CURRICULUM VITAE

Andrew J. Miller

Professor, Université Bordeaux 1
Institut de Mathématiques de Bordeaux
351 cours de la Libération
33405 Talence, France
Team RealOpt, INRIA Bordeaux Sud-Ouest
Tel: (33) 5 40 00 60 50 Fax: (33) 5 40 00 21 17
Andrew.Miller@math.u-bordeaux1.fr
https://wiki.bordeaux.inria.fr/realopt/pmwiki.php/Members/AMiller

As of May 2012

BACKGROUND

Education

Ph.D.	Georgia Institute of Technology, Atlanta, GA, USA, December 1999 Industrial and Systems Engineering Thesis: *Polyhedral Approaches to Capacitated Lot–Sizing Problems*
M.S.	Georgia Institute of Technology, June 1996 Operations Research
B.S.	Furman University, Greenville, SC, May 1994 Mathematics, *summa cum laude*

Professional Experience

Employment

2008–present	Professor, Université Bordeaux 1; Team RealOpt, INRIA Bordeaux Sud-Ouest
2001–2008	Assistant Professor, Department of Industrial and Systems Engineering, University of Wisconsin–Madison
1999–2001	Visiting Research Fellow, Center for Operations Research and Econometrics, Louvain–la–Neuve, Belgium
1994–1999	Research Assistant, Georgia Institute of Technology
1997	Intern/Consultant/Software Developer, Philips Electronics North America, Briarcliff Manor, New York, USA

Consulting

InterTrans Logistics Solutions (1998)	I participated in the development of a prototype of Carrier Bid Optimizer, a product marketed by ITLS, a subsidiary of i2.

RESEARCH

- **Projects**

  External Funding

  - "Mixed Integer Programming Approaches to Production Planning Problems." August 1, 2003–July 31, 2007. Funded by the National Science Foundation, grant # CMMI-0323299. Funding level: $202,888.
  - "Planning Under Uncertainty: Methods and Applications" (co-PI with S.M. Robinson and M.C. Ferris). March 15, 2004–March 14, 2007. Funded by the Air Force Office of Scientific Research, grant # FA9550-04-1-0192. Funding level: $275,210.
  - "Collaborative Research: Exploiting Cyberinfrastructure to Solve Real-time Integer Programs" (co-PI with M.C. Ferris (UW-Madison), J.T. Linderoth and T.K. Ralphs (Lehigh University), and S. Ahmed, G.L. Nemhauser, and M.W.P. Savelsbergh (Georgia Institute of Technology)). September 1, 2005–August 31, 2009. Funded by the National Science Foundation, grant # CMMI-0521953 Funding level (UW-Madison): $249,889.
  - "Planning Under Uncertainty: Methods and Applications" (co-PI with S.M. Robinson and M.C. Ferris). April 1, 2007–November 30, 2009. Funded by the Air Force Office of Scientific Research, grant # FA9550-07-1-0389. Funding level: $302,667.
  - "CIEG: Exploiting Cyberinfrastructure to Solve Real-time Integer Programs" (co-PI with M.C. Ferris (UW-Madison). September 1, 2005–August 31, 2008. Funded by the National Science Foundation, grant # CMMI-0521953 Funding level: $15,000.
  - "Collaborative Research: Next Generation Mixed Integer Nonlinear Programming Solvers: Structure, Search, and Implementation" (co-PI with J.T. Linderoth and J. Luedtke (UW-Madison) and S. Leyffer

and Todd Munson (Argonne National Laboratory). August 15, 2008–August 14, 2011. Funded by the Department of Energy, grant # DE-PS02-08ER08-13. Funding level (UW-Madison): $528,476.

– "Collaborative Research: Next Generation Mixed Integer Nonlinear Programming Solvers: Structure, Search, and Implementation" (co-PI with J.T. Linderoth and J. Luedtke (UW-Madison) and S. Leyffer and Todd Munson (Argonne National Laboratory). January 1, 2009–December 31, 2011. Funded by the National Science Foundation, grant # CSF-0830153. Funding level (UW-Madison): $199,997.

Internal Funding

– "Sequencing and Lot–Sizing in Production Planning: A Branch, Cut, and Price Paradigm." July 1, 2003–June 30, 2004. Funded by the University of Wisconsin–Madison Graduate School Research Committee. Funding level: $17,300.

– "Hybrid Methods for Discrete Optimization Problems." July 1, 2005–June 30, 2008. Funded by the University of Wisconsin–Madison Graduate School Research Committee. Funding level: $68,158.

– "Advanced Optimization Techniques for Scheduling in the Process Industry" (co-PI with C. Maravelius). July 1, 2005–June 30, 2007. Funded by the University of Wisconsin–Madison Graduate School Research Committee. Funding level: $26,832.

- **Publications and Papers**

Refereed Journals

1. On the Capacitated Lot-Sizing and Continuous 0-1 Knapsack Polyhedra. A.J. Miller, G.L. Nemhauser, and M.W.P. Savelsbergh. *European Journal of Operational Research* **125**: 298-315, 2000.
2. On the Polyhedral Structure of a Multi-Item Production Planning Model with Setup Times. A.J. Miller, G.L. Nemhauser, and M.W.P. Savelsbergh. *Mathematical Programming* **94**:375-405, 2003.
3. A Multi-Item Production Planning Model with Setup Times: Algorithms, Reformulations, and Polyhedral Characterizations for a Special Case. A.J. Miller, G.L. Nemhauser, and M.W.P. Savelsbergh. *Mathematical Programming* **95**:71-90, 2003.
4. Tight MIP Formulations for Multi-Item Discrete Lot–Sizing Problems. A.J. Miller and L.A. Wolsey. *Operations Research* **51**: 557-605, 2003.

5. Tight Formulations for Some Simple Mixed Integer Programs and Convex Objective Integer Programs. A.J. Miller and L.A. Wolsey. *Mathematical Programming* **98**: 73-88, 2003.
6. A Nested Partitions Framework for Solving Large-Scale Multicommodity Facility Location Problems. L. Shi, R.R. Meyer, M. Bozbay, and A.J. Miller. *Journal of Systems Science and Systems Engineering* **13**: 158-179, 2004.
7. A Branch-and-Cut Algorithm for the Stochastic Uncapacitated Lot-Sizing Problem. Y. Guan, S. Ahmed, G.L. Nemhauser, and A.J. Miller. *Mathematical Programming* **105**: 55-84, 2006.
8. On Formulations of the Stochastic Uncapacitated Lot-Sizing problem. Y. Guan, S. Ahmed, A.J. Miller, and G.L. Nemhauser, *Operations Research Letters* **34**: 241-250, 2006.
9. Polynomial Time Algorithms for Stochastic Uncapacitated Lot-Sizing Problems. Y. Guan and A.J. Miller. *Operations Research* **56**: 1172-1183, 2008.
10. A Heuristic Approach to Big Bucket Production Planning Problems. K. Akartunalı and A.J. Miller. *European Journal of Operational Research* **193**: 396-411, 2009.
11. Mixing MIR Inequalities with Two Divisible Coefficients. M. Constantino, A.J. Miller, and M. Van Vyve. *Mathematical Programming*, **123**: 451-483, 2010.
12. Optimal Allocation of Surgery Blocks to Operating Rooms Under Uncertainty. B. Denton, A.J. Miller, H. Balasubramanian, and T. Huschka. *Operations Research*, **58**: 802-816, 2010.
13. Linear inequalities for bounded products of variables. P. Belotti, A.J. Miller, and M. Namazifar. SIAG/OPT Views-and-News, **22/1**: 1-8, 2011.
14. A Computational Analysis of Lower Bounds for Big Bucket Production Planning Problems. K. Akartunalı and A.J. Miller. Accepted by *Computational Optimization and Applications*, 2012.

Refereed Conference Proceedings (Selection)

15. Facets, Algorithms, and Polyhedral Characterizations for a Multi-Item Production Planning Model with Setup Times. A.J. Miller, G.L. Nemhauser, and M.W.P. Savelsbergh. IPCO, June 2001, Utrecht, Netherlands. *Lecture Notes in Computer Science* **2081**, 318-332, Springer Verlag, 2001.

16. Collaborative decision-making in supply chains using lagrangian duality. S. Poundarikapuram, A. Miller, D. Veeramani. IIE Annual Conference and Exposition, pp. 619-624, May 2004, Houston, TX, USA.
17. Distributed decision-making of integer problems with limited information. S. Poundarikapuram, A. Miller, D. Veeramani. IIE Annual Conference and Exposition, 6 pp., May 2005, Atlanta, GA, USA.
18. A Parallel Macro Partitioning Framework for Solving Mixed Integer Programs. M. Namazifar and A.J. Miller. CPAIOR, May 2008, Paris, France. *Lecture Notes in Computer Science* **5015**, 343-348, Springer Verlag, 2008.
19. A Polynomial Time Algorithm for the Stochastic Uncapacitated Lot-Sizing Problem with Backlogging. Y. Guan and A.J. Miller. IPCO, May 2008, Bertinoro, Italy. *Lecture Notes in Computer Science* **5035**, 450-462, Springer Verlag, 2008.
20. Applications and algorithms for mixed integer nonlinear programming. S. Leyffer, J. Linderoth, J. Luedtke, A. Miller, T. Munson. SciDAC, June 2009, San Diego, California, USA. *Journal of Physics: Conference Series* **180** 012014, Institute of Physics, 2009.
21. Local Cuts and Two-Period Convex Hull Closures for Big Bucket Lot-Sizing Problems. K. Akartunalı and A.J. Miller. ROADEF, February 2010, Toulouse, France. `http://spiderman-2.laas.fr/roadef2010/actes/`.
22. Valid Inequalities and Convex Hulls for Multilinear Functions. P. Belotti, A.J. Miller, and M. Namazifar. ISCO, March 2010, Hammamet, Tunisia. *Electronic Notes in Discrete Mathematics*, **36**: 805-812, 2010.
23. On the composition of convex envelopes for quadrilinear terms. P. Belotti, S. Cafieri, J. Lee, L. Liberti, and A.J. Miller. In A. Chinchuluun et al. (eds.), *Proceedings of ICOSC11*, 2012.

Submitted Papers

24. Strong Branching Inequalities for Convex Mixed Integer Nonlinear Programs. M.Kılınç, J.T. Linderoth, J. Luedtke, and A.J. Miller.

Unpublished Technical Reports

25. Solving Multi-Item Capacitated Lot-Sizing Problems with Setup Times by Branch-and-Cut. A.J. Miller, G.L. Nemhauser, and M.W.P. Savelsbergh. CORE DP 2000/39, CORE, UCL, Belgium, August 2000.

26. Discrete Lot-Sizing and Convex Integer Programming. A.J. Miller and L.A. Wolsey. CORE DP 2001/8, CORE, UCL, Belgium, January 2001.
27. New MIP Cuts for Supply Chain Structures: Final Report on MIP Cuts. Technical Report LISCOS: Large Scale Integrated Supply Chain Optimisation Software Based upon Branch-and-Cut and Constraint Programming. M. Constantino, A. Miller, Y. Pochet, B. Verweij, M. Van Vyve, and L.A. Wolsey. GROWTH Project G1RD-1999-00034, DR2.3.1/U, CORE, 2002.
28. Mechanism Design for Multiple Item Procurement Using a Distributed Ellipsoid Algorithm. A.J. Miller, D. Mishra, and D. Veeramani. CORE DP 2005/87, CORE, UCL, Belgium, December 2005.
29. A Distributed Decision-Making Method for Logistics Network Optimization. S. Poundarikapuram, A.J. Miller, R. Panchalavarapu, and D. Veeramani. June 2006.
30. A Combinatorial Active Set Algorithm for Linear and Quadratic Programming. A.J. Miller. December 2007. `http://www.math.u-bordeaux1.fr/~amiller/PAPERS/Mi07.pdf`.

- **Invited Presentations and Seminars**
  - "Solving Multi-Item Capacitated Lot-Sizing Problems with Setup Times by Branch-and-Cut." CORE, Louvain-la-Neuve, Belgium, October 1999.
  - "Discrete Lot–Sizing and Convex Integer Programming." Mathématiques de la gestion, Université Libre de Bruxelles, November 2000.
  - "The Multi–Stage Stochastic Lot–Sizing Problem: a Polynomial Time Algorithm and Valid Inequalities."
    - Universidade de Lisboa, Portugal, December 2001.
    - CORE, Louvain-la-Neuve, Belgium, December 2001.
  - "Tutorial on Integer Programming." Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, USA, September 2002.
  - "Mixing Two Sets of MIR Inequalities." University of California at Berkeley, USA, November 2002.

– "Polyhedral Approaches to Finding Economic Equilibria." Università di Modena e Reggio Emilia, Italy, July 2003.

– "Solving Production Planning Problems by Branch-and-Cut Algorithms." Università di Modena e Reggio Emilia, Italy, July 2003.

– "Solving MRP Production Planning Problems by Mixed Integer Programming." University of Minnesota, Minneapolis, USA, February 2004.

– "Nested Partitions Based Column Generation."

  * Northwestern University, Evanston, USA, February 2005.
  * University of Auckland, New Zealand, August 2005.

– "Heuristics for Big Bucket Production Planning Problems." University of Auckland, New Zealand, August 2005.

– "Production Planning and Knapsack Problems: A Short Tour of Mixed Integer Programming."

  * Furman University, Greenville, SC, USA, October 2005.
  * University of Wisconsin–Stevens Point, USA, December 2005.

– "Parallel Local Search Heuristics for Mixed Integer Programs." Argonne National Laboratory, Chicago, USA, November 2006.

– "Polynomial Time Algorithms for Stochastic Lot-Sizing Models." CORE, Louvain-la-Neuve, Belgium, December 2006.

– "Algorithmes rapides et formulations fortes pour l'optimisation stochastique en production par lot." Université de Bordeaux, France, September 2007.

– "Developing Extended Formulations for Stochastic Lot-Sizing Problems." Invited presentation for *Topics in integer programming: Workshop on the occasion of the departure of Yves Pochet.* CORE, Louvain-la-Neuve, Belgium, September 2007.

– "Fast algorithms and strong formulations for fundamental stochastic lot-sizing models." Northwestern University, Evanston, USA, October 2007.

– "A Parallel Marco Partitioning Framework for Solving Mixed Integer Programs"

  * Université de Bordeaux, France, January 2008.
  * North Carolina State University, Raleigh, USA, February 2008.
  * Ecole Polytechnique, LIX, Paris, France, October 2008. ARS08, `http://www.lix.polytechnique.fr/~liberti/ars08/`.

- "On Using 2-Period Submodels to Solve Big-Bucket Production Planning Problems." IBM T.J. Watson Research Center, Yorktown Heights, New York, USA, August 2008.
- "Valid Inequalities and Convex Hulls for Bounded Multilinear Functions"
  * North Carolina State University, Raleigh, USA, February 2010.
  * MIP 2010, Atlanta, GA, USA, July 2010.

TEACHING

- **Courses Taught in English**

  Bachelor's

  - Introduction to Combinatorial Optimization (Spring 2002, S03, S04, S05, S06, S07,S08)
  - Operations Research–Deterministic Modeling (F03, F04, F05)

  Master's/Ph.D.

  - Integer Programming (S03, S06, F07)
  - Network Flows (Fall 2003)
  - Quantitative Methods in Supply Chain Planning (S05, S07, F07)
  - Strong Formulations for Mixed Integer Programs (F02, S04, F06)

- **Courses Taught in French**

  License

  - Modélisation et optimisation (S09)

  Master's

  - Gestion des opérations et planification de production (F08, F09)
  - Optimisation stochastique (F08,F09)
  - Outils et logiciels pour l'optimisation (F08, F09)
  - Programmation linéaire II (F08)
  - Flots et routages (S09)

  Continuing Education (Conservatoire National des Arts et Métiers)

– Modèles et Méthodes d'Optimisation (S09)

- **Ph.D. Students Supervised**

  – Seeronk Prichanont (2002) (co-supervised with Dharmaraj Veeramani). *Multi-Item Multi-Attribute Outsourcing in Manufacturing Supply Networks.* Currently on the faculty of Chulalongkorn University in Bangkok, Thailand.

  – Sricharan Poundarikapuram (2002-2006) (co-supervised with Dharmaraj Veeramani). *Collaborative Planning in Supply Chains with Incomplete Information.* Poundarikapuram is currently an Operations Research Analyst with Decisive Analytics.

  – Kerem Akartunalı (2002-2007). *Computational Methods for Big Bucket Production Planning Problems: Feasible Solutions and Strong Lower Bounds.* August 2007. Currently a Research Lecturer at Strathclyde Business School at the University of Strathclyde in Glasgow, Scotland.

  – Mahdi Namazifar (2006-2008). Namazifar continued his Ph.D. thesis under the supervision of Dr. Jeff Linderoth when I moved to Université Bordeaux 1. He defended his thesis, entitled *Strong Relaxations and Computations for Multilinear Programs*, in July 2011. Namazifar is currently an analyst with Opera Solutions.

  – Chun Wang (2005-2008). When I moved to Bordeaux, Wang interrupted his Ph.D. studies at UW-Madison. In September 2009, he entered the Ph.D. program of the Department of Industrial Engineering and Operations Research at Columbia University.

  – Nicolas Dupin (2011-present) (co-supervised with François Vanderbeck, Marc Porcheron, and El-Ghazali Talbi). Dupin is investigating how to compute robust maintenance schedules for the set of nuclear reactors operated by Electricité de France.

- **Ph.D Thesis Committees** (in addition to those students supervised)

  – Jinho Lim, 2002

  – Debasis Mishra, 2004

  – Mehmet Bozbay, 2004

  – Samik Raychaudhuri, 2006

  – Arinbjörn Òlafsson, 2006

  – Hoksung Yao, 2006

- Ben Van Roo, 2007
- Shu Lu, 2007
- Bex George Thomas, 2007
- Michael Thompson, 2007
- Christina Oberlin, 2007
- Jun Zhang, 2008
- Benoit Vignac, 2009
- Laurent Gély, 2010
- Cédric Joncourt, 2010

- **Professional Development**

  - I participated in the week-long Summer Institute organized by the Teaching Academy of the University of Wisconsin-Madison, during the summers of 2004 and 2005. `http://teachingacademy.wisc.edu/TASI/`

- **Presentations**

  - "Teaching the Use of Mixed Integer Programming Models and Algorithms." Presented at INFORMS, Seattle, USA, November 2007.

SERVICE

- **External**

  International Conferences

  - Organizing Committee of MIP 2007, Montreal, Canada, July 30–August 2, 2007
    `http://www.crm.umontreal.ca/MIP2007/index_e.shtml`
  - Organizing Committee of MIP 2008, Columbia University, New York, USA, August 4-7, 2008
    `http://coral.ie.lehigh.edu/mip-2008/index.html`
  - Organizer of the Spring Workshop on Computational Issues in Mixed Integer Nonlinear Programming, March 19-20, 2009, Bordeaux, France
    `https://wiki.bordeaux.inria.fr/realopt/pmwiki.php/Project/CIMINLP`

- Program Committee of European Workshop on Mixed Integer Nonlinear Integer Programming, April 12-16, 2010, Marseille, France `http://sites.google.com/site/ewminlp/`
- Session organization
  - Annual INFORMS National Meetings (2002, 2003, 2004, 2006, 2007)
  - Triennial International Symposia on Mathematical Programming (2003, 2006)
  - INFORMS Computing Society conference (2009)

Editorial Activities

- I am serving as one of the guest editors for a special issue of *Mathematical Programming, Series B* entitled "Mixed Integer Nonlinear Programming".

Professional Society Memberships

- Mathematical Programming Society (MPS)
- Institute for Operations Research and Management Science (INFORMS)

Referee

- *Annals of Operations Research*
- *Computational Optimization and Applications*
- *Discrete Optimization*
- *European J of Operational Research*
- *IIE Transactions*
- *INFORMS J on Computing*
- *J of Global Optimization*
- *Management Science*
- *Mathematical Programming*
- *Naval Research Logistics*
- *Operations Research*
- *Operations Research Letters*

Software

- I participated in the development of $bc-shell$, $bc-prod$, and $bc-gen$, academic mixed integer programming (MIP) software.
- With a student, I have developed an MIP solver for massively parallel computing architectures. This solver runs on top of optimization algorithms implemented in open-source code (see also publication 16).
- With a student and other co-authors, I have developed heursitics that have been integrated into CBC, a COIN-OR (`http://www.coin-or.org/`) open-source project.

- **Internal**

  Committees (ISyE Department, UW-Madison)

  - Graduate Policy and Exams 2002-2007
  - Faculty Awards and Recognition 2002-2005 (Chair 2003-2005)
  - Optimization Qualifying Exam, 2003-2008 (Organizer Fall 2004)
  - Quantitative Decision Making Qualifying Exam, 2002-2008
  - Performance Evaluation of Stochastic Systems Qualifying Exam, 2004
  - ISyE Colloquium Committee 2006-2008 (Chair)
  - Workload Policy Committee, 2007-2008
  - Student Activities Board, 2007-2008

  Committees (UW-Madison)

  - Committee on Committees (2006-2008)

  Committees (Masters in "Modélisation, Ingénierie Mathématique, Statistique et Economique", joint program of Universités Bordeaux 1, 2, and 4, `http://www.math.u-bordeaux.fr/DIM/master/mimse/pageweb/pmwiki.php/Main/HomePage`)

  - Equipe pédagogique pour la mention (2009-present)
  - Chair of the specialty "Recherche Opérationelle et Aide à la Décision" (2010-2011)

  Committees (Université Bordeaux 1)

  - Comité de Selection, poste de Maître de conférences/Chair INRIA (position number 1239) (2009)