

Raf Jans

Professeur Agrégé / Associate Professor
HEC Montréal
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Positions: **HEC Montréal, Canada**
Associate Professor of Operations Management, July 2008 - present

Erasmus University, Rotterdam School of Management, The Netherlands
Visiting Associate Professor of Operations Management, 2008-2010
Associate Professor of Operations Management, January 2008 – June 2008
Assistant Professor of Operations Management, October 2003 – December 2007
Post-Doctoral Research Fellow, October 2002 – October 2003

McGill University, Desautels Faculty of Management, Montreal, Canada
Visiting Assistant Professor, Management Science Department, September 2006 – June 2007

Education: **Katholieke Universiteit Leuven, Belgium**
Ph.D., Department of Applied Economics, Specialization: Operations Research, September 1997 - September 2002
Dissertation: “Capacitated Lot Sizing Problems: New Applications, Formulations and Algorithms”
Advisor: Prof. Z. Degraeve, London Business School

London Business School, UK
Visiting PhD student, Decision Sciences Group, September 2000- September 2002

Katholieke Universiteit Leuven, Belgium
B.Sc. and M.Sc. in ‘Business Engineering’ (Handelsingenieur), Department of Applied Economics, 1992-1997

Research Interests: Operations Research: linear and integer programming: modeling, development of algorithms.
Applications of OR to industrial problems, mainly in the area of Operations Management.

Teaching Interests: Operations Management: production and inventory planning, product variety, logistics
Operations Research: LP and IP, combinatorial optimisation, computer modelling.
Decision and Risk Analysis: decision trees, simulation, behavioural aspects of decision making.

Papers: **Articles in international scientific journals:**

Jans, R., 2010, Classification of Dantzig-Wolfe Reformulations for Binary Mixed Integer Programming Problems, *European Journal of Operational Research*, 204, 251-254.

Guner Goren, H., Tunali, S., Jans, R., 2010. A Review of Applications of Genetic Algorithms in Lotsizing, *Journal of Intelligent Manufacturing*, 21, 575-590.

Jans, R., 2009, Solving Lotsizing Problems on Parallel Identical Machines Using Symmetry Breaking Constraints, *INFORMS Journal on Computing* Vol. 21 (1), 123-136.

Jans, R., Degraeve, Z., 2008. Modeling Industrial Lot Sizing Problems: A Review, *International Journal of Production Research*, Vol. 46 (6), 1619-1643.

Jans, R., Degraeve, Z., Schepens, L., 2008. Analysis of an Industrial Component Commonality Problem, *European Journal of Operational Research*, 186, 801-811.

Jans, R., Degraeve, Z., 2008. Analysis of a symmetrical Set Covering problem: The lottery problem,

European Journal of Operational Research, 186, 104-110.

- Degraeve, Z., Jans, R., 2007. A New Dantzig-Wolfe Reformulation and Branch-and-Price Algorithm for the Capacitated Lot Sizing Problem with Set Up Times, *Operations Research*, Vol. 55 (5), 909-920.
- Jans, R., Degraeve, Z., 2007. Meta-heuristics for lot sizing problems: review and comparison of solution approaches, *European Journal of Operational Research*, Vol. 177, 1855-1875.
- Jans, R., Degraeve, Z., 2004. Improved Lower Bounds for Capacitated Lot Sizing Problems with Set Up Times. *Operations Research Letters*, Vol. 32, 185-195.
- Jans, R., Degraeve, Z., 2004. An Industrial Extension of the Discrete Lot Sizing and Scheduling Problem. *IIE Transactions*, Vol. 36 (1), 47-58.
- Degraeve, Z., Gochet, W., Jans, R., 2002. Alternative Formulations for a Layout Problem in the Fashion Industry. *European Journal of Operational Research*, Vol. 143, 80-93.

Chapters in scientific books:

- Jans, R., Dittrich, K., 2008, A review of case studies in business research, book chapter in *Case Study Methodology in Business Research*, J. Dul and T. Hak (Eds.), Butterworth Heinemann, 19-29.
- Van den Ende, J., Jans, R., 2006. Liquid Gold: Innovation on a European Scale, book chapter in *Teaching entrepreneurship: Selected cases*, Clarysse, B., Roure, J., San Jose, A. (Eds.), Gate2Growth Academic Network, Brussels, 157-178.
- Huisman, D., Jans, R., Peeters, M., Wagelmans, A., 2005. Combining Column Generation and Lagrangian Relaxation, book chapter in *Column Generation*, G. Desaulniers, J. Desrosiers, M. Solomon (Eds.), Springer, 247-270.

Working papers and submitted:

- Jans, R., Desrosiers, J., 2010. Binary clustering problems: symmetric, asymmetric and decomposition formulations, submitted to EJOR (August 2010), GERAD working paper G-2010-44
- Retel-Helmrich, M., Jans, R., van den Heuvel, W., Wagelmans, A., 2010, Economic Lot Sizing with remanufacturing: complexity and efficient reformulations, submitted to IIE Transactions (August 2010)
- Guner Goren, H., Tunali, S., Jans, R., 2010, A hybrid approach for the capacitated lot sizing problem with setup carry-over, submitted to International Journal of Production Research (August 2010)

In progress:

- “Formulations and an exact algorithm for a production distribution routing problem”, with M. Ruokokoski, O. Solyali, J.F. Cordeau and H. Süral.
- “Column generation and Lagrange relaxation for the Capacitated Lot Sizing Problem with Setup Times”, with S. Araujo and Z. Degraeve;
- “Modelling issues in breaking symmetry in MIP’s: review and results”, with J. Desrosiers;
- “An optimization approach to the advertising campaign allocation problem”, with L. Rasekh and Yihua Li;

Grants & Awards:

- Individual Discovery Grant NSERC (Natural Sciences and Engineering Research Council of Canada): ‘Models and Algorithms for Integrated Production Planning Problems’; 100.000 CAD for the period 2009-2013.
- Member of GERAD (Groupe d’études et de recherche en analyse des décisions), since April 2009.
- High Performing Research Member: Erasmus Research Institute of Management, The Netherlands (April 2008 – June 2008)
- PhD grant (January 2007 – January 2011) (187.000 euros) in the NWO (Dutch Science Foundation) Open Competition Programme on the project: “Production planning and scheduling problems with demand substitution and remanufacturing” The main supervisor is Prof. Albert Wagelmans (Faculty of Economics, Erasmus University). Co-supervisors are dr. W. van den Heuvel and myself.
- Grant (10.000 euros) from the Gate-2-Growth Academic Network, sponsored by the European

Commission to develop the case: *Liquid Gold Case: Innovation on a European scale at Unilever*; 2005, with J. van den Ende.

Post doctoral research fellowship of ERIM (Erasmus Research Institute of Management) in the Logistics group (October 2002 – October 2003).

PhD Scholarship: Research Assistant of the Flemish Fund for Scientific Research (October 1998- October 2002). This scholarship is awarded each year to a small number of Ph.D. students in the field of business and economics, based on their academic record.

Presentations:

Invited Presentations

- “Formulations and a Branch-and-Cut algorithm for a production-distribution-routing problem”, with M. Ruokokoski, O. Solyali, J.F. Cordeau and H. Süral, invited talk, **International Workshop on Lotsizing**, Gardanne, France, August 2010.
- “Dynamic Lotsizing: Introduction and decomposition approaches”, **GERAD**, Montréal, November 2009.
- “A classification of MIP’s for Dantzig-Wolfe decomposition”, **Workshop on Column Generation**, Aussois, France, June 2008.
- “Breaking symmetry in MIP’s”, invited seminars at **CORE**, Louvain-La-Neuve, Belgium, March 2008; **University of Antwerp**, Belgium, April 2008; **Econometrics Institute**, Erasmus University, The Netherlands, May 2008.
- “Solving production planning problems using decomposition approaches”, Research Seminar, John Molson School of Business, **Concordia University**, Montreal, Canada, April 2007
- “Solving industrial lot sizing problems using decomposition approaches”, Research seminar, **McGill University**, Montreal, Canada, December 2006
- “Solving Integer Programming Problems Using Symmetry Breaking Constraints”, Research seminar, **McGill University**, Montreal, Canada, October 2006
- “Combining Column Generation and Lagrangian Relaxation”, with D. Huisman, **International Colloquium for the 25th anniversary of GERAD**, Montreal, Canada, May 2005.
- “Decomposition Approaches for the Capacitated Lot Sizing Problem”, with Z. Degraeve, Research Seminar, **GERAD**, Montreal, Canada, August 2003.
- “Two Alternative Decomposition Reformulations for the Capacitated Lot Sizing Problem”, with Z. Degraeve, Research Seminar, **Erasmus University**, The Netherlands, June 2002.
- “Solving Industrial Lot Sizing Problems: A Column Generation and Branch-and-Price Approach”, with Z. Degraeve, Research Seminar, **Erasmus University**, The Netherlands, March 2002.
- “Solving an Industrial Lot Sizing Problem”, with Z. Degraeve, Research Seminar, **London School of Economics**, March 2002.
- “A Strategic Product Range Split Problem”, with Z. Degraeve and L. Schepens, Research Seminar, **London Business School**, March 2001.

Regular Presentations

- “Binary Clustering Problems: Symmetric, Asymmetric and Decomposition Models”: with J. Desrosiers, **INFORMS**, Austin, TX, USA, November 7-10, 2010; **Optimization Days**, Montreal, Canada, May 10-12, 2010.
- “Symmetry Breaking constraints in MIP’s”, **INFORMS Meeting**, Washington DC, October 2008.
- “Solving lotsizing problems on parallel identical machines using symmetry breaking constraints”, Poster presentation, **MIP Workshop 2007**, Montreal, July 2007.
- “Symmetry breaking in IP models: Parallel machine lotsizing”, **INFORMS Meeting**, San Francisco, November 2005.
- “Lot Sizing on Parallel Machines”, **Optimization Days**, Montreal, Canada, May 2005.
- “A Comparison of Lower Bounds for the Capacitated Lot Sizing Problem”, with Z. Degraeve, **EURO/INFORMS Meeting**, Istanbul, July 2003.
- “Strong Lower Bounds for the Capacitated Lot Sizing Problem with Set Up Times”, with Z. Degraeve, **INFORMS Meeting**, San José, November 2002.
- “A Branch-and-Price Algorithm for the Capacitated Lot Sizing Problem”, with Z. Degraeve, **INFORMS Meeting**, Miami, November 2001.
- “A Production Planning Problem in the Tire Industry”, with Z. Degraeve, **INFORMS Meeting**, San Antonio, November 2000.
- “An Algorithm for the Multi-Item Lot Sizing Problem with Setup Times at Solideal”, with Z. Degraeve, **14th International ORBEL Conference**, Belgium, January 2000.

- “Tire Production Scheduling at Solideal”, with Z. Degraeve, **INFORMS Meeting**, Philadelphia, November 1999.
- “Alternative Formulations for a Layout Problem in the Fashion Industry”, with Z. Degraeve and W. Gochet, **13th International ORBEL Conference**, Belgium, January 1999.

Presentations by co-authors of joint work:

- “A Branch-and-Price Algorithm for the Capacity Constrained Lotsize Problem with Set Up Times”, with S. Araujo and Z. Degraeve, **INFORMS**, Austin, TX, USA, November 7-10, 2010.
- “A Branch-and-Price Algorithm for the Capacity Constrained Lotsize Problem with Set Up Times”, with S. Araujo and Z. Degraeve, **International Workshop on Lotsizing**, France, August 2010.
- “Economic Lotsizing with remanufacturing: Complexity and efficient reformulations”, with M. Retel-Helmrich, W. Van den Heuvel and A. Wagelemans, **International Workshop on Lotsizing**, France, August 2010.
- “Lotsizing with remanufacturing”, with M. Retel-Helmrich, W. Van den Heuvel and A. Wagelemans, **24th European Conference on Operational Research (EURO XXIV)**, Lisbon, Portugal, July 11-14, 2010.
- “Lower Bounds for the Capacitated Lot Sizing Problem with Set Up Times”, with S. Araujo and Z. Degraeve, **24th European Conference on Operational Research (EURO XXIV)**, Lisbon, Portugal, July 11-14, 2010.
- “Genetic Algorithm Based Approaches for the Capacitated Lot Sizing Problem with Set-up Carryover and Backordering”, with H. Guner Goren and S. Tunali, **24th European Conference on Operational Research (EURO XXIV)**, Lisbon, Portugal, July 11-14, 2010.
- “A Hybrid Approach for the Capacitated Lot Sizing Problem with Setup Carryover”, with H. Guner Goren and S. Tunali, **Optimisation Days**, Montréal, Canada, May 10-12, 2010.
- “A Genetic Algorithm Approach for the Capacitated Lot Sizing Problem with Set-up Carryover”, with H. Guner Goren and S. Tunali, **CORS/INFORMS Joint International Conference**, Toronto, June 14-17, 2009.

Supervision:

Supervision of PhD Students:

Supervisor of Samir Elomari, HEC Montréal, January 2010 – January 2014, “Intelligent production planning through a coupled lotsizing and cutting stock optimization”;

Co-Supervisor of Yossiri Adulyasak, HEC Montréal, September 2009 – September 2013, “Optimisation of Integrated Production Planning and Distribution Problems” with JF Cordeau

Co-Supervisor of Mathijn Retel Helmrich, Faculty of Economics, Erasmus University, The Netherlands, January 2006 – January 2011, “Production planning and scheduling problems with demand substitution and remanufacturing” The main supervisor is Prof. Albert Wagelemans and co-supervisor W. van den Heuvel.

Supervision of Visiting PhD Students:

Co-Supervision of Mirko Ruokokoski (visiting PhD student at HEC Montréal and CIRRELT, August 2009 – February 2010), a PhD student at the System Analysis Laboratory, Helsinki University of Technology; “The integrated lotsizing and vehicle routing problem”, with JF Cordeau.

Supervision of Mathijn Retel Helmrich (visiting PhD student at HEC Montréal, May 2009 – July 2009), a PhD student at the Faculty of Economics, Erasmus University, The Netherlands, “Production planning and scheduling problems with demand substitution and remanufacturing”.

Supervision of Hacer Goren Gunen (visiting PhD student at HEC Montréal, September 2008 – August 2009), a PhD student at the Department of Industrial Engineering, Dokuz Eylul University, Izmir, Turkey. (ongoing collaboration since 2007); “Meta-heuristics for capacitated lotsizing problems”

Member of PhD jury:

Arcan Nalcan, Desautels Faculty of Management, McGill University, October 2008

Member of the PhD Phase II committee:

Mohammad Nikoofal, Desautels Faculty of Management, McGill University, December 2010

Supervision of Master’s Students:

HEC Montréal

Jury member (lecteur): 2 in 2009; 2 in 2010

Rotterdam School of Management (2004-2008)

Supervision of 4 master’s thesis

Co-Supervision of 12 master's thesis
Supervision of 4 (E)MBA projects

Teaching:

Development of teaching cases

- *Liquid Gold Case: Innovation on a European scale at Unilever*; 2005, with J. van den Ende.

HEC Montreal

- *Operations Management*, core course in the MBA programme, Winter 2009 (3 sections), Winter 2010 (3 sections), Winter 2011 (4 sections).
- *Managing Product and Service Variety*, elective in the MBA programme, Spring 2009.
- *Logistics and Supply Chains*, elective in the MBA programme, Winter 2009.
- *Decision Tools for the Operations Manager*, elective in the MSc programme, Winter 2010, Summer 2011.
- *Advanced Production Planning*, PhD course, Summer 2010.
- *Operations Management*, core course in the Bachelor's programme, Fall 2008.

Rotterdam School of Management, Erasmus University

- *Management Science*, MBA program, Oct. 2003 – Jan. 2004, Oct. 2004 – Jan. 2005, Oct. 2005-Jan. 2006, Dec. 2006-Jan. 2007, Oct. 2007-Jan. 2008.
- *Management Science*, Executive MBA program, Jan. – March 2004, Jan. – March 2005, Jan. – March 2006, Jan. – March 2007, Jan. – March 2008, April -June 2009, May-June 2010.
- *Management Science*, Master program General Management, Jan. – March 2007, Jan. – March 2008, April 2009.
- *Refresher Mathematics*, MBA program, Oct. 2004, Oct. 2005, Oct. 2007.
- *Managing Product Variety*, Supervision of Bachelor's thesis projects, Third year Bachelor's program in Management, Oct. 2003 – May 2004, Oct. 2004 – May 2005, Oct. 2005- May 2006.
- *Production and Logistics Management* (case discussion classes), second year Bachelor's program in Management, Sept. 2004 – Nov. 2004.
- Supervision Executive MBA In-Company Projects, February 2004 – May 2004.
- Supervision Master's thesis projects (2003 – 2009).

Desautels Faculty of Management, McGill University

- *Data, Models & Decisions*, MBA program and Masters in Manufacturing Management, Sept. 2006 – Dec. 2006, Sept. 2007 – Dec. 2007.
 - *Analysis of Production Operations*, MBA program and Masters in Manufacturing Management, Sept. 2006 – Dec. 2006.
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**Industry
Experience:**

Consultant, Ernst & Young, London, U.K.

January 2005 – April 2005,
Project on the optimisation of corporate tax planning.

Consultant, Atlas Copco, Wilrijk, Belgium

April 2004 – August 2004, with Prof. Z. Degraeve and Prof. F. Spieksma
Optimization of a product range using component commonality.

Consultant, Solideal, Gent, Belgium / Columbo, Sri Lanka

1999 – 2002, with Prof. Z. Degraeve
Solideal is a leading industrial tire manufacturer based in Sri Lanka.
The aim of the project is the optimisation of the production planning and inventory management.

Consultant, OMPartners, Brasschaat, Belgium

June 1998 – September 1998, with Prof. Z. Degraeve and L. Schepens (OMPartners)
OMPartners is an international software and consulting firm specializing in operations management and production planning applications. We studied the optimisation of a product range using component commonality at an international industrial manufacturer in Belgium.

Academic Supervisor (RSM Erasmus University, The Netherlands, 2003-2008) on student's projects for companies such as Heineken, LU, TNT, UPS Supply Chain Services, Peugeot Netherlands, DAF, Riedel Drinks.

Professional Service:

Department representative in the Local PhD Committee at HEC (February 2009 – present)
Responsible for the GOL profile in the MBA programme (June 2010 – present)
Member of the Steering Committee for the International Workshop on Lotsizing, Gardanne, France, August 25-27, 2010.

Referee for > 30 journal articles in 2008-now.

Referee for 30 journal articles in 2002-2007

Referee for grant application FRSCQ (Fonds de recherché sur la société et la culture Québec), 2009.

Referee for grant application NSERC (Fonds de recherché sur la société et la culture Québec) 2009, 2010.

Referee for:

International Journal of Production Research

Operations Research

Operations Research Letters

European Journal of Operational Research

Computers and Operations Research

Production and Operations Management

Journal of Purchasing and Supply Management

International Journal of Production Economics

Journal of Scheduling

Manufacturing and Services Operations Management

IIE Transactions

Naval Research Logistics

Asia-Pacific Journal of Operational Research

International Journal of Systems Science

Omega

Journal of Computational and Applied Mathematics

Annals of Operations Research

Optimization Letters

Flexible Services and Manufacturing

Journal of Heuristics