December 2009 www.cis-ieee.org

THE REPORTER

Journal of the Central-Indiana Section • IEEE

BENTON COUNTY WIND FARM TOUR

Reinhold M.W. Strnat, President, Magnet-Physics Inc., IEEE Senior Member

Fifty members and guests of the IEEE PES/ISA visited the Orion Energy Wind Farm in Benton County, Indiana on October 20, 2009. Jerry Short and Jerry Bowman, who work at the site, were the hosts and gave an excellent presentation and tour, making the group feel welcome. Their competence and experience were made obvious by their comprehensive presentation and knowledgeable answers to questions.

The tour started with a forty-five minute discussion about the history of the wind farm and the studies required to determine if there is sufficient wind for an economical installation. The mechanics and politics of meeting with the landowners to negotiate rights for the placement of a wind turbine on their property are complex and take years to settle. Maps are produced showing the proposed site for each windmill. Some owners are eager to participate, others not so much. Then the participating property owners have to agree to the sites or, more often, suggest changes, which result in modifications and new negotiations. Simultaneously it is necessary to obtain contracts with utilities and energy distributors to sell the generated power, a major task in itself. Several years of work were invested before the first ground was broken. As if all that were not enough of a challenge, the wind farm operator must coordinate and cooperate with the FAA, DNR, and local and state government agencies. Finally, when all parties have reached agreement, the actual construction can begin.

After the discussion, the group took a stroll to a nearby tower and spent about an hour at the base of the windmill experiencing the sight and sound of it from close by. As impressive as these machines look from the highway, their size and majesty cannot be truly appreciated until they are seen from up close.

Some interesting facts about the Orion Energy Wind Farm and wind turbines:

Height from base to bottom of nacelle is approximately 260 feet (80 m).
It takes seven semi-tractor-trailer loads to bring all the parts for one wind turbine to the site:
One load for two of the blades
One load for the third blade
Three loads for tower sections (one each for the three tower sections, one of which is 100 feet long and two of which are 80 feet long)
Two loads for the gearbox, nacelle, electronics cabinets, etc.
The foundation of each tower is poured cement with a diameter of 30 feet, and it extends down 8 feet. It must remain above the (high) water table in Indiana, or else pylons are sunk to support the tower. The total installed cost for each wind turbine is between $2 million and $3 million.

The nacelle with contents weighs about 70 tons (generator, gearbox, electrical cabinets, all equipment) and is the size of several pickup trucks. You would never guess the size when standing on the ground. Access to the nacelle is via a single straight ladder inside the tower, with two platforms on the way up. On a good day an agile and rested maintenance person can climb up in about 5 minutes, but 10 to 15 is more typical.

It was learned early on that copper power cables could not be used inside of the towers. Thieves would break into a tower, climb the ladder, and use a Saws-All to cut the cables without any regard for the electrical voltage that is present. (It is a risky proposition at best!) The cables then drop within the tower and are removed and

hauled off with a pickup truck. Since changing to aluminum cables that problem has been eliminated, as the aluminum has much lower scrap value.

Lightning strikes are common. The wind turbines are designed to withstand them and typically suffer no major damage. Blades are fiberglass with a “rebar” bus-bar running from a copper “hockey puck” near the blade tip to tower ground. That is the lightning protection. For blade maintenance it is sometimes necessary to rappel down a blade. A set of blades costs $390,000 so their upkeep is critical.

Significant ice can build up on the blades in the winter. It results in only a slight decrease in efficiency but poses a significant danger to anyone nearby on the ground. When a sheet of ice breaks off of a blade and falls it can crush a pickup truck! Winter maintenance involves caution and good timing. Deliberate braking can cause the blades to vibrate enough to shed their ice load, increasing the safety factor for technicians.

There are quarterly drills for emergency removal of personnel from a tower. Techniques used include climbing the internal ladder, using an internal hoist, and rappelling down the outside of the tower.

Each wind turbine is fully instrumented with hundreds of parameters that can be viewed and controlled locally or remotely. Underground fiber-optic cables provide the Ethernet-based data communications link. The entire wind farm area is criss-crossed with underground power cables and optical fibers.

The wind farm uses asynchronous generators. Since “it takes power to make power,” the excitation comes from the power utility so the generator synchronizes at 60 Hz. There is also a lot of sophisticated, computer-controlled electronics to make each generator play nicely with the power grid.

There are two high-profile “problems” that have been identified by the public and often get media attention. The first relates to noise. The tower visited by our group is considered a 'noisy unit' which was running in a pretty stiff wind (estimated 13 to 14 m/s) and we could talk with no problem. They really run remarkably quietly, but of course, not silently. There is a continuous low-level whooshing sound reminiscent of a jet airliner flying overhead at a high altitude. It fades away very quickly with distance from the tower.

The second public concern is that birds will be killed by flying into the wind turbines. The Indiana Dept. of Natural Resources requires that

if a bird is killed by a wind turbine, the event must be reported to DNR. No report has had to be issued to date.

If an endangered raptor such as a bald eagle were to make a nest on the top of one of the wind turbines, the DNR could insist that the machine be shut down until the young were hatched and had left the nest. This also has yet to occur. The noise and bird problems seem to be minor but they always comes up when the pros and cons of wind power are discussed.

You can see the wind farm for yourself by taking a driving tour. Details and an extensive collection of photos taken during construction can be found at www.earlparkindiana.com/windfarm.html.

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How Do You Communicate??

Do you want to know what is happening in the Central Indiana Section? Don't know where to look? Already inundated with eNotices? Need to ask a question? Want to find an expert? Get a meeting idea?

Here are some of the many communication channels available in the Central Indiana Section

Find the Central Indiana Engineering Consultants' Network and the Central Indiana Section Communications Society, as well as several other IEEE related organizations on LinkedIn.

Student Branch members are encouraged to join "CIS-IEEE Student Branches" group on Facebook. Several opportunities for students and student branches have been posted there. The Facebook group also provides and opportunity for CIS student members to interact or to make contact with student members outside of Central Indiana. There is no substitute for a good network, but be aware that some hiring managers are also checking these sites.

Communications Society members can find "COMSOC – Central Indiana Section" on Facebook.

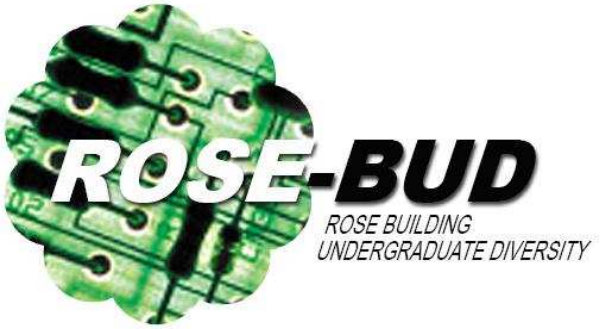
CIS Home Pages

Start with the main site. (www.cis-ieee.org) Check out the calendar of events or link to the many IEEE groups in the Central Indiana Section, including all of the Student Branches.

eNotices

Not getting eNotices? eNotices are not only a resource for keeping in touch with the activities throughout CIS, but you will also receive information on topics of interest throughout IEEE

Login to myIEEE from the IEEE Home Page (www.ieee.org) and sign-up!



by Dr. Carlotta A. Berry,
Assistant Professor,
Department of Electrical and Computer Engineering,
Rose-Hulman Institute of Technology

"**ROSE-BUD Scholarship Program**"

The department of Electrical and Computer Engineering (ECE) at Rose-Hulman Institute of Technology in Terre Haute would like to announce the launch of the ROSE-BUD scholarship program.

The goal of the ROSE-BUD program is to increase the enrollment and retention of academically talented students majoring in electrical and computer engineering, with a special emphasis on women and minorities. All students with a demonstrated financial need and an interest in electrical and computer engineering are encouraged to apply. This program is funded by a $600,000 S-STEM grant from the National Science Foundation.

This program is more than just a scholarship because there is so much more. Students will participate in professional development, mentoring, advising, and networking activities. The professional development program will be used to offer workshops on topics such as teamwork, communication, professionalism, and research. Speakers will be invited from academia, government, and industry to serve as speakers and mentors to the students. The networking, advising and mentoring will be used to create a community and sense of identity for students in the ECE department. All students will be eligible to participate in the scholarship program activities.

The ROSE-BUD program will also sponsor the Wheatstone bridge summer program and the mobile studio teacher program. The summer bridge program between the senior year in high school and the freshman year of college will be a three week refresher course in mathematics, physics for ROSE-BUD scholars. This course will teach the components of pre-calculus with applications to electrical and computer engineering to prepare the scholars for the rigors of an engineering major at Rose-Hulman. The mobile studio teacher program is a workshop for high school physics teachers that will serve a recruiting tool for ROSE-BUD participants. Teachers will participate in a day-long workshop on the use of the Mobile Studio hardware platform. This platform includes an oscilloscope, function generator, spectrum analyzer, voltmeter and digital I/O. Upon completion of the workshop, each teacher will receive a laptop, a curriculum and a board that they can use in their classroom. This program has already garnered support from Rockwell Collins.

The scholarship application is now available online and the first scholarship recipients will enroll at Rose-Hulman in fall 2010.

For questions, please contact the program coordinators, Carlotta Berry and Deborah Walter at rosebud@rose-hulman.edu or visit the website www.rose-hulman.edu/rosebud.

IEEE CENTRAL INDIANA SECTION

CIS-IEEE Continues Teacher Grants for 2010

Teachers Reimbursed for up to $100 of Classroom Expenses

The Central Indiana Section of the IEEE (pronounced Eye-triple-E) is encouraging area teachers to utilize the large selection of free lesson plans available at TryEngineering.org. Lessons focus on Science, Technology, Engineering, and Math and are designed for classroom presentation for under $100.

Eligibility

- School must be located within the CIS-IEEE geographical area
- A lesson from www.tryengineering.org must be chosen
- The lesson must be presented by the classroom teacher. (Not by an IEEE Volunteer)

Teachers may determine geographic eligibility by reviewing Article I, Section 2 of the CIS Bylaws at:
http://www.cis-ieee.org/bylaws.asp

Applying for a Grant

Central Indiana Section (CIS) will reimburse costs for presentation of an eligible lesson up to the $100 limit. Teachers should first get a pre-approval for the reimbursement by supplying the information requested below. Pre-approved lessons will be given an address for submittal of related lesson expenses, up to the $100 limit.

To apply, send an email with the following information to Brad Snodgrass at bsnodgrass@ieee.org

- Name and address of the School
- Teacher sponsoring the lesson
- Grade level(s) targeted for the lesson
- Name of person who will be presenting the lesson
- Date lesson will be presented
- Name of the lesson that will be presented.

Questions

Send questions or requests to Brad Snodgrass at bsnodgrass@ieee.org. Brad coordinates Pre-University Activities for the Central Indiana Section of IEEE.

About the IEEE

The IEEE is the world's leading professional association for the advancement of technology. With more than 350,000 members worldwide, IEEE is the largest technical society in the world. The IEEE is a leading authority on a broad range of topics including aerospace systems, computers, telecommunications, robotics, nanotechnology, biomedical engineering, electric power, consumer electronics, and many others.

Central Indiana Section (CIS) of the IEEE is the local organization supporting the nearly 2000 IEEE members in central Indiana.

About the Teacher In-Service Program

The Teacher In-Service Program (TISP) features IEEE Section volunteers developing and presenting technologically oriented subject matter to local K-12 educators in an in-service or professional development setting. TISP allows IEEE volunteers to share their technical expertise and to demonstrate the application of engineering concepts to support the teaching and learning of science, mathematics and technology disciplines.

To schedule a TISP Presentation for your school, contact Brad Snodgrass at bsnodgrass@ieee.org.

IEEE Resources for Students and Teachers

http://www.cis-ieee.org/ http://www.ieee.org/web/aboutus/home/index.html
http://www.ieee.org/web/education/home/index.html
http://www.ieee.org/web/education/preuniversity/tispt/index.html

IEEE CENTRAL INDIANA SECTION

Write an Essay – Win $500 for your FRC Team

Annual Essay Contest

The Central Indiana Section of the IEEE (pronounced Eye-triple-E) is inviting all Central Indiana FRC Teams to submit their essays to earn a $500 Sponsorship. Three Sponsorships will be awarded.

The IEEE is the world's leading professional association for the advancement of technology. With more than 350,000 members worldwide, IEEE is the largest technical society in the world. The IEEE is a leading authority on a broad range of topics including aerospace systems, computers, telecommunications, robotics, nanotechnology, biomedical engineering, electric power, consumer electronics, and many others.

Central Indiana Section of the IEEE is the local organization supporting the nearly 2000 IEEE members in Central Indiana.

Eligibility for Sponsorship

FRC Teams must meet **ONE** of the following requirements

Teams Headquarters must be located within the CIS geographical area
Team must have an Adult Mentor who is a CIS-IEEE Member

Teams may determine geographic eligibility by reviewing Article I, Section 2 of the CIS Bylaws at http://www.cis-ieee.org/bylaws.asp. Teams may determine Adult Mentor eligibility by sending their Mentor's Name and IEEE Member Number to bsnodgrass@ieee.org.

Essay Contest and Sponsorship Rules

Teams must submit a short (one-page) essay. The essay must identify an engineering mentor on your team and explain what compelled that person to pursue a career in engineering.

Submissions must be in PDF format.

Only one entry per team is allowed.

The top three entries will be selected from all submissions. Each of the three winning teams will receive a $500 Sponsorship from CIS-IEEE. The judges will determine the winning entry and the decision of the judges is final.

Winning Teams are required to display the CIS-IEEE logo at all competitions and demonstrations.

Deadline

Entries must be submitted by Monday, March 1, 2010. All entries must be sent to bsnodgrass@ieee.org. All submissions will receive confirmation that their essay was received and that they have met eligibility requirements.

Awards will be announced no later than Friday, March 12, 2010.

IEEE Resources for Students and Teachers

http://www.cis-ieee.org/
http://www.ieee.org/web/aboutus/home/index.html
http://en.wikipedia.org/wiki/Ieee
http://www.ieee.org/web/education/home/index.html
http://www.ieee.org/web/education/preuniversity/tispt/index.html

Questions

Questions or requests can be sent to Brad Snodgrass at bsnodgrass@ieee.org. Brad is an Adult Mentor for Team 829 at Warren Central and will not be judging the contest. Teams' questions and requests will **not** be shared with Contest Judges.

(This page and the previous page may be printed out and distributed to your local school.)

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VOLUNTEER OPPORTUNITIES

The Central Indiana Section still needs help in a few areas. This is your opportunity to give back to an organization that has helped you in your career and a chance to network with your peers and gain recognition. The following positions are currently open:

- Constitution and Bylaws Chair
- Fund Raising Chair
- Vice Chair
- Communications and Information Officer
- PACE Chair

Becoming an IEEE volunteer can be a gratifying and memorable experience. Whether your skills are suited for organizing conferences and meetings, fund raising, financial reporting, communicating or maintaining web sites, CIS can use your skills.

Additional opportunities for involvement include fund raising, awards, educational activities and the development of new programs.

As an IEEE volunteer, you can take pride in participating in activities that interest you, while expanding your knowledge of the IEEE, gaining valuable management and leadership skills, and connecting with others in your profession.

Teachers Learn Rotational Equilibrium at Brownsburg Challenger Center

On September 1, 2009, as part of their Moon Mission Level 2 teacher training workshop, teachers and staff at the Brownsburg Challenger Center participated in the "Rotational Equilibrium" TISP lesson.

Teachers and staff built all three levels of their mobile, and successfully connected their mobiles together. The teachers then learned how these same concepts are used to steer rockets in space.

Curious? You can find the Rotational Equilibrium lesson on www.TryEngineering.org.

To learn more about the CIS TISP initiative, contact Brad Snodgrass at bsnodgrass@ieee.org. Please join the CIS TISP Volunteers Yahoo Group and share your TISP successes. See the Yahoo Group at http://groups.yahoo.com/group/cis_tisp_vols. Contact Brad for a membership invitation.

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CIECN Members Get Educated on new Patent Law

On October 8, 2009, Central Indiana Engineering Consultants' Network (CIECN) members learned about proposed changes to patent law and strategies for protecting Intellectual Property, from Matthew Schantz of Bingham McHale, LLP

Matt provided information on changes to patent law that are being discussed in Congress and in the courts that are targeting some long-standing principles of patent law. Intellectual property strategies that a business can use to optimize its position both near-term and long-term were addressed.

CIECN meets on the second Thursday of every month. Meeting details are available on the CIECN website. (Indy-Engineer.net) Contact the CIECN steering committee for more information on meetings, to suggest a meeting topic, or for information on presenting a meeting.

We'll see you there!

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CIS NEWS – Treasurer

David Koehler will begin serving as CIS Treasurer in 2010. Carlotta Berry has served in this position since the beginning of 2008 and expressed a desire to be replaced so she can spend more time on her career and with her family. CIS expresses heartfelt thanks to Carlotta for her service and staying on until a replacement could be found.

Pam May is retiring from IUPUI and is, therefore, also retiring as the CIS Communications and Information Officer, a position she has held for many years. Pam is well known at IUPUI for being an over-achiever and her assistance to CIS will be sorely missed.

Niusha Rostamkolai is retiring as a director for CIS, a position he has held for the last two years. CIS wishes to thank him for his service.

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NEWLY ELEVATED FELLOWS AND SENIOR MEMBER

The following members of CIS-IEEE have recently been elevated in grade. Congratulations to them all.

Fellows: Joerg Appenzeller

Ahmed El-Magarmid

Anand Raghunathan

Timothy Sands

Vladimir Shalaev

Senior Member: Bin Yao

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ELECTION OF CIS OFFICERS FOR 2010

The following CIS officers were voted in at the December 12, 2009 ExCom/Planning meeting.

- **2nd Year Director – Will Kassebaum**
- **1st Year Director – Steve Shen**
- **Chair – Phil Walter**
- **Vice Chair – Open**
- **Secretary – Karl Huehne**
- **Treasurer – David Koehler**

Congratulations to these volunteers.

For immediate release

EMC by Your Design
Practical Applications Seminar/Workshop

By Donald L. Sweeney and Roger Swanberg

Includes learning to control signal return currents on PCB's and how EMC and signal integrity are interrelated

With free take-home computer software and free individual 45-minute product review

April 15, 16 19, & 20, 2010
Hilton Hotel, Northbrook, IL
$300 discount if registered by March 15, 2010

www.dlsemc.com/1001
cgorowski@dlsemc.com
847-537-6400

Don't just hear about it

See it

Feel it

Experience it

* * * * *

2010 Meeting Calendar			
Date	**Host**	**Subject**	**Location**
Tue, Jan. 12	PES/IAS	Plug-in Hybrid Vehicles	IPL/Indianapolis
Thu, Jan. 28	CIS	**Executive Committee Meeting**	IUPUI - ET201S
Thu, Feb. 25	CIS	**Executive Committee Meeting**	TBD
Thu, Mar. 25	CIS	**Executive Committee Meeting**	TBD
... Check the Section web page for details and current information.			

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Central Indiana Section Active Volunteers (effective January 1, 2010)

Director (317) 225-4126
Will Kassebaum Will.Kassebaum@ieee.org

Director (317) 706-9125
Steve Shen sshen@itt-tech.edu

Chair (812) 223-6520
Phil Walter Phil.Walter@ieee.org

Vice Chair
OPEN

Treasurer (317) 441-2076
David Koehler David.Koehler@wicor.com

Secretary (317) 985-5360
Karl Huehne khuehne@ieee.org

Power & Energy/ Industry Applications Societies (317) 726-1236
Earl Hill eshill@loma-consulting.com

Computer Society (317) 715-8598
Matt Etchison Matthew.Etchison@inin.com

Central Indiana Section Active Volunteers (cont'd)

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Communication Society (260) 437-1177
Sam Kincaid sam.kincaid@ieee.org

Constitution and Bylaws
OPEN

Historian (317) 274-7881
Marv Needler mnpn@juno.com

Pre-university/Student Activities (317) 679-6194
Brad Snodgrass bsnodgrass@ieee.org

IUPUI Student Branch ieee@iupui.edu

ITT Tech Student Branch CIS-IEEE Representative
Mohammed Boudaia MBoudaia@itt-tech.edu

Signal Processing Society (765) 494-5916
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Engineering in Medicine and Biology Society
Jake Chen (317) 278-7604
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Newsletter Editor (317) 985-5360
Karl Huehne khuehne@ieee.org

Communications Information Officer
OPEN

Rose - Hulman Institute of Technology Student Branch
Robert Throne throne@rose-hulman.edu

Purdue University Student Branch
Tom Talavage tmt@purdue.edu

Editorial Policies

Each issue of The Reporter typically references three months - the month in which it is published and the following two months. The Reporter is typically published in March, June, September, and December.

Material to be included should be submitted mid-month prior to the month it is to be published. For example, material intended for the September issue should be submitted to the Editor by August 15. The Editor will send a reminder to all IEEE Central Indiana Section entities by the 15th of the month to submit their updates.

Copy should be submitted electronically. Photographs are desirable. Advertisements are welcome. Contact the editor for layout sizes and rates.

Distribution: The Reporter is made available electronically to the approximately 1800 IEEE members within the Central Indiana Section including student members and faculty of Purdue, IUPUI, Rose-Hulman Institute of Technology and ITT Technical Institute.

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Central Indiana Engineering Web Links

ACEC	American Council of Engineering Companies, Indiana	acecindiana.org
ASCE	American Society of Civil Engineers	sections.asce.org/indiana
ASME	American Society of Mechanical Engineers	http://sections.asme.org/central_indiana/
ASM-INDY	American Society for Metals - Indianapolis	asm-indy.org
CIECN	Central Indiana Engineering Consultants' Network	Indy-Engineer.net
CINLUG	Central Indiana Linux Users Group	cinlug.org
IBEN	Indiana Biomedical Entrepreneur Network	indianabionetwork.org
ICES	Indiana Council of Engineering Societies	in-ces.org
IHIF	Indiana Health Industry Forum	ihif.org
INCOSE	International Council on Systems Engineering	www.incose.org
INDSPE	Indiana Society of Professional Engineers	indspe.org
INDYASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers	indyashrae.org
NSBE-IAE	National Society of Black Engineers - Indianapolis Alumni Extension	nsbe-iae.org
PIMCIC	Project Management Institute - Central Indiana Chapter	pmicic.org
SAE	Society of Automotive Engineers, Indianapolis	http://www.saesections.org/indiana/
Scientech	Scientech Club in Indianapolis	scientechclub.org
SIM	Indianapolis Chapter of Society for Information Management (SIM)	SimNet.org
SWE-CI	Society of Women Engineers - Central Indiana Section	swe-ci.com
Techpoint	A diverse collection of technology-based Indiana industries.	Techpoint.org