

Mathematical Research Challenges in Optimization of Complex Systems

Marriott Bethesda North Hotel and Conference Center
5701 Marinelli Road, North Bethesda, MD 20852

December 7-8, 2006

Workshop Organizers

Margaret Wright

Courant Institute for Mathematical Sciences, New York University

Bruce Hendrickson

Sandia National Laboratory

The DOE workshop on "Mathematical Research Challenges in Optimization of Complex Systems" will be held at the Marriott Bethesda North Hotel and Conference Center on December 7-8, 2006. The goal of the workshop is to identify opportunities for mathematical research for advancing a range of important DOE applied science applications. There will be presentations by applications experts on: (1) Power Grid Control and Optimization, (2) Optimization of Fossil Fuel Power Generation, (3) Lifecycle Optimization of the Nuclear Fuel Cycle, and (4) Risk Assessment for Cybersecurity. Each of these problems is of great interest to DOE and rich in opportunities for mathematical contributions. About 35 distinguished mathematical scientists representing a broad range of expertise, including relevant areas not traditionally supported by DOE, will participate in intense interactive follow-up discussions and breakouts to identify promising areas for long-term mathematical research contributions. A summary report will be written following the workshop.

Agenda

Thursday, December 7th

8:30 - 8:45	Welcome & Introduction
8:45 - 9:30	Application 1: Fossil Energy Power Generation
9:30 - 10:15	Application 1 questions and discussion
10:30 - 11:15	Application 2: Nuclear Fuel Cycle
11:15 - 12:00	Application 2 questions and discussion
12:00 - 2:00	Buffet lunch and breakout 1a (three breakout rooms)
2:00 - 2:45	Application 3: Electrical Power Systems
2:45 - 3:30	Application 3 questions and discussion
3:45 - 4:30	Application 4: Risk Assessment for Cyber security
4:30 - 5:15	Application 4 questions and discussion
5:30 - 7:30	Buffet dinner & Breakout 1b (three breakout rooms)
7:30 - 9:00	Plenary presentation of breakout reports and discussion

Friday, December 8th

8:30 - 10:00	Breakout 2 (two breakout rooms)
10:15 - 12:00	Plenary presentation of breakout reports and discussion

Applications Speakers and Experts

Power Grid Control and Optimization: Robert Thomas, *Cornell U.*
Optimization of Fossil Fuel Power Generation: Stephen Zitney, *NETL*
Lifecycle Optimization of the Nuclear Fuel Cycle: Phillip Finck, *INL* and Dana Knoll, *INL*
Risk Assessment for Cybersecurity: Dwayne Ramsey, *LBL*

Mathematical Sciences Participants

Mihai Anitescu, *ANL*
David Applegate, *AT&T Research*
John Bell, *LBNL*
John Birge, *U. Chicago*
Michael Branicky, *Case Western U.*
Joe Chow, *RPI*
Brenda Dietrich, *IBM*
Paul Frank, *Boeing*
John Gilbert, *UCSB*
Martin Groetschel, *TU Berlin*
Seth Guikema, *Texas A&M*
Bruce Hendrickson, *SNL*, co-organizer
Michael Holst, *UCSD*
Tim Kelley, *NCSU*
Tammy Kolda, *SNL*
John Lewis, *Cray*
Bill Massey, *Princeton U.*
Juan Meza, *LBNL*
Jorge More', *ANL*
Richard Murray, *Caltech*
Cindy Phillips, *SNL*
Vladimir Protopopescu, *ORNL*
Bill Pulleyblank, *IBM*
Roman Samulyak, *BNL*
Radu Serban, *LLNL*
Ellen Stechel, *SNL*, DOE ASCAC Representative
Virginia Torczon, *C. of William & Mary*, DOE ASCAC Representative
Steve Vavasis, *U. Waterloo*
Bruce West, *Army Research Office*
Paul Whitney, *PNNL*
Alyson Wilson, *LANL*
Margaret Wright, *NYU*, co-organizer

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