IEEE Madison Section Newsletter

Volume 9, Number 4 — Serving IEEE Members of South Central Wisconsin — April 2006

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

Date/Time: Thursday, April 13, 2006, 5:30 - 7:00 PM
Speaker: Pat Ringler, P.E., PMP, Project Manager, Alliant Energy
Location: Tong Auditorium, UW Engineering Centers Building, 1550 Engineering Drive - parking in lot 17
Menu: TBD, no cost to audience
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 34.5kV-230kV step-up collector substation, a 230kV Ring-bus switching substation, and a 10.5 mile 230kV 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.

Pat Ringler has 25 years of engineering, construction and project management experience in the utility and heavy construction industry. Pat has designed and managed the construction of many large projects including wind generation facilities, EHV transmission lines, substations, distribution lines, water treatment plants, and medical facilities. He provides project management and engineering services to developers of renewable energy facilities, municipal utilities and industrial clients. He holds degrees in Civil Engineering, Business Management, and Building Construction.

For a video of the Wind Farm as it was being commissioned, please point your browser at: <http://www.news10now.com/content/top_stories/default.asp?ArID=55931>.

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

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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

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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: "EE's know how to use email, don't they?"

In an effort to better serve the members of our section and control costs, the Madison section board and I are pushing a program to move away from paper newsletters and towards electronic communications. Our existing communications paradigm is that we publish the monthly newsletter, have it printed and mailed to ~750 members, and allow those who desire it to also receive an email; those who do receive the email have opted-in for the email correspondence—about 140 members in all. The costs of the paper newsletter is approximately $4,500.00 per annum, this being our single largest expense. In addition, due to delays in bulk printing and mailing, our communications usually require a 3-4 week lead-time, making changes somewhat difficult. If we were to cut the mailing, even just by half, we could recognize a significant savings, that I would like to put towards lowering members' cost of food at meetings from $10 to $5.

Our plan is to institute an OPT-IN for paper mailing, allowing those who really don't want to lose the paper newsletter to continue receiving it. We would automatically include members to receive paper newsletters who have not provided any email address to IEEE via the ieee.org website. In this way we would be shifting our paradigm from normally paper/optionally email, to normally email/optionally paper. Weren't EE's the ones who made ubiquitous email a reality, in the first place?

I hope you'll agree, that moving our resources away from publications and towards greater professional development opportunities, to be a worthy cause for this change. Our target date for this paradigm shift is October 2006. I would welcome your feedback and further suggestions as to how we can make the IEEE a better organization for you!

Mitch Bradt, P.E., IEEE Madison Section Chair, mmbradt@ieee.org

IEEE Robot Team - Help Wanted

The IEEE Student Section Robot Team is currently working on a robot that they plan to enter in the 2006 Intelligent Ground Vehicle Competition (IGVC) which will be held mid-June in Michigan. For the competition, over 30 teams from all over the world construct vehicles that must autonomously navigate several challenges and will additionally be evaluated on design. More information about the competition is available at <http://www.igvc.org/>. The Robot Team's website is at <http://homepages.cae.wisc.edu/~ieeerobo/>.

The team has put together a project proposal with design goals, project timeline, and detailed budget. If anyone would like to assist the Robot Team with this endeavor, please contact Mark D. Schneider, IEEE Robot Team Leader - UW Madison, at mdschneider@wisc.edu or 414.899.0592.

IEEE Starts to Plug Away at Standard for Power Line Communications

By Willie D. Jones

High-speed data communications over ordinary power lines, which could give anyone with a computer access to the Internet simply by plugging into an electrical outlet, has become a commercial reality. With a number of electric utilities rolling out services for broadband communications over power lines (BPL), formal standards are needed to ensure that the various gadgets making power line communications possible are compatible and to prevent interference with other communications devices.

Last July, the IEEE Standards Association convened a working group whose aim is to deliver a standard governing how BPL devices should operate. Members of the group include representatives from Internet Service Provider Earthlink, utility company Duke Power, Intel, Sony, and electronics retailer RadioShack. The standard is known formally as the IEEE P1901 Draft Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications.

At a meeting in January in Las Vegas, the working group focused on "making sure that the [data-carrying capacity] of the power lines is adequately shared," says IEEE Member Jim Mollenkopf, the group's co-chair. Mollenkopf is a researcher at Current Technologies LLC, in Germantown, Md., which developed a device that lets data packets avoid the transformers that step down voltage from distribution wires to the low-voltage lines that run to houses. This is one of a handful of advances that made BPL reliable enough to be offered commercially.

At the meeting, the participants created a functional map showing how data packets would travel over power lines, and indicating where conflicting bandwidth demands could result in packets not reaching their intended destinations. At an earlier meeting last November in Paris, the working group enumerated all the ways BPL could be used, such as sending multimedia content between devices inside a house

while simultaneously sending and receiving e-mail.

According to Mollenkopf, the work done in Paris and Las Vegas represents the basics that will make the later stages of the standard-making process smoother. Asked about the likelihood of companies choosing to fight over which technical specs should be included, he insists that "all of the companies [represented in the P1901 Working Group] recognize that this is a situation where everyone's needs can be met or no one's needs can be met." In other words, compromise will be in order.

Nevertheless, he says, "Having all these companies together representing their unique interests in the room will result in a better standard because we'll get to see different ideas on how this technology can be implemented." The group is still working on defining requirements for what BPL devices must do and therefore hasn't reached the stage where it will review design proposals for systems and devices. Mollenkopf expects that a proposal for a standard will be approved by the end of 2006 and the final standard released not too long thereafter.

BPL's great advantage, he notes, is that power lines are everywhere, providing "a ubiquitous wire." That will be of tremendous benefit to people in places where DSL and cable Internet services don't reach and where there's no financial incentive for phone and cable companies to expand their service regions, he continues. "If you can use power lines in a fast, efficient, and non-interfering way—which is what IEEE P1901 is all about," he says, "you've got something that can be very useful to the consumer and very competitive in the marketplace."

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