Required Information for MITACS Project CV - for last two years

NAME Henry Wolkowicz **DEPT** Combinatorics and Optimization

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GRADUATE/POSTDOC SUPERVISION

List graduate students, PDFs and NSERC undergraduate research students for whom you are the principal supervisor. For each student, indicate the program, status (e.g., full- or part-time, inactive), and the term in which supervision began (e.g., F01). For those who finished during the year, please indicate in the last column the term in which the program was completed.

	Program					Status			Progress	
Student Name	MMath essay	MMath thesis	PhD	PDF	U'grad research	Full time	Part time	Inactive	Term started	Term finished
Oleg Grodzevich			PhD[a]						Sept/05	cont..
Farheen Omar			PhD[b]						May/07	cont..
Nathan Krislock			PhD						Sept/05	cont...
Marina Potaptchik			PhD[c]						Dec/05	July/06
Hua Wei			PhD						May/02	Oct/06
Yichuan Ding			Masters						Sept/05	Apr/07
Jiawei Qian			Summer Schol.[d]						Summer/06	Winter/0

[a] Joint supervision with Samir Elhedhli, Mngmt. Sc., UofW

[b] Joint supervision with Pascal Poupart, Comp. Sc., UofW

[c] Originally on examining Committee; but essentially joint supervision with Levent Tuncel UofW, i.e. met with student weekly for two semester to complete the thesis based on a modified research topic.

[d] This is not a graduate program, but is part of the summer undergraduate research program. But, Jiawei continued to work with me and Nathan Krislock during fall/06,winter/07

PUBLICATIONS

Give title, full authorship, for publications in each of the following four categories: in the case of articles, include the number of pages:

(A) Refereed papers (journal articles and conference proceedings) and (contributions to) books with publication date 2007 (or 2006 and not reported last year).

- [1]

(B) Articles accepted in 2007 for publication.

- [2],
- [3];

(C) Other articles (manuscripts, research reports, abstracts, letters to the editor, newsletter articles, etc.) including those submitted for publication.

- [4]
- [5]
- [6]
- [7]
- [8]
- [9]
- [10]
- [11]
- [12]
- [13]
- My students won the: Student Poster Competition, Honourable Mention, Yichuan Ding, Nathan Krislock, Jiawei Qian, University of Waterloo. Title: Sensor Network Localization, Euclidean Distance Matrix Completions & Graph Realization. Presented at CORS 2007, London, on May 15, 2007. (Based on our joint work.)

(D) Theses:

- [14]
- [15]
- [16][1]

RESEARCH SEMINARS

List dates, place, and title of research seminars given, including invited conference talks and contributed conference talks.

The details are given at URL: http://orion.math.uwaterloo.ca/˜hwolkowi/henry/reports/talks.d/talks.html

- An Overview of Semidefinite Programming, a series of seminars given at University of Waterloo, Jan, 2005, MC5136.

- A Stable Iterative Method for Linear Programming, Computational Math. Seminar, Feb. 14, 2005, University of Waterloo.

- 7th IMACS International Symposium on Iterative Methods in Scientific Computing, May 5-8, 2005, Fields Institute and the University of Toronto, Toronto, Canada

- Short Course presentations, at Eighth SIAM Conference on Optimization, SIAG/OPT, OP05, May 15-18, Stockholm.

[1] Originally on examining Committee; but essentially joint supervision with Levent Tuncel UofW, i.e. met with student weekly for two semester to complete the thesis based on a modified research topic.

- A Stable Iterative Method for Linear Programming at Eighth SIAM Conference on Optimization, SIAG/OPT, OP05, May 15-18, Stockholm.
- Regularization Using a Parametrized Trust Region Approach, at Eighth SIAM Conference on Optimization, SIAG/OPT, OP05, May 15-18, Stockholm.
- Keynote Invited talk: Symmetric Kronecker Products and Uniqueness and Existence of search directions for semidefinite programming (SDP), keynote talk at the (first) "Southern Ontario Matrices and Statistics Day", University of Windsor (Windsor, Ontario), Thursday, 9 June 2005
- title, at ILAS 2005, Regina, Canada, June 26-29.
- title at Foundations of Computational Mathematics, at Universidad de Cantabria in Santander, Spain, between 30 June and 9 July 2005. (Optimization part is on July 4-6.
- Franco-Canadian Workshop on Combinatorial Algorithms, August 18-20, 2005, at McMaster University.
- CMS Winter Meeting 2005, December 10 - 12, 2005, at the Victoria Conference Centre.
- *Anchored Graph Realization and Sensor Localization* at CORS/Optimization Days 2006, Joint Conference, Montreal, May 8-10, 2006. (session organizer);
- *Anchored Graph Realization and Sensor Localization* at Dalhousie University, Friday May 12, 2006.
- *Anchored Graph Realization and Sensor Localization* at CAIMS -MITACS 2006 Joint Annual Conference, June 15 - 20, 2006 at York University in Toronto, Ontario.
- (Due to a family crisis the following invited plenary talk at the workshop was cancelled; as was the other talk at EURO. I did organize a session at EURO which proceeded without me. One of my co-authors gave my talk. Plenary Talk, *Trust Region Methods using Regularization*, 50 minutes, at the Workshop on "Advances in Continuous Optimization" Reykjavik, Iceland, Friday June 30 and Saturday July 1, 2006 *Anchored Graph Realization and Sensor Localization* at EURO XXI in Iceland, in Reykjavik, July 2-5, 2006, 21st European Conference on Operational Research)
- *Regularization and Trust Region Methods*; invited talk at SIAM Annual Meeting, July 10 - 14, 2006 in Boston Massachusetts.
- (Due to a family crisis the following invited plenary talk was cancelled at: Beijing International Conference on Numerical Analysis and Optimization, dedicated to M.J.D. Powell's 70th Birthday, (Beijing, Sept 25-28, 2006)
- Sensor Localization; Invited colloquium at Rice University, Department of Computational: and Applied Mathematics, Oct., 2006.
- Invited presentation, Survey of Optimization, to the SAC committee at MSRI, Berkeley, Nov. 2006.
- Sensor Localization; plenary talk at BIRS conference on Optimization and Engineering, Nov, 2006.
- Multi-Stage Investment Decision under Contingent Demand for Networking Planning, at 2006 IEEE GLOBECOM Conference in San Francisco, Nov., 2006 (given by co-author). IEEE Globecom 2006, technical conference and IEEE communications expo; Nov 27-Dec 1, San Francisco, CA.
- Euclidean Distance Matrix Completions, Sensor Network Localization, and Graph Realization, at the Tutte Colloquium, Dept. C&O, Univ. of Waterloo, Dec. 2006.

- I attended TWO conferences without presenting a paper: (i) MOPTA 06 at University of Waterloo, July, 2006; and (ii) BIRS Conference on Positive Polynomials and Optimization, Oct. 2006.
- *Anchored Graph Realization and Sensor Localization* poster session at IMA Annual Program Year Workshop on Optimization and Control, January 16-20, 2007. (Invited.)
- Sensor Network Localization, Euclidean Distance Matrix Completions, and Graph Realization in the session on Numerical Linear Algebra and Optimization: speaker and theme organizer - 9 speakers; at CAIMS/SCMAI 2007 at Banff Centre, Alberta. May 20-24, 2007.
- A Workshop on Optimizaation given at MSRI, Berkeley Calif. Two weeks of talks.
- at ICCOPT/MOPTA at McMaster University, Hamilton, Ontario, August 12-17, 2007 (program chair of the conference) speaker and co-author of 3 other papers and a poster session:

  1. Speaker: Generating and Measuring Instances of Hard Semidefinite Programs;
  2. Marina Potaptchik, CIBC, Levent Tuncel (University of Waterloo), Henry Wolkowicz (University of Waterloo), Title: Large Scale Portfolio Optimization with Piecewise Linear Transaction Costs
  3. Oleg Grodzevich, Dept. of Management Sciences, University of Waterloo, Henry Wolkowicz (Dept. of Combinatorics&Optimization, University of Waterloo), Samir Elhedhli (Dept. of Management Sciences, University of Waterloo), Title: Robust Optimization For Asset Liability and Risk Management Under Uncertainty
  4. Simon Schurr, Department of Combinatorics and Optimization, University of Waterloo, Levent Tuncel (Department of Combinatorics and Optimization, University of Waterloo), Henry Wolkowicz (Department of Combinatorics and Optimization, University of Waterloo), Title: Strong Duality and Stability in Conic Convex Optimization
  5 Nathan Krislock, Combinatorics and Optimization, University of Waterloo Co-authors: Yichuan Ding (Combinatorics and Optimization, University of Waterloo), Jiawei Qian (Combinatorics and Optimization, University of Waterloo), Henry Wolkowicz (Combinatorics and Optimization, University of Waterloo) Poster presentation: Sensor Network Localization, Euclidean Distance Matrix Completions, and Graph Realization Nathan Krislock, Combinatorics and Optimization, University of Waterloo, Yichuan Ding (Combinatorics and Optimization, University of Waterloo), Jiawei Qian (Combinatorics and Optimization, University of Waterloo), Henry Wolkowicz (Combinatorics and Optimization, University of Waterloo)

- Sensor Network Localization, Euclidean Distance Matrix Completions, and Graph Realization, at the Colloquium at McGill University, C.S. Dept, Oct. 19, 2007.

Seminars by Students:

- At ICCOPT, Aug. 2007: Oleg Grodzevich, Dept. of Management Sciences, University of Waterloo, Henry Wolkowicz (Dept. of Combinatorics&Optimization, University of Waterloo), Samir Elhedhli (Dept. of Management Sciences, University of Waterloo), Title: Robust Optimization For Asset Liability and Risk Management Under Uncertainty
- Three Poster presentations:

  Sensor Network Localization, Euclidean Distance Matrix Completions, and Graph Realization Nathan Krislock, Combinatorics and Optimization, University of Waterloo, Yichuan Ding (Combinatorics and Optimization, University of Waterloo), Jiawei Qian (Combinatorics and Optimization, University of Waterloo), Henry Wolkowicz (Combinatorics and Optimization, University of Waterloo) presented at:
  CORS, Univ. of Western Ontario, May, 2007, Honorable mention Award
  C&O at 40, University of Waterloo, June, 2007
  ICCOPT, McMaster University, Aug. 2007

References

[1] A. ALFAKIH and H. WOLKOWICZ. Necessary and sufficient trace inequalities for Euclidean distance matrices. *Linear and Multilinear Algebra*, 55(5):499–506, 2007.

[2] M.F. ANJOS, M. DESROCHES, A. HAQUE, O. GRODZEVICH, H. WEI, and H. WOLKOWICZ. Multi-stage investment decision under contingent demand for networking planning. In *Proceedings of the 2006 IEEE GLOBECOM Conference in San Francisco*. accepted June/06, 2006.

[3] O. GRODZEVICH and H. WOLKOWICZ. Regularization using a parameterized trust region subproblem. *Math. Programming*, (CORR 2005-11):accepted Jan. 6/06, 2006.

[4] R. BHATIA, R. GURALNICK, S. KIRKLAND, and H. WOLKOWICZ, editors. *12th ILAS Conference Proceeding, Regina 2005*, volume 421. 2007. Held in Regina, SK, June 26–29, 2005.

[5] H. WOLKOWICZ. Semidefinite programming. In Leslie Hogben, editor, *CRC Handbook of Linear Algebra (HLA)*, pages 51–1 – 51–13. CRC Press, Bacon Raton, Fl, 2007, appeared, Oct/06. URL:http://www.crcpress.com/shopping_cart/products/product_detail.asp?sku=C5106&parent_id=&pc=.

[6] H. WEI and H. WOLKOWICZ. Generating and solving hard instances in semidefinite programming. Technical Report CORR 2006-01, University of Waterloo, Waterloo, Ontario, 2006. Submitted to Math. Progr. Jan/06; Accepted subject to revision Sept/06.

[7] Y. DING, N. KRISLOCK, J. QIAN, and H. WOLKOWICZ. Sensor network localization, Euclidean distance matrix completions, and graph realization. Technical Report CORR 2006-23, submitted Dec/06, University of Waterloo, Waterloo, Ontario, 2006. URL:orion.uwaterloo.ca/˜hwolkowi/henry/reports/ABSTRACTS.html#sensorsdpDKQW.

[8] N. KRISLOCK, V. PICCIALLI, and H. WOLKOWICZ. Robust semidefinite programming approaches for sensor network localization with anchors. Technical Report CORR 2006-12, submitted April/06, University of Waterloo, Waterloo, Ontario, 2006. URL:orion.uwaterloo.ca/˜hwolkowi/henry/reports/ABSTRACTS.html#sensorKPW.

[9] M. POTAPTCHIK, L. TUNÇEL, and H. WOLKOWICZ. Large scale portfolio optimization with piecewise linear transaction costs. Technical Report CORR 2006-19, submitted Sept./06, University of Waterloo, Waterloo, Ontario, 2006. URL:http://orion.uwaterloo.ca/˜hwolkowi/henry/reports/ABSTRACTS.html#portfolio.

[10] Y. DING and H. WOLKOWICZ. A matrix-lifting semidefinite relaxation for the quadratic assignment problem. Technical Report CORR 2006-22, submitted Oct./06, University of Waterloo, Waterloo, Ontario, 2006.

[11] E. ANDERSEN, E. de KLERK, L. TUNCEL, H. WOLKOWICZ, and S. ZHANG, editors. *Large Scale Nonlinear and Semidefinite Programming*, volume 109. North-Holland Publishing Co., Amsterdam, 2007. Dedicated to the memory of Jos Sturm, Math. Programming, Ser. B.

[12] H. WOLKOWICZ. Book review of: Optimization: Insights and Applications, by Brinkhuis and tikhomirov. *IEEE Control Systems Magazine*, page to appear, 2006.

[13] M. GONZALEZ-LIMA, H. WEI, and H. WOLKOWICZ. A stable iterative method for linear programming. Technical Report CORR 2004-26, University of Waterloo, Waterloo, Ontario, 2004. resubmitted 2006.

[14] H. WEI. *Robust Solutions for Large Sparse Linear and Semidefinite Programming*. PhD thesis, University of Waterloo, 2006.

[15] Y. DING. On efficient semidefinite relaxations for quadratically constrained quadratic programming. Master's thesis, University of Waterloo, 2007.

[16] M. POTAPTCHIK. *Portfolio Selection Under Nonsmooth Convex Transaction Costs*. PhD thesis, University of Waterloo, 2006.