IEEE Madison Section Newsletter

Volume 9, Number 3 | Serving IEEE Members of South Central Wisconsin | March 2006

Security Challenges on the Plant Floor

Date/Time: Thursday, March 16, 2006, 11:45 AM - 1:00 PM
Speaker: Kenneth Hartman, VP of Operations and Chief Security Officer, Visonex, LLC
Location: Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444
Menu: Pizza buffet, salad and soft drinks (cost $10.00, free for student members)
RSVP: by March 13th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.444.9144

Non-member guests are always welcome!

Internet technology is becoming more ubiquitous every day. There is tremendous demand for "web-enabled" or "smart" devices, such as photocopiers that email a service technician when a repair is needed. This technology, based on open TCP/IP standards, is also rapidly starting to replace the traditional control networks used in manufacturing because of its lower cost of ownership. Along with the huge benefits of using TCP/IP on the plant floor come the same information security concerns that rage on the Internet - except that now it affects the control of equipment. At stake is the health and safety of plant employees, product integrity, as well as economic repercussions. Most information security professionals do not understand the special needs of machine control networks or embedded controllers and many controls engineers do not relish the idea of the outside interference with how they design 'their' solutions. Security by obscurity is no longer adequate.

This discussion will discuss the security challenges and decisions facing organizations that use TCP/IP for control networks. It will give decision makers, designers, and project managers a very practical perspective of the challenges as well as potential solutions and resources to combat the challenges.

Kenneth Hartman is the VP of Operations and Chief Security Officer for Visonex, LLC. Visonex is a medical informatics company that serves dialysis centers. Prior to joining Visonex, Ken worked for Kraft Foods for ten years in a variety of maintenance, engineering and management positions. Ken has also worked for The Dial Corp. as a process engineer and at Grede Foundries as a project engineer. Ken attended Michigan Technological University and holds a BSEE with an Automatic Controls Systems specialization. Ken is serving as the 2006 Vice-Chair for the Madison IEEE Section.

Maple Ridge Wind Farm (NY)—Up and Running!

Date/Time: Thursday, April 13, 2006, 5:30 - 7:00 PM
Speaker: Pat Ringler, P.E., Project Manager, Alliant Energy
Location: UW Campus - TBD (see next month's newsletter for exact details)
Menu: TBD
RSVP: by April 10th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.444.9144

Non-member guests are always welcome!

The Maple Ridge Wind Farm, sitting atop the Tug Hill plateau in Lewis County, New York, was commissioned near the end of 2005 with an ultimate output of 320 MW. This is the largest wind farm East of the Mississippi River, commissioned to date. It connects into the transmission grid via two substations and a new transmission line: a step-up collector substation, a Ring-bus transmission substation, and a 10.4 mile transmission line in between.

Pat Ringler will share some of Alliant Energy's experiences with the design, construction and commissioning of the Maple Ridge Wind Farm in Lewis County, New York. This presentation will be full of photos of the plant and substations during and after construction.

IEEE Madison Section Newsletter

Published 9 times per year (Jan. - May & Sep. - Dec.) by the Madison, Wisconsin Section of the Institute of Electrical and Electronic Engineers (IEEE), as a service to its members in south-central Wisconsin.

Printing and mailing by: SprintPrint
2790 S. Fish Hatchery Rd.
Madison, WI 53711

Mailed at Madison, Wisconsin as 3rd Class, Non-Profit postage. Permit No. 953.

Online at <http://www.bugsoft.com/ieee/>

For address changes: notify IEEE headquarters, address-change@ieee.org or <http://www.ieee.org>

For advertising information:
contact John Hicks, jhicks@wisc.edu, 608.233.4875

For editorial comment:
contact Craig Heilman, cheilman@ieee.org, 608.424.6860

High-Power Diode Lasers: How They Work and Where They Live

Date/Time: Wednesday, April 19, 2006, 11:45 AM - 1:00 PM (Note day of the week!)
Speaker: Dr. Rob Williamson, Director of Marketing, Alfalight, Inc.
Location: Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444
Menu: Pizza buffet, salad and soft drinks (cost $10.00, free for student members)
RSVP: by April 17th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.444.9144

Non-member guests are always welcome!

High-power diode lasers are a key component in a broad range of applications, including telecommunications, industrial lasers for material processing, as well as in defense, medical, printing, display, and scientific applications. Recent research and development efforts have made tremendous improvements in many of the key performance characteristics of diode lasers, including power conversion efficiency, spatial brightness, and spectral quality. These performance boosts have substantial impact on a wide range of systems pumped by high-power diode lasers.

This talk will outline the properties and operating principles of high-power infrared diode lasers and the manufacturing processes used to make them, highlighting how these recent revolutionary performance improvements have been achieved. We will also explore the architectures of several systems incorporating diode lasers, including optical communications (CATV/FTTH), high power fiber lasers for material processing (cutting and welding), free-space communications, and kilowatt-class lasers.

Rob Williamson is currently the Director of Marketing at Alfalight, a high-power diode laser manufacturer in Madison, Wisconsin. In his previous roles, he has led the development and marketing of high-speed optical communication devices, ultrastable lasers, and other optoelectronic instruments for telecommunication and industrial applications. Dr. Williamson has a Ph.D. in Physics from the University of Wisconsin - Madison and a B.S. in Physics from Caltech. He holds four patents, has published numerous papers and articles, and has led development efforts in the IEEE Ethernet Standards Committee. He is a member of IEEE Lasers and Electro-Optics Society, the American Physical Society, and Sigma Xi.

Building IceCube, A Neutrino Telescope at the South Pole

Date/Time: Thursday, May 18, 2006, 11:45 AM - 1:00 PM
Speaker: Jeff Cherwinka, IceCube - EHWD
Location: Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444
Menu: Pizza buffet, salad and soft drinks (cost $10.00, free for student members)
RSVP: by May 15th to Les Schroeder via e-mail (l.schroeder@ieee.org) or call 608.444.9144

Non-member guests are always welcome!

IceCube is the largest neutrino telescope in the world after two seasons of construction at the South Pole. This talk will present a brief introduction to what neutrinos are, what they might tell us about the universe, and how IceCube is designed to gather this information. The construction of IceCube requires drilling 2.5 km deep holes in the ice at the South Pole to allow installation of sophisticated light detection equipment in the deep clear ice. Some of the details and challenges of the logistics, drilling, and instrument deployment will also be discuss.

Message from the Chair:

I wanted to take this opportunity to introduce myself to the Madison Section of the IEEE, and offer my ear to all who like to volunteer or have questions. I am Mitch Bradt, elected to the office of Chair as of the beginning of 2006. I intend to keep up the pace on providing Professional Development and Technical Interest meetings to the roughly 700 members of the Madison Section, and am delighted that our immediate past chair, Sandy Rotter will be continuing to assist with the Board's activities. With the Vice Chair, Ken Hartman, Secretary Les Schroeder, Treasurer John Hicks, the Members-at-Large Tom Yager, Clark Johnson, and Dennis Bahr, and our webmaster/newsletter editor Craig Heilman, we the Board are here to serve the interests of our institute's membership. I encourage you to call on us for assistance or suggestion. We have a few new initiatives that I will elaborate on in the upcoming months that include a Specialization Lecture Series for UW-Madison student members and an effort to develop technical and professional workshops of interest at reasonable costs to the local members. Please feel free to contact me with suggestions—or even to volunteer!

Mitch Bradt, P.E.

IEEE Madison Section Chair, mmbradt@ieee.org

IEEE Milestones—ENIAC: Electronic Numerical Integrator and Computer, 1946

A major advance in the history of computing occurred at the University of Pennsylvania in 1946 when engineers put the Electronic Numerical Integrator and Computer (ENIAC) into operation. Designed and constructed at the Moore School of Electrical Engineering under a U. S. Army contract during World War II, the ENIAC established the practicality of large scale, electronic digital computers and strongly influenced the development of the modern, stored-program, general-purpose computer.

On 14 February 1946, the New York Times announced the unveiling of "an amazing machine that applies electronic speeds for the first time to mathematical tasks hitherto too difficult and cumbersome for solution… Leaders who saw the device in action for the first time," the report continued "heralded it as a tool with which to begin to rebuild

scientific affairs on new foundations." With those words, the world's first large-scale electronic general-purpose digital computer, developed at The Moore School of Electrical Engineering at the University of Pennsylvania in Philadelphia, emerged from the wraps of secrecy under which it had been constructed in the last years of World War II.

ENIAC (Electronic Numerical Integrator and Computer) was completed in 1945. Its first major job, finished in a little over two hours, would have required many years of labor to perform by conventional calculating methods. That task, assigned to the ENIAC on its first test run, involved many thousand computations connected with top-secret studies on thermonuclear reactions. While many projects were scrapped at the end of the war, the ENIAC had proven to be significant for military research at Los Alamos as well as the Ballistic Research Laboratory in neighboring Maryland.

ENIAC was built at the Moore School, under a contract with the U.S. Army. The machine contained over 18.000 vacuum tubes, which were cooled through the use of 80 air blowers. It measured 8 feet high, 3 feet wide and almost 100 feet long, filled a 30-by-50 foot room, and weighed 30 tons.

In much the same way that the airplane expanded man's physical domain, this invention extended the capacity of human reason. In the brief span since its inception, individuals have explored our nearest planets, walked on the moon, and revolutionized the business, scientific and engineering worlds. It's a far cry from today's laptops and PDA's.

IEEE

2790 S. Fish Hatchery
Madison, WI 53711

WHAT'S INSIDE

NONPROFIT ORG.
U.S. POSTAGE
PAID
Madison, WI
Permit No. 953