

Foreword by the PIMS Director

The PIMS Industrial Problem Solving Workshops have been held annually since 1997. The 9th IPSW was held at the University of Calgary from May 15–19, 2005, immediately following the 8th GIMMC (Graduate Industrial Mathematics Modelling Camp) which was held at the University of Lethbridge. We are very grateful to the universities for hosting these events.

Approximately 55 participants worked intensely on five problems posed by industrial companies from across North America. All these problems highlight the need for correct mathematical modelling, and the industrial payback from a good solution. We are grateful to Donald Mackenzie (University of Calgary), Gerald K. Cole (Biomechanig Research Inc.), Pierre Lemire & Rob Pinnegar (Calgary Scientific Inc.), Brad Bondy (Genus Capital Management), and Brian Russell (Hampson Russell Software) for providing the problems and guiding the participants.

Special thanks go to Sean Bohun from Penn State University who carefully edited these proceedings, and Elena Braverman and Gary Margrave from the University of Calgary for the difficult task of providing the industrial contacts and organizing the meeting.

Dr. Ivar Ekeland, Director
Pacific Institute for the Mathematical Sciences

Preface

The University of Calgary was the site of the ninth annual PIMS Industrial Problem Solving Workshop (IPSW). Hosted from May 15 through May 19, 2005, the workshop was co-sponsored by PIMS, Alberta Innovation and Science, iCORE and the University of Calgary. This workshop saw the bringing together of participants from across North America.

Many first time participants of these workshops are surprised by the intensity of the work. Based on the Oxford Study Group Model, the morning of the first day consists of the initial problem presentations and the beginning of focused discussions amongst the self-selected groups. Input from the academic experts was found to be especially vital during the initial phases the work, especially in providing guidance to the new participants and graduate students. Work continued throughout the next few days culminating in a summary presentation of results at the end of the fifth day. These summary presentations form the basis of these proceedings. Problems were chosen from a diverse set of topics which challenged the participants and utilized many of their individual talents. I would like to take this opportunity to thank the individual authors for their dedication and prompt response so that these proceedings were possible. These individuals were (in order of their submission):

- Tony Ware: Adaptive Statistical Evolution Tools for Equity Ranking Models
- Greg Lewis: Force-Control for the Automated Footwear Testing System
- Michael Lamoureux: Seismic Image Analysis Using Local Spectra
- Yaling Yin: Seismic Prediction of Reservoir Parameters
- C. Sean Bohun: Mathematical Model of the Mechanics and Dynamics of Tails in Dinosaurs

To ensure the smooth and efficient operation of the workshop, many individuals are needed behind the scenes. I would like to thank the organizing committee consisting of Elena Braverman and Gary Margrave both from the University of Calgary. Without their dedication and resourcefulness, this event would not have been possible.

Two other essential ingredients for the success of the workshop were the industrial representatives and the industrial experts. While the representatives are certainly an asset and provide a basis for each of the problems, it is the academic experts that are responsible for each of the groups moving along productive lines. For this year the academic experts were:

- C. Sean Bohun, Pennsylvania State University
- Len Bos, University of Calgary
- Elena Braverman, University of Calgary
- Gemai Chen, University of Calgary
- Lou Fishman, MDF International, University of Calgary
- Michael Lamoureux, University of Calgary
- Greg Lewis, University of Ontario Institute of Technology
- Qiao Sun, University of Calgary
- Tony Ware, University of Calgary
- Rex Westbrook, University of Calgary

A special thanks goes to the industrial contributors and their representatives who include:

- Donald M. Henderson, University of Calgary in collaboration with the Royal Tryell Museum of Palaeontology
- Gerald K. Cole, University of Calgary in collaboration with Biomechanigg Research Inc.
- Rob Pinnegar, Calgary Scientific Inc.
- Pierre Lemire, Calgary Scientific Inc.
- Brad Bondy, Genus Capital Management
- Brian Russell, Hampson-Russell Software

In closing, I would like to thank Heather Jenkins at the PIMS central office for her dedication, efficiency, and patience in dealing with the production of these proceedings.

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