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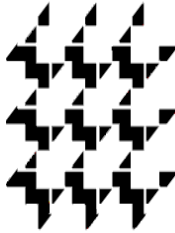
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**DIMACS**

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*Center for Discrete Mathematics & Theoretical Computer Science  
Founded as a National Science Foundation Science and  
Technology Center*



## RECONNECT 2017

### Mathematical and Computational tools for Energy Efficiency and Reliability of Data Centers and the Electrical Grid – Individual Interests vs. the Common Good

**Where:** Appalachian State University, Boone, NC

**When:** June 11-17, 2017

#### **About Reconnect:**

Reconnect Workshops expose faculty teaching undergraduates to current applications of mathematical and computational sciences and provide an opportunity for government or industry professionals to learn about recent research in related areas. Topics are presented in a weeklong series of lectures and activities; participants are involved in both research activities and in writing materials useful in the classroom or to share with their colleagues. Participants may develop materials for publication in either the CCICADA Technical Reports Series or the Educational Modules Series published by the DIMACS.

#### **Topic: Mathematical and Computational tools for Energy Efficiency and Reliability of Data Centers and the Electrical Grid – Individual Interests vs. the Common Good**

The World Business Council for Sustainable Development (2008) indicates that buildings account for as much as 40 percent of energy use in industrialized countries. Data centers (computing facilities with electronic equipment for data processing, storage, and communications networking) are especially inefficient users of energy. In light of such issues, the information technology (IT) industry is looking to advanced power management hardware, smart cooling systems, virtualization tools, and dense server configurations to reduce energy consumption. Large scale sensor networks used in the design of these advanced systems are inherently graph theoretical. Part of Reconnect will be devoted to understanding these sensor networks. A second related area will examine the development of a truly “smart” electrical grid. The Smart Grid will include smart sensors and controls throughout the transmission and distribution system and a broad communication platform for two-way communications to move data and electricity between utilities and consumers. Smart Grid consumers will have smart meters that can track energy consumption, monitor individual power circuits in the home, control smart appliances, and actively manage energy use. Game-theory models, multi-agent based models, decision-support and optimization tools, and security and privacy tools will be considered. A third topic will explore policies for balancing individual interests with the common good to avoid an eventual “tragedy of the commons”. In this area, game theory can model the interactions of multiple agents and show the effects of competing interests. Economic incentives may influence whether a country or a company is motivated to enter an agreement and then abide by it.

**Organizers:** Dr. Margaret (Midge) Cozzens, Research Professor at DIMACS Rutgers University, Mark Ginn, Professor of Mathematics at Appalachian State

**Speakers:** Dr. James Case, Mathematician, Modeling Energy’s Future  
Dr. Daniel Bienstock, Industrial Engineering and Operations Research, Columbia University, “The Electric Grid” – pending  
Dr. Carla Gomes, Cornell University Computer Science, “Energy from Big Data”, pending

Other speakers from the Appalachian Energy Center

**Lodging, meals and travel: Participants receive** all meals from Sunday dinner through Saturday lunch, and lodging for six nights. Limited funds are expected to be available to provide partial support for travel. It is expected that each participant stays the whole week.

**Deadline for Applications is March 29, 2017 or until all slots are filled.** A link to the online application will be available on the Reconnect webpages ([ccicada.org/education/reconnect](http://ccicada.org/education/reconnect) and [dimacs.rutgers.edu/workshops](http://dimacs.rutgers.edu/workshops)). Applications must be submitted online and will be reviewed as they are received.

**Sponsorship:** The 2017 Reconnect Workshop is presented under the auspices of the DIMACS Special Focus on Energy and Algorithms and by CCICADA.

**For more information:** Kelly Quesnelle ([kellyq@dimacs.rutgers.edu](mailto:kellyq@dimacs.rutgers.edu)) or Midge Cozzens ([mcozzens@dimacs.rutgers.edu](mailto:mcozzens@dimacs.rutgers.edu) or [midge6930@comcast.net](mailto:midge6930@comcast.net)) or visit the Reconnect web page in the CCICADA website or the DIMACS website.