



TRANSFORMING GRID OPERATION AND PLANNING

# Future Power Grid Initiative Newsletter

March 2013

With a successful mid-year review under its belt, the FPGI team is starting the year off with an expansion of the leadership team and a strategic hire, new connections with industry and follow up research for the Department of Energy.



## NEW TEAM MEMBERS

FPGI is proud to announce that David Callahan has joined the initiative as the new Focus Area two lead. David joins PNNL from Microsoft, where he had a distinguished career in technical leadership of development of programming abstractions and supporting tools for modern computing platforms. As part

of the Visual Studio releases, David led adding multi-core and GPU support to their C++ product and .NET. His work also included product-team oversight of two multi-million dollar university centers funded jointly by Microsoft and Intel doing basic research to make parallel programming easier and more effective. Previously, David worked for Cray Inc. in Seattle, where he led all aspects of programming environment for the Tera MTA/Cray XMT computer system. David was also responsible for the early design of the Chapel programming language and was co-PI for Cascade, DAPRA funded project to innovate in high-performance computing achieve significant advances in productivity. David has an extensive publishing record, issued two dozen patents and got his M.A. and Ph.D. in computer science from Rice University.

FPGI is also fortunate to call Jodi Obradovich the new co-lead for Focus Area 3. Jodi joined PNNL in 2010 to conduct research at Bonneville Power Administration with the goal of designing tools for real-time transmission operators aiding them in problem solving and decision making. Prior to joining the laboratory, Jodi has conducted research, designed visualization, collaboration, and decision-support tools in a variety of domains, including healthcare, aviation, and military command

and control. Jodi holds a Ph.D. in Cognitive Systems Engineering, a specialization within the Human Factors discipline that takes an interdisciplinary approach to the development of principles, methods, tools, and techniques to guide the design of computerized systems intended to support human performance. The basic unit of analysis and design in cognitive engineering is a cognitive system, composed of human and machine agents in a work domain that is delineated by roles, work and communication norms, artifacts, and procedures.



*Jodi Obradovich*

## GRIDOPTICS™ WORKSHOP

After FPGI's successful workshop on Challenges in Next-Generation Analytics for the Future Power Grid (<http://gridoptics.pnnl.gov/FPGWS/>), participants are now finalizing a report that summarizes the findings around the need for a common framework to accelerate development of next-generation power grid computing tools, such as PNNL's GridOPTICS™, better coordination among the community as well as outreach to other groups for technology development, collaboration, and coordination, and business models for transferring research software codes to commercial tools.

## VOLTTRON PROJECT TO SERVE AS PLATFORM FOR HVAC NETWORK DEMONSTRATION

Volttron, Focus Area One's intelligent software framework for electric power system sensors and controllers, has become a key component in a roof top unit HVAC Network demonstration project for the U.S. Department of Energy. The team led by Bora Akyol and Jereme Haack will develop a special, open source version of Volttron to fulfill the client's requirements. This version will serve both as an integration point for the roof top unit controller and applications being run in the cloud, as well as the platform where agents written by external partners will be implemented on.

## TERENCE CRITCHLOW ON COMMITTEE FOR SMART ENERGY DATA REPOSITORY

PNNL's Terence Critchlow was invited to be on the executive committee of a new IEEE Industry Connections working group focused on designing a Smart Energy Data Repository. The working group will determine guidelines safeguarding privacy and intellectual property, while at the same time ensuring the cyber security of the submitting entities. The group is led out of IBM's TJ Watson Labs and consists of participants from several national laboratories, utilities and universities. Terence is in charge of the architecture council, which will publish a white paper later this year that

will provide guidance for several data questions.

## powerNET PRESENTED TO U.S. SENATE STAFF

Thomas Edgar and David Manz presented the GridOPTICS™ powerNET, FPGI's Testbed for Energy Networking, Equipment, and Technology, to a group of several Senate Staffers from the Armed Services Committee on Friday, March 1. The team presented a three way live federation demonstration focusing on a possible cyber physical research infrastructure. The audience, as well as several guests from the Armed Services and the office of the secretary of defense responded very positively and gave positive feedback.

## ABOUT FPGI

The Future Power Grid Initiative (FPGI) will deliver next-generation concepts and tools for grid operation and planning and ensure a more secure, efficient and reliable future grid. Building on the Electricity Infrastructure Operations Center (EIOC), the Pacific Northwest National Laboratory's (PNNL) national electric grid research facility, the FPGI will advance the science and develop the technologies necessary for meeting the nation's expectations for a highly reliable and efficient electric grid, reducing carbon emissions and our dependence on foreign oil.

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### Past Newsletters

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### Contact

For more information, please visit the FPGI website [gridoptics.pnnl.gov](http://gridoptics.pnnl.gov) or contact Initiative Leads

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## FPGI FOCUS AREAS

**Focus Area One** addresses data networking and management issues, and enables the digital infrastructure for the future grid. This focus area will address the gaps in networking and real-time data management by developing advanced algorithms and software tools and techniques. **Focus Area Leads:** Bora Akyol ([bora@pnnl.gov](mailto:bora@pnnl.gov)) and Harold Kirkham ([harold.kirkham@pnnl.gov](mailto:harold.kirkham@pnnl.gov))

**Focus Area Two** targets research in the areas of advanced mathematical models, next-generation simulation and analytics capabilities for the power grid. Projects in Focus Area Two will use high-throughput data streams produced by projects in Focus Area One and integrate them with sophisticated mathematical models to conduct large-scale power grid simulation and analysis. Focus Area Two strives to advance the state-of-the-art in modeling and simulation in order

to achieve much higher fidelity situational awareness and global comprehension for power grid stability, efficiency and flexibility. **Focus Area Leads:** David Callahan ([david.callahan@pnnl.gov](mailto:david.callahan@pnnl.gov)), and Ning Zhou ([ning.zhou@pnnl.gov](mailto:ning.zhou@pnnl.gov))

**Focus Area Three** aims to convert large amounts of model and sensor data into information and knowledge to support decisions in grid operation, planning, and policymaking. This area concentrates on the development of coordinated visualization interfaces and decision support capabilities in a modular, extensible software environment that can be used for both real-time grid operations as well as long-term planning. **Focus Area Lead:** Paul Whitney ([paul.whitney@pnnl.gov](mailto:paul.whitney@pnnl.gov)), and Jodi Obradovich ([jodi.obradovich@pnnl.gov](mailto:jodi.obradovich@pnnl.gov))

## Future Power Grid Initiative

Enabling a Resilient and Efficient  
future power grid



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NATIONAL LABORATORY

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