

THE REPORTER

Journal of the Central Indiana Section • The Institute of Electrical and Electronics Engineers, Inc.

CIS-IEEE National Engineers Children's Day

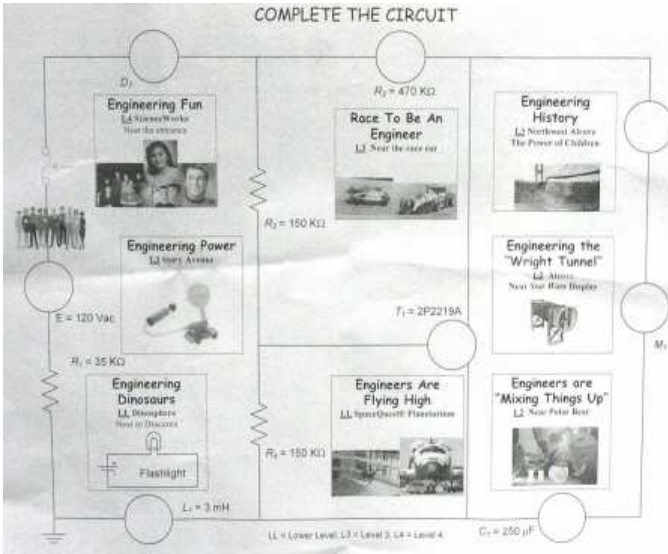
Co-sponsored by Indiana Council of Engineering Societies
with support from:

SWE - Society of Women Engineers
NSBE - National Society of Black Engineers
AIChE - American Institute of Chemical Engineers
ASME - American Society of Mechanical Engineers
INCOSE - International Council on Systems Engineers
AIAA - American Institute of Aeronautics and Astronautics





Saturday, February 16 was National Engineers Children's Day at the Children's Museum of Indianapolis, in accordance with National Engineers Week, February 17-23. Children were given a paper "circuit", (see diagram below), and asked to "Complete the Circuit" by visiting the eight engineering locations throughout the museum. Volunteers working at the various locations helped the children with a number of hands-on activities and stamped the circuits as events were completed at each station.



Pick up Your Schematic at the Entrance

"Complete the Circuit" Schematic



Engineers are "Mixing Things Up"



Race to be an Engineer
Volunteer Brad Snodgrass (L)



"Balloon Racing" Sponsored by Rolls-Royce



Engineering Power Sponsored by Rolls-Royce



Engineering History with a Video of the Tacoma Narrows Bridge Failure (1940)



Engineering Fun



Engineering Energy



Engineers are Flying High with Volunteers Will and William Kassebaum, among others

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In order to encourage girls to become involved with engineering and technology, the [Society of Women Engineers \(SWE\) Central Indiana Section](#) has launched a new program, **Wow! That's Engineering!**

The event was held on the IUPUI campus on February 23 and was co-sponsored by IBM.

What happened at the *Wow! That's Engineering!* event?

SWE-CI created activities geared for middle school girls (7th and 8th grade) where they had the opportunity to meet women engineers and technologists and hear first-hand about these exciting career paths. Through interactive demonstrations and lunch discussions, girls were able to experience the creativity and innovation that occurs in the field of engineering and technology.

- Activities included:
 - Balloon/payload Races (aerospace/aeronautical engineering)
 - Lipstick Making (chemical/manufacturing engineering)
 - Crystal Radio (electrical/electromagnetic engineering)
 - Watersheds/ drilling wells (environmental/civil engineering)
 - Bridge Building (mechanical/civil engineering)
 - Peanut Butter & Jelly sandwich (programming/software engineering)

The Richard P. Lugar Center for Renewable Energy

IUPUI dedicated the Richard G. Lugar Center for Renewable Energy on January 4, 2008. The Center will be involved in research involving ethanol, fuel cells, energy efficiency and many other topics related to alternative and renewable energy. More information on the Center's areas of activity can be found at <http://lugarenergycenter.iu.edu/research.html>.

Several CIS-IEEE members (mostly from the Power Engineering/Industrial Applications Societies) attended. This event was publicized by the CIS-IEEE, as part of ongoing efforts to spread the word on interesting technical events in the area.

The ceremony was opened by chancellor Bantz of IUPUI, who introduced Center Director Dr. Andrew Hsu, who spoke and showed a short video on the Center and its mission. The key note presentation was provided by Senator Richard Lugar, who covered a wide range of energy related topics. The Senator then answered audience questions. A complete text of the Senator's remarks can be found at <http://lugarenergycenter.iu.edu/forum.html>

On February 12th, the PES/IAS membership toured the Richard G. Lugar Center for Renewable Energy at IUPUI. The tour began with a lecture by Dr. Andrew Hsu, Director of the Center. His talk included discussion of the need to address the energy situation in the US today. Energy policy makers find that currently the US is the largest total consumer of energy and the second largest consumer on a per capita basis. The US also has the highest per capita production of carbon dioxide, contributing to global warming. Much of our oil and other energy resources come from foreign countries with which the US does not necessarily have good relations. Lastly, Dr. Hsu showed that worldwide oil production rate of increase has slowed, and that more oil is being consumed than found each year. Eventually, this will reduce oil reserves from the forty years worth of current consumption.

The Center was founded to reduce our dependence of fossil (in particular foreign) fuels and to improve energy efficiency before the costs of these actions become prohibitively high. One of the key areas of research is the production of ethanol, in particular from corn. The Center is also experimenting with other crops, and with other means of performing the conversion to ethanol. The Center is involved in efficiency research as well – it is clear the US is not the most efficient user of energy. Other areas of research include the following:

- Photovoltaics (solar power)
- Fuel cells
- Fuel conversion (ethanol to hydrogen or gasoline)
- Use of "other" parts of the corn plant for ethanol conversion to improve process efficiency


Following the lecture, Dr. Hsu led the group through parts of the laboratory located in the ET building (the Center itself is scattered across several buildings, including the medical school). The tour touched on several ongoing experiments, which looked promising for addressing the energy issues the Center was founded to explore.

More information on the Center's areas of activity can be found at <http://lugarenergycenter.iu.edu/research.html>.

2008 Meeting Calendar

Date	Host	Subject	Location
2008			
Mon., March 3	SciTech	China's Three Gorges Dam - Darrell Bakken & Jim Bettner	Children's Museum, 11:30am
Wed., March 5	ASME	Utilization of Insulation for Greater Energy Efficiencies	Indianapolis Columbus, IN
Thu., March 6	ASME	Center for Coal Technology Research Meeting	
Tue., March 11	ASME	Durability by Design: Introduction to fe-safe™ (Half Day) Hosted by Cummins Inc , Professor John Draper, CEO, Safe Technology Ltd., fe-safe™ is Safe Technology's fatigue analysis software for FEA models.	
Mon., March 17	ASM	Student Night/Scholarship Night , Albert Feuernstein - Praxair, EB PDV Technology	
March 25-27	Purdue JTRP	Purdue Road School , Road School is a free conference open to the public but registration is required.	Purdue, West Lafayette, IN
Mon., March 31	SciTech	Tour of Indianapolis Waste Water Treatment Facilities	Indy Children's Mus.
Mon., April 21	ASM	Business/Awards/Past Chair Night , Bernice Aboud - Dupuy, New Materials for Joint Replacements	
Tue., April 22	PMICIC	2008 Spring PMP Exam Prep Class	IN CPA Society, Indianapolis, IN
April 22, 23	SBIR	Small Business Innovation Research Workshop	Hampton Inn Downtown, Indianapolis, IN
April 24-25	ISPE	Fundamentals of Engineering and Principles and Practices Examinations	
Mon., May 19	ASM	Fabrication of Custom bicycles , Steve Maus	
Thu., October 16	ICES	Professional Networking Event	



Check the [Section Website](#) for current information. 

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Power Engineering Society / Industrial Applications Society

The PES/IAS schedule of activities continues throughout 2008. The following items are scheduled for the first half of the year.

March 2008

Short Course: "Engineering Economics" by Dr. Thomas Mason and Craig Downing, Rose-Hulman Institute of Technology; Safety Room, Indianapolis Power & Light, 1230 Morris St. Indianapolis, IN 46221.

April 15, 2008

Annual CIS-IEEE/PES-IAS Student Awards Banquet
Safety Room, Indianapolis Power & Light, 1230 Morris St. Indianapolis, IN 46221.

May 8, 2008

Tour of Midwest Independent System Operator (MISO)
701 City Center Drive, Carmel, IN 46032.

June 10, 2008


"Advances in SCADA Technology" by Don Bergert of Advanced Control Systems
Safety Room, Indianapolis Power & Light, 1230 Morris St. Indianapolis, IN 46221.

More events will be scheduled for the fall, including another short course, plus tours or meetings in September and possibly November. Please consult the CIS-IEEE website for additional details on the times and dates for these events (which may change). For more information, contact Mr. Earl Hill, Chairman, PES/IAS at 317-726-1236 or eshill@loma-consulting.com

learn



investigate



explore



apply



discover



evaluate





EMC by Your Design

An EMC Practical Applications Seminar and Workshop
(with free product design evaluation and take home computer program)

by Donald L. Sweeney and Roger Swanberg

April 3, 4, 7 and 8, 2008
Northbrook, IL

More information at
www.dlsemc.com/1001

Call 847.537.6400 today to register.
(class size limited)

\$300 discount if you register by
March 18, 2008

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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
CINLUG	Central Indiana Linux Users Group	cinlug.org
IBEN	Indiana Biomedical Entrepreneur Network	indianabionetwork.org
ICES	Indiana Council of Engineering Societies	http://in-ces.org/default.aspx
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

How to Start and Expand a Successful Consulting Practice

**Gary L. Blank, PhD.
P.E.**

President
Engineering Update Institute
Plato Center, Illinois, USA
<http://drblank.com/mal.htm>



Join the Central Indiana Engineering Consultants' Network (CIECN) and the Central Indiana Section of the IEEE for this valuable Seminar on Saturday, April 26th from 9 am – 4 pm.

Gary Blank received a Bachelor of Science Degree in 1959 from Illinois Institute of Technology, a Master of Science Degree in 1960 from the University of Idaho, and a Doctor of Philosophy Degree in 1963 from the University of Wisconsin. All degrees are in Electrical Engineering. He was a Principal Staff Engineer at Honeywell, Litton Guidance and Control Systems, and Teledyne Systems. He was a full-time Professor of Electrical Engineering at Illinois Institute of Technology, Northern Illinois University, Marquette University; and part-time at U.C.L.A. and the University of Florida.

He has been a successful self-employed consultant in industry for 35 years to over 30 client companies including Lucent, Hamilton-Sundstrand, GMAC Electronics Division, Rockwell-Collins, Northrop-Grumman, Hughes, Unisys, and the U.S. Navy, in the areas of Controls, Brushless Motors, Power Electronics, DSP, and Navigation and Guidance. He has published many technical papers. He is a Life Senior Member of the IEEE.

Consultants are in high demand . . . are you available? Learn "How to Start and Expand a Successful Consulting Practice"

SEMINAR OUTLINE

Session 1 - How to Get Started Without Leaving Your Present Job, Keeping Records, & TAXES

- INTRODUCTION to modern consulting and the consulting marketplace.
- MYTHS about consulting. Some are true, some are false.
- REASONS to become a consultant. How do these reasons influence your success as a consultant?
- Critical details and important concerns about GETTING STARTED. What are the steps?
- The RECORD-KEEPING procedures used by many consultants FOR TAXES are simple.

Session 2 - How to set your fees -A FORMULA for fee setting; Experience Needed

- How do you determine what the FEE is for an assignment? You will be shown a simple FORMULA for calculating the fee to charge a client.
- Common question: Do you have the EXPERIENCE to be a consultant? The answer is revealed during the seminar.

Session 3 - HOW TO WIN THE CONTRACT, Step-By-Step, What To Say, What To Do

- The ETHICS of consulting and multicultural diversity awareness. What are they? How you as a consultant handle them professionally.
- Why will A CLIENT SEEK YOU? How does a client make a final decision among you, other consultants, and using internal capabilities?
- How do you WIN a contract? Follow the steps involved from the first contact, through the interview, the preparation of the proposal, and obtaining the purchase order.

Session 4 - HOW TO FIND CLIENTS

- How do you FIND CLIENTS? You will be shown OVER TWENTY UNIQUE AND PROVEN METHODS OF FINDING CLIENTS, without cold calling or mass mailing.

ADDITIONAL BENEFITS OF SEMINAR

TAX DEDUCTION: It is likely that each attendee is eligible to receive a tax deduction for education expenses undertaken to maintain or improve skills required in one's business.

When: Saturday April 26th, 9:00am - 4:00pm

Where: TBD - Probably IUPUI

Cost: IEEE Members \$120, Non-IEEE Members \$150
Save \$250 over buying the course online. Plus, get a tax deduction!

Three Central Indiana FIRST Robotics Teams Claim \$500 Sponsorships

Three local FRC Teams have claimed \$500 sponsorships in the IEEE Central Indiana Section's Second Annual Essay Contest.

The FIRST Robotics Competition (FRC) challenges high school students to solve a common problem in a six-week time frame using a standard "kit of parts" and a common set of rules. Teams build robots from the parts and enter them in a series of competitions designed by Dean Kamen, Dr. Woodie Flowers, and a committee of engineers and other professionals. (<http://www.usfirst.org>). FIRST Robotics Competition is a unique varsity sport of the mind designed to help high-school-aged people discover how interesting and rewarding the life of engineers and researchers can be.

This year's essay contest challenged teams to describe how at least one of the tasks to be performed by their robot for the 2008 games could be applied to a robot used in industry.

This year's winning essays were submitted by Warren Robotics, (Warren Central High School) The CyberCards, (Southport High School) and Team Roboto (Madison County Community Foundation and Ebbert Education Center) The winning essays appear below.

CyberCards Team 1529 Southport High School

Every year, FIRST creates a new game with many different ways to score. One of the ways to score is to be able to knock a 40" trackball off a 6 ft. overpass. To accomplish this task, we have modified a piston to push the ball completely off of the overpass. The challenge is becomes more a challenge, because the whole process is during the autonomous period, so the movements have to be pre-programmed into the robot's memory.

Most industries don't need a robot to knock a ball off of an obstacle, but there is becoming more of a demand for robots being able to do small tasks without human supervision. Automated courier robots are slowly being used more and more in hospitals. These robots are 50-pound machines, which look like a vacuum cleaners mated to a cabinet, designed to autonomously ferry loads of linens, medical supplies, X-rays, food and other materials. Their memories are packed with detailed maps of the hospital and computer programs to help them keep track of where they are. Though the courier's program is more sophisticated than our own robot's, they both are aimed to do a similar job, to move toward a goal and execute its designed task. Our robot is designed with a rubber piece connected to the end of a pneumatic piston. The rubber causes high friction between it and the ball, making sure there is a good grip to control the ball's mobility.

Robots are continuing on making human's lives easier. By helping in hospitals, the automated courier robots help save money and time. A third of the nation's hospitals have lost money due to unfilled nurse positions, these robots thus are more cost efficient than having to pay salaries. A 2000 study by Manuel Rosetti, an assistant professor of engineering at the University of Arkansas, found that the University of Virginia Hospital could save as much as \$218,000 a year if it replaced 15 human couriers with six HelpMate robots, a brand of automated courier robots, which are able to work continuously without any breaks. While the robots are making their deliveries, this frees up workers from doing tedious tasks, to being able to do more critical tasks that require more detailed attention. With all of these advances in technical fields, we are hoping to make our future easier and less strenuous for everyone.

Warren Robotics Team 829

Warren Central/Walker Career Center

One of the tasks our robot faces this year is to pick up a large 40" ball and lift it to a height of 6' 6" and put it over an obstacle (the OVERPASS). To do this, we use a pneumatic operated arm with several joints and a gripper mechanism. The gripper mechanism is made to reach around a 40" ball, grab it, and lift it up to drop it over or onto the "OVERPASS" structure. This requires the use of motors and pneumatic pumps and pistons.

This kind of technology can be seen in other industrial areas, such as storage and medical fields. Arms are used to store and retrieve items in a storage area, such as an ASRS, or Automated Storage and Retrieval System. These generally stay on tracks that are located between storage racks, unlike our robot, which moves freely on wheels. The arms of the storage robots are made to reach different elevations, move straight to reach out, grab, and pull back the item, and then return it when it is time.

Our robot is made to go to only two or three different heights, one to pick up the ball, one to get it over the "OVERPASS" and maybe one to carry the ball around in front of the robot. This is mainly due to the fact that the storage robot is on a beam that goes up and down like an elevator, while our robot's arm has joints. Like the storage robot, ours has only two gripping functions, open and closed.

Robotics is even being used currently in the medical fields, with more advances sure to be on the way. There are cases where robots are used for surgery. Doctors in the United States are performing surgeries in Iraq via robots. Saint Vincent's Hospital also uses a robot for surgeries. Named the da Vinci Robotic Surgical System, the system is used for Laparoscopic Prostatectomy, which removes prostate cancer. It has made it much safer for patients receiving the surgery, because it is more precise, and less invasive than normal prostatectomy. In the future, medical institutes can use robotic arms for their storage, and for helping with treatments. They can be used for therapy, to help stretch limbs that need to keep moving. They can even be used to give injections or draw blood, because a needle on a track, or in a mechanical arm, moves much smoother and steadier than a human's hand. With all the current advances in the field, and more sure to come, things will hopefully be made much easier, and safer, in the future.

Team Roboto # 447

Ebbertt Education Center

In today's industry, robots are used to perform precise, constant, and efficient tasks. Applying the idea of human interactions with objects, we can come up with practical ways to engineer our own robots to do these same repeated tasks consistently. In production, one small misalignment can disrupt the remainder of the process. Our robot is able to compensate for certain degrees of placement error. Using rotating treads on the ends of our grabber and an ability to reach out, it is able to take hold of the ball without being precisely on target. And doing so allows for a larger tolerance of error. Therefore, even with marginal difference in placement, the ball will still be brought back to a precise position to handle with as needed.

Using our idea in industry, errors can be compensated for with less hassle. For example, in the movement of a product from one point of the assembly to another, our robot's grabbing technique can be used to easily pull the object from any location into its possession. Then the product can be carried to a desired destination in the production process. Once there, the rotation of the grippers can be reversed to release the object into position. Due to our robot's concept, an error in this process can be fixed with ease.

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Editorial Policies

Each issue of The Reporter references approximately three months - the month in which it is published and the following two months. The Reporter is not published in June, July, and August because there are generally fewer meetings held during the summer months.

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 monthly updates. If no update is received for that month, only the mission statement and contact information will be published for that entity.

Copy should be submitted electronically. Photographs are most desirable and may be submitted in electronic format or color, black-and-white glossy, or Polaroid. Please note that black-and-white photographs reproduce best. Advertisements are welcome. Contact the editor for layout sizes and rates.