

Ricardo Fukasawa

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Areas of Interest

- ◇ Mixed Integer Programming (theory and computation)
- ◇ Operations Research
- ◇ Polyhedral Combinatorics
- ◇ Discrete/Combinatorial Optimization
- ◇ Vehicle Routing
- ◇ Logistics problems

Work Experience

- ◇ **University of Waterloo**, Waterloo, Canada.
Assistant Professor (08/2009-present)
- ◇ **IBM Research**, Yorktown Heights, NY.
Postdoctoral fellow (08/2008-07/2009)
- ◇ **Georgia Institute of Technology**, Atlanta, GA.
Graduate Research Assistant for Prof. William Cook (08/2003-07/2008)
- ◇ **Georgia Institute of Technology**, Atlanta, GA.
Instructor of undergraduate *Engineering Optimization* course (Fall 2007)
- ◇ **IBM Research**, Yorktown Heights, NY.
Summer intern (05/2006-07/2006)
- ◇ **AT&T Research Labs**, Florham Park, NJ.
Summer manager (05/2004-08/2004)
- ◇ **GAPSO Inc**, Rio de Janeiro, Brazil
Optimization manager (07/2000-06/2003)
- ◇ **Facility Automation Sistemas**, Rio de Janeiro, Brazil
Intern in the Solutions Department, (03/1999-09/1999)
- ◇ **Infoquality Consultoria e Serviços**, Rio de Janeiro, Brazil.
Intern, (01/1996-02/1997)

Publications **Refereed Journals**

- ◇ R. Fukasawa and M. Goycoolea. On the exact separation of mixed-integer knapsack cuts. *Forthcoming in Mathematical Programming*, DOI: 10.1007/s10107-009-0284-7 .
- ◇ W. Cook, S. Dash, R. Fukasawa and M. Goycoolea. Numerically safe Gomory mixed-integer cuts. *Forthcoming in INFORMS Journal on Computing*, DOI: 10.1287/ijoc.1090.0324
- ◇ S. Dash, R. Fukasawa and O. Günlük. On a generalization of the master cyclic group polyhedron. *Forthcoming in Mathematical Programming*, DOI: 10.1007/s10107-008-0252-7.
- ◇ E. Uchoa, R. Fukasawa, J. Lysgaard, A. Pessoa, M. Poggi de Aragão and D. Andrade. Robust Branch-Cut-and-Price for the Capacitated Minimum Spanning Tree Problem over a Large Extended Formulation. *Mathematical Programming Series A*, volume 112, number 2, pp. 443-472, 2008.

- ◇ R. Fukasawa, H. Longo, J. Lysgaard, M. Poggi de Aragão, M. Reis, E. Uchoa and R. F. Werneck. Robust branch-and-cut-and-price for the Capacitated Vehicle Routing Problem. *Mathematical Programming Series A, volume 106, number 3, pp. 491–511, 2006.*

Submitted papers

- ◇ S. Dash, R. Fukasawa and O. Günlük. The master equality polyhedron with multiple rows.
- ◇ R. Fukasawa and O. Günlük. Strengthening lattice-free cuts using nonnegativity.

Conference Proceedings

- ◇ S. Dash, R. Fukasawa and O. Günlük. On a generalization of the master cyclic group polyhedron. *Proceedings of the twelfth Integer Programming and Combinatorial Optimization conference IPCO'07, Ithaca, NY. Lecture Notes in Computer Science, Vol.4513 pp.197–209, 2007.*
- ◇ R. Fukasawa and M. Goycoolea. On the exact separation of mixed-integer knapsack cuts. *Proceedings of the twelfth Integer Programming and Combinatorial Optimization conference IPCO'07, Ithaca, NY. Lecture Notes in Computer Science, Vol.4513 pp.225–239, 2007.*
- ◇ R. Fukasawa, J. Lysgaard, M. Poggi de Aragão, M. Reis, E. Uchoa and R.F. Werneck. Robust branch-and-cut-and-price for the capacitated vehicle routing problem. *Proceedings of the tenth Integer Programming and Combinatorial Optimization conference IPCO'04, New York, Lecture Notes in Computer Science, Vol.3064 pp.1-15, 2004.*
- ◇ R. Fukasawa, M. Poggi de Aragão, O. Porto and E. Uchoa. Robust branch-and-cut-and-price for the Capacitated Minimum Spanning Tree Problem. *Proceedings of the International Network Optimization Conference, pp. 231-236, Evry, France, 2003.*
- ◇ R. Fukasawa, M. Poggi de Aragão, O. Porto and E. Uchoa. Solving the freight car flow problem to optimality. *Proceedings of the ATMOS 2002, Málaga, Spain. Electronic Notes in Theoretical Computer Science, Vol.66 (6), pp. 1-14, Elsevier, 2002.*

Technical Reports/Thesis

- ◇ R. Fukasawa and O. Günlük. Strengthening Lattice-free Cuts Using Non-negativity. *IBM Research Report RC24798, 2009.*
- ◇ S. Dash, R. Fukasawa and O. Günlük. The Master Equality Polyhedron with Multiple Rows. *IBM Research Report RC24746, 2009.*
- ◇ R. Fukasawa. Single-row mixed-integer programs: Theory and computations. *PhD Dissertation. Algorithms, Combinatorics and Optimization program, GeorgiaTech, 2008.*
- ◇ S. Dash, R. Fukasawa and O. Günlük. On a Generalization of the Master Cyclic Group Polyhedron. *IBM Research Report RC24201, 2007.*
- ◇ E. Uchoa, R. Fukasawa, J. Lysgaard, A. Pessoa, M. Poggi de Aragão and D. Andrade. Robust Branch-Cut-and-Price for the Capacitated Minimum Spanning Tree Problem over a Large Extended Formulation. *Technical Report: Logistics/SCM Research Group working paper series, L-2006-08, 2006.*
- ◇ R. Fukasawa, M. Poggi de Aragão, M. Reis, and E. Uchoa. Robust branch-and-cut-and-price for the capacitated vehicle routing problem. *Technical Report RPEP Vol.3 no.8, Universidade Federal Fluminense, Engenharia de Producao, Niteroi, Brazil, 2003.*
- ◇ R. Fukasawa. Solution of railroad logistics problems using Integer Programming. *Masters Dissertation (in Portuguese). Electrical Engineering Department, PUC-Rio, 2002.*

Presentations:◇ **The master equality polyhedron with multiple rows.**

MIP 2009 (June, 2009)

- ◇ **Experiments with Extended Capacity Cuts.**

INFORMS Annual meeting 2008 (October, 2008)

- ◇ **Single-row mixed-integer programs: Theory and computations.**
 Thesis defense - GeorgiaTech (June, 2008)
 Lehigh University - Dept. of Ind. and Syst. Eng. (February, 2008)
 University of Waterloo - Dept. of Combinatorics and Optimization (February, 2008)
 Argonne National Labs (January, 2008)
 ISYE DOS Seminar at GeorgiaTech (January, 2008)
- ◇ **Numerically accurate Gomory mixed-integer cuts.**
 AUSSOIS 2008 (January, 2008)
 INFORMS Annual meeting 2007 (November, 2007)
- ◇ **On a generalization of the master cyclic group polyhedron.**
 INFORMS Annual meeting 2007 (November, 2007)
 IPCO 2007 (June, 2007)
 IP Seminar, GeorgiaTech (Oct, 2006) - (presented with title “Polyhedral study of the generalized master knapsack problem.”)
 IBM student seminar (June, 2006)
- ◇ **On the capacitated vehicle routing problem.**
 Invited presentation at Universidad de Chile (April, 2007)
- ◇ **Robust Branch-and-cut-and-price and Extended Capacity Cuts.** Invited presentation at IBM Research (Dec, 2006)
- ◇ **MIR inequalities, mixed integer knapsack problems and the closure of single row systems**
 INFORMS Annual meeting 2006 (Nov, 2006)
 International Symposium on Mathematical Programming, ISMP (Aug, 2006)
 IBM IP/AP for Lunch (July, 2006)
- ◇ **Choosing the best cuts (Poster)**
 MIP 2006 (June, 2006)
- ◇ **Robust branch-and-cut-and-price for the capacitated minimum spanning tree problem.**
 International Symposium on Mathematical Programming, ISMP (August, 2003)
- ◇ **Solving the freight car flow problem to optimality.**
 Algorithmic Methods and Models for Optimization of Railways, ATMOS (July, 2002)

- Education*
- ◇ PhD in Algorithms, Combinatorics and Optimization (ACO) program. GeorgiaTech, 08/2003-08/2008
 GPA: 4.0/4.0
 - ◇ M.Sc. in Electrical Engineering, emphasis on Decision Support Methods. PUC-Rio, 07/2000-07/2002
 GPA: 9.9/10.0
 - ◇ Bachelor of Science in Electrical Engineering, emphasis on Decision Support Methods. PUC-Rio, 03/1995-07/2000.
 GPA: 8.9/10.0
 - ◇ Exchange student at the University of California at Santa Barbara (UCSB), 09/1999-03/2000.
 GPA: 4.0/4.0

- Awards and Honors*
- ◇ IBM Herman Goldstine Postdoctoral Fellowship in Mathematical Sciences, 2008-2009.
 - ◇ John Morris Fellowship at the PhD program at GeorgiaTech, 2003-2007.
 - ◇ MIP Student Travel Award (2006).
 - ◇ INFORMS 2007 Doctoral Colloquium.

- ◇ Selected for FAPERJ fellowship as the best first-year student of the Electrical Engineering M.Sc. program, 2001.
- ◇ CNPq Scholarship at M.Sc. program at PUC-Rio, 2000.
- ◇ Dean's honors in both semesters at the exchange program in UCSB, Fall 1999/Winter 2000.
- ◇ FAPERJ Scientific Initiation Scholarship, 1997/1998.
- ◇ CNPq Scientific Initiation Scholarship, 1995/1996.
- ◇ Academic Excellence award given to the top students on freshman and sophomore years at undergraduate level, 1995/1996.
- ◇ Academic Performance Scholarship - ranked 21st in the College Entrance Examination of the Technical Scientific Center, PUC-Rio, 1995.
- ◇ Ranked third over all majors (second in Engineering), College Entrance Examination of UFRJ, 1995.

Service

- ◇ **Conferences:**
 Chaired session "Computational Integer Programming" at INFORMS 2009.
 Chaired session "Advances in Integer Programming" at INFORMS 2009.
 Chaired session "Computational Integer Programming I" at INFORMS 2008.
- ◇ **Referee:**
 Latin-American Algorithms, Graphs and Optimization Symposium - LAGOS
 Operations Research
 INFORMS Journal on Computing
 Symposium on Experimental Algorithms (formerly WEA)
 Integer Programming and Combinatorial Optimization conference - IPCO
 Networks
 4OR: A Quarterly Journal of Operations Research
- ◇ **Events:**
 Organizer of IP seminar at GeorgiaTech (2006).

Skills

- ◇ **Programming:** VBA (basic knowledge), C/C++ (advanced).
- ◇ **Programming tools:** Visual C++, C++Builder, gdb, valgrind.
- ◇ **Softwares:** CPLEX, XPRESS-MP, MATLAB, Mathematica.
- ◇ **Operating Systems:** Windows, LINUX.