSION:

To help cyclists, both amateur and professional, improve their performance.

Many products currently exist that allow cyclists to measure power output. However, these devices are quite expensive.

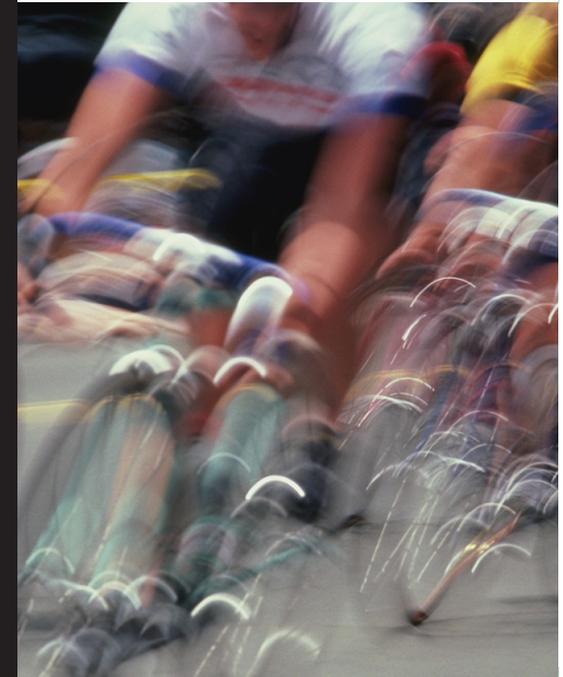
iitorque aims to be more affordable and more accurate than current power measurement devices.

Power Measurement for Performance Bicycles

IPRO 324

iitorque

**Integrated Intelligent
Torque Measurement
System**

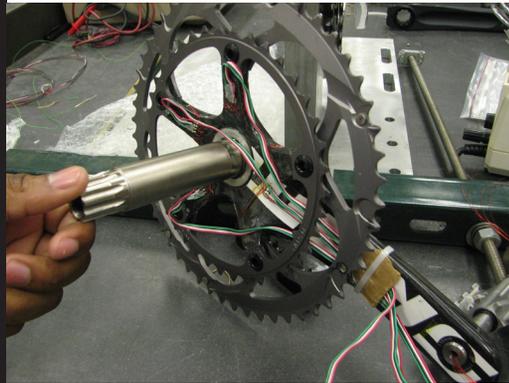


**Part of the IPRO
Program at IIT:**

ipro.iit.edu

No strain, no gain

Methods & findings



Mechanics

Once the casing was successfully prototyped and completed, the Mechanical Teams efforts went into dynamic testing.

Power measurements were calculated using the strain coefficients from last semester, which were then compared to values obtained from a commercially available PowerTap.

Although we have a few kinks to workout with our test system, these preliminary results have proven to be quite promising. Our calculations were right in the ballpark, producing an average error of only 15%.

After recalculating the strain coefficients for our new system, we should be extremely accurate.

Electronics

The Electrical Team had the task of rebuilding last semester's circuit. The circuit is key to processing the data from the mechanical components.

Some of the work completed to date includes preliminary design of a period to voltage circuit and the building/testing of the circuit on a breadboard.

At the time this brochure went to print, the Team was finishing up building and testing the circuit using data incorporated from the Mechanical Team's static testing.

Programming

The Electrical Team was also in charge of writing the code that would allow interpretation of the data from the circuit.

After reading up on ANT+ protocol and getting familiar with C programming, the Team was able to establish some communication.

ANT+ is a popular protocol for many sports performance devices. It allows for the wireless transmission of data to devices like bike computers and smart-phones.

Survey

The Marketing Team reached out to area cycling clubs to better determine the willingness to pay for our product and the acceptability of our expected product delivery method.

We received 83 responses and made some contacts along the way.

We confirmed that cost and data accuracy were the primary factors when consumers purchase power meters.

It came as no surprise that Midwestern cyclists are most willing to part with their bike during the winter.

However, we were pleasantly surprised to find that most cyclists wouldn't mind being without their bike for a period of greater than one week.



Work hard

The Mechanical Team shows off their work.

The Mechanical Team designed and built the casing.

In addition, they performed dynamic testing and used a variety of skills from CAD design to soldering.

Play hard



Vote for us in the IPRO Video Competition! Watch the video again at <http://sites.google.com/site/ipro324>

Team Cyclists

The fall 2010 continuance of IPRO 324 was lucky to have two members of Illinois Tech Cycling on board. Ian and Brian were able to provide invaluable insights on our target audience.

Sweet Gains

Early in the semester, our team participated in IPRO Jeopardy. Our knowledge and our go big or go home attitude made us one of three teams to win a treat party!