



## MODERN TRENDS IN OPTIMIZATION AND ITS APPLICATION

September 13 – December 17, 2010

**ORGANIZING COMMITTEE:** Stephen Boyd (Stanford), Emmanuel Candes (Caltech), Masakazu Kojima (Tokyo Inst Tech), Monique Laurent (CWI), Arkadi Nemirovski (Georgia Tech), Yurii Nesterov (Université Catholique de Louvain), Bernd Sturmfels (UC Berkeley), Michael Todd (Cornell), Lieven Vandenbergh (UCLA)

### Scientific Overview

Today, fundamental advances in mathematical optimization occur at a furious pace. In recent years, spectacular progress has been made in our understanding of convex optimization problems whose expressive power make them suitable for a wide spectrum of important applications. We have also learned how to approximate combinatorially hard optimization problems by simpler convex problems, which are tractable and provide accurate solutions. Further, robust optimization offers new techniques for preventing solutions to be too sensitive to noise or model errors. Finally, recent remarkable advances in algorithms have made possible solving optimization problems involving tens of thousands of variables and/or constraints—even tens of millions in some instances—in reasonable time. These and other fundamental developments, along with progress in high-quality software, have expanded the scale and complexity of optimization problems that can be addressed in practice, and are leading to a wider adoption of optimization techniques throughout many fields in science and engineering. Centered around five workshops, the goal of this program is to bring together scientists from many different backgrounds to develop and exchange ideas about modern optimization which can be influenced by, and influence in turn, progress in engineering and science.

### Workshop Schedule

- Optimization Tutorials: September 14 – 17, 2010
- Workshop 1: Convex Optimization and Algebraic Geometry, September 28 – October 1, 2010
- Workshop 2: Numerical Methods for Continuous Optimization, October 11 – 15, 2010
- Workshop 3: Discrete Optimization, October 26 – 29, 2010
- Workshop 4: Robust Optimization, November 16 – 19, 2010
- Workshop 5: Applications of Optimization in Science and Engineering, November 29 – December 3, 2010
- Culminating Workshop at Lake Arrowhead Conference Center, December 12 – 17, 2010

### Participation

This long program will involve a community of senior and junior researchers. The intent is for participants to have an opportunity to learn about Optimization, and to meet a diverse group of people and have an opportunity to form new collaborations. Full and partial support for long-term participants is available. We are especially interested in applicants who intend to participate in the entire program (September 13 – December 17, 2010), but will consider applications for shorter periods. Funding is available for participants at all academic levels, though recent PhDs, graduate students, and researchers in the early stages of their careers are especially encouraged to apply. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission and we welcome their applications. More information and an application is available online.

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