

# Wind turbine increases campus sustainability

By Utsav Gandhi  
CAMPUS EDITOR

One of the most exciting events to have occurred on campus during the summer, and definitely one of the most significant, was the installation of Chicago's first research-focused wind turbine at a ribbon-cutting ceremony on Wednesday, July 20 on Stuart Field. The small 8kW turbine is a part of the IIT Wind Energy Consortium, a \$9 million, two-year research project managed by the university's Robert W. Galvin Center for Electricity Innovation and funded by the U.S. Department of Energy (DOE) and private partners. The consortium is working to help reduce the cost of wind power so that the nation may reach its target of 20% Wind Energy by 2030.

Energy prices, supply uncertainties, and environmental concerns are driving the United States to rethink its energy mix and develop diverse sources of clean, renewable energy. The nation is working toward generating more energy from domestic resources—energy that can be cost-effective and replaced or “renewed” without contributing to climate change or major adverse environmental impacts. In 2006, President Bush emphasized the nation's need for greater energy efficiency and

a more diversified energy portfolio. This led to a collaborative effort to explore a modeled energy scenario in which wind provides 20% of U.S. electricity by 2030. Published in 2008, the U.S. Department of Energy's “20% Wind Energy by 2030” report outlines the projected impacts of an increase in wind energy generation. A higher wind energy level has the potential to create American jobs, reduce fuel prices and stabilize electricity rates, create an income source for rural landowners, and lower air pollution.

The majority of academic buildings at IIT are due to get solar arrays as part of the proposed perfect power smart grid. The substations are almost complete, and the test turbine and solar array have been on top of the plant for a while now. Some students are rather skeptical of how much power the campus can harness with only one of these. They're also curious to see how a wind turbine will affect people since it is an urban environment. The Wind Turbine Syndrome is caused by ultra-low frequency and in some cases high frequency noise produced by these turbines that cause some pretty serious health issues.

The turbine stands on IIT's Stuart Field at 31st and Federal Streets and is one of three turbines acquired by the university for research by the consortium. The IIT Wind

Consortium also conducted a ribbon-cutting ceremony for its large 1.5 MW GE Turbine located on a wind farm in Marseilles, Illinois, managed by Invenergy. This utility-grade research turbine is outfitted with high-performing technology designed to increase the output and reduce wear and tear of components, which will ultimately increase the lifespan and performance of the structure.

The technology includes an innovative set of add-on instrumentation and analytical techniques that can detect emerging wind turbine gearbox and other mechanical problems and a laser unit that sits atop the nacelle and measures the wind in front of the turbine blades using laser doppler velocimeter technology. The sensor enables the turbine to “dance” towards the wind to increase output and minimize stress to components. In addition to these instruments, IIT has developed sophisticated phased array acoustic sensors in order to pinpoint acoustic sources on the wind turbine and develop noise reduction technologies.

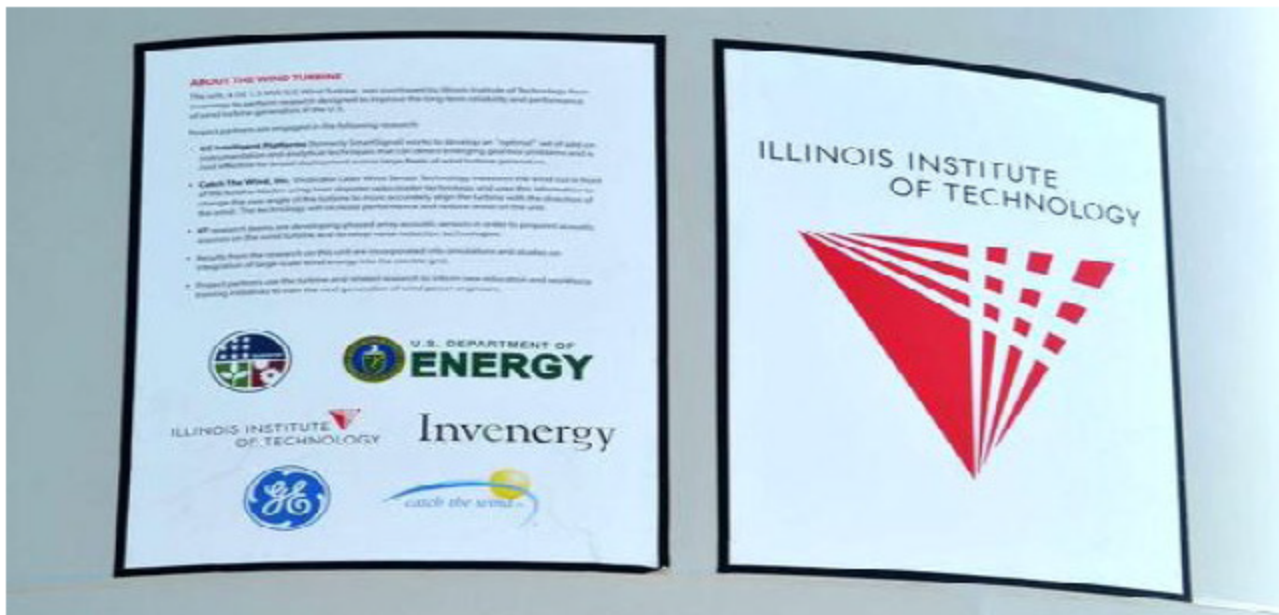
The consortium is only one of the projects managed by the IIT Galvin Center for Electricity Innovation aimed at pursuing groundbreaking work in the generation, transmission, distribution, management and consumption of electricity.

20% Wind Scenario: Wind Energy Provides 20% of U.S. Electricity Needs by 2030  
Key Issues to Examine:

- Does the nation have sufficient wind energy resources?
- What are the wind technology requirements?
- Does sufficient manufacturing capability exist?
- What are some of the key impacts?
- Can the electric network accommodate 20% wind?
- What are the environmental impacts?

Wind vs. Traditional Electricity Generation

- Emissions of mercury or other heavy metals into the air
- Emissions associated with extracting and transporting
- Lake and streambed acidification from acid rain or mining
- Water consumption associated with mining or electricity
- Production of toxic solid wastes, ash, or slurry
- Greenhouse gas (GHG) emissions (Acknowledgements to IIT Today and the US Department of Energy's “20% Wind Energy by 2030”, published July 2008)



Photos courtesy of OCES

# URJit accepting undergrad research submissions

By Chris Roberts  
TECHNEWS WRITER

Do you want to improve fuel cell technology? Are you interested in learning how to prevent cancer cells from moving throughout the body? Have you ever wandered through the MTCC and wondered, “What was this architect thinking?”

By getting involved in undergraduate research at IIT, not only will you be able to answer those (and many other) questions, you now also have the opportunity to share your work with the IIT community through the newly-formed Undergraduate Research Journal: URJit. URJit is currently accepting submissions for its 2011 issue. The journal is the result of IPRO 321, which focused on connecting students to research opportunities. In 2010, the IPRO shifted its focus to promoting and spreading awareness of undergraduate re-

search at IIT as a whole, through a student-run publication. After gaining the support of IIT faculty and administrators, IPRO members created a students organization to carry on the work.

The submission deadline for the 2011 issue is 11:59 p.m. on October 1.

URJit welcomes submissions from all undergraduates within the IIT community, including students from Shimer College and Vandercook College of Music. 2011 graduates are also welcome to contribute. Submissions can take the form of documents, posters, or videos. Currently, URJit is accepting articles in the following formats:

**Formal research article:** A traditional scientific article that describes the subject, methods, and results of the research. This is appropriate for most scientific research at IIT.

**Essay:** An essay which cites verifiable references; this excludes fiction and unsupported opinion pieces. This format is intended for researchers studying Humanities and other

subjects which typically do not adhere to the above format.

**Literature review:** A critical review of a published work. The review could argue or test the claims made by the work's author, evaluate techniques and methods used, et cetera.

**Research experience:** A personal narrative highlighting the experiences of being involved in undergraduate research, rather than the content and results of the research itself. This format may be useful for on-going research projects, IPROs which do not have a physical end-product, and when the research content is copyrighted by a third party.

In addition to submitting articles, students can also get involved by becoming members of URJit. Positions are divided into three boards:

The Design Board creates all of the journal's visual designs, ranging from print (covers and layout) and marketing (fliers and posters) to Web content. The Peer Review

Board reviews submissions, suggests edits for articles, and provides feedback for submitters.

The Editorial Board oversees all steps of publication; edits articles; manages all business aspects of the organization; and works with authors, faculty, and peer-reviewers to maintain quality and style standards for all URJit content.

Currently, URJit intends to publish annually in the fall semester. If there are consistently enough submissions, the journal may switch to publishing an issue every semester. While surveying students during IPRO 321, questionnaire data showed that many students were unaware of that undergraduates could be involved in research. URJit seeks to not only reverse that trend, but to increase interest and participation in undergraduate research at IIT.

Full submission guidelines are available at <http://urjit.wordpress.com/submit/>. Questions about URJit can be sent to [urjit@gmail.com](mailto:urjit@gmail.com).