

High Performance Optimization: Theory, Algorithm Design and Engineering Applications

Project Leaders: Dr. Anthony Vannelli, University of Guelph
Dr. Miguel F. Anjos, University of Waterloo

Project Exit Strategy - November 1, 2009

After 10 years of existence, our group has established strong links with a number of industry partners. With ABB in particular, given the successful termination of a multiyear project in reactive power management with MITACS, NSERC, OCE and OPA funds. Therefore, we expect to continue collaborating with the company beyond the termination of the present project. Furthermore, we also have a strong partnership with Hydro One, Ontario's transmission company, which is funding and supporting several multi-year, multi-million research projects in microgrids, solar power integration, energy management systems and plug-in hybrid electric vehicles, all in the context of Smart Grids, in which we play a significant role. Hydro One has also established an Endowed Research Chair currently being held by Prof. Caizares. In view of these facts, we expect the proposed research and related projects to continue beyond the termination of this project, with likely support from OCE, as it has been the case so far, as well as NSERC.

The research support of ABB, AFOSR and Tata Consultancy is guaranteed in the short-term, i.e., for the next two years, and provides a solid foundation for this MITACS project until 2012. In particular, we have already generated matching funds for 2010-2011 approximately half of the amount that our project was allocated for 2009-2010. Furthermore, on the health sector side, the links with the ROWEMS are strong. Our EMS contacts are very pleased with the research so far, and we look forward to further extensions of our activities in the health sector.

Looking beyond 2012, the University of Waterloo and the University of Guelph have begun discussions on the establishment of a **Joint Centre for High Performance Optimization** whose mandate will be to use and extend the developed expertise in high performance optimization and to use it to solve optimization problems in various industrial and government settings. The physical Centre would operate at the University of Waterloo and would be shared with the University of Guelph as a major partner and the McMaster University as a minor partner. The Centre would support and develop a network of **internship partners** and support the delivery of **short courses** within its research areas to connect with the real large-scale optimization problems existing in industry and government. The universities are planning to bring on board current industrial partners such as IBM, ABB, Ontario Hydro, ROWEMS, Bombardier and Intel (among others) to act as a diverse consortium to enable and empower this unique research centre in Canada.

Preliminary discussions regarding the set-up of the Joint Centre have also been held with MITACS. The details of the proposed Joint Centre are being written up in an LOI that will be sent to MITACS within the next two months. The intent is for the Joint Centre to be set up independently of our current MITACS project; hence the specific research topics will be different from those in the current project, and the financial contributions from non-academic partners will be separate from the funds currently supporting this MITACS project. Nonetheless, if the funding for this project is not extended beyond 2012, then we anticipate that the research activities supported here would be brought within the umbrella of the Joint Centre so as to allow this diverse group of researchers to thrive at the current high level of productivity and impact, and to attain even higher levels of impact on the international scientific community and on Canadian society.