Curriculum vitae—Michael Patriksson 641221-1911

PERSONAL DATA

Full Name	Klas Åke *Michael* Patriksson
Citizenship	Swedish
Date of Birth	December 21, 1964

CURRENT OFFICE ADDRESS

Office
Department of Mathematics
Chalmers University of Technology
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EDUCATION

2004–07 Postgraduate examiner in applied mathematics, Department of Mathematics, Göteborg University, Gothenburg

2004 Studies in history, Göteborg University, Gothenburg

2004 Professor of applied mathematics (professor), Department of Mathematics, Chalmers University of Technology, Gothenburg

2002–03 Examiner in applied mathematics, Department of Mathematics, Göteborg University, Gothenburg

2002 Professor of applied mathematics (biträdande professor), Department of Mathematics, Chalmers University of Technology, Gothenburg

2001–04 Studies in history, military history, and sociology, Lund University, Lund, and Kristianstad College, Kristianstad

1997 Docent (habilitation) in optimization, Department of Mathematics, Linköping University, Linköping, Sweden

1991–1993 Doctor of Philosophy, Division of Optimization, Department of Mathematics, Linköping University, Linköping
Title of Doctorate Thesis: *A Unified Framework of Descent Algorithms for Nonlinear Programs and Variational Inequalities*
Thesis advisor: Associate Professor Torbjörn Larsson
Faculty opponent: Professor R. Tyrrell Rockafellar, University of Washington, Seattle, WA, USA

1988–1991 Licentiate of Philosophy, Division of Optimization, Department of Mathematics, Linköping University, Linköping
Title of Licentiate Thesis: *Algorithms for Urban Traffic Network Equilibria*
Thesis advisor: Associate Professor Torbjörn Larsson
Faculty opponent: Dr. Karl-Johan Rehn, Royal Institute of Technology, Stockholm, Sweden

1984–1988 Bachelor of Science in Mathematics, Linköping University, Linköping

EXPERIENCE

2004–	Professor of applied mathematics, Department of Mathematics, Chalmers University of Technology, Gothenburg
2002–04	Professor of applied mathematics (biträdande professor), Department of Mathematics, Chalmers University of Technology, Gothenburg
2001–	Scientific advisor, Fraunhofer-Chalmers Center for Industrial Mathematics, Gothenburg
1997–2002	Associate professor, Department of Mathematics, Chalmers University of Technology, Gothenburg
1995–1997	Temporary position as lecturer/assistant professor (vikarierande universitetslektor), Division of Optimization, Department of Mathematics, Linköping University, Linköping
1994–1995	Postdoctoral scholarship, Department of Mathematics, University of Washington, Seattle, WA, USA
1993–1994	Postdoctoral scholarship, Department of Mathematics, University of York, Heslington, England
1988–1993	Ph.D. student (doktorand), Division of Optimization, Department of Mathematics, Linköping University, Linköping
Spring 1988	Research assistant (amanuens), Division of Optimization, Department of Mathematics, Linköping University, Linköping

PROFESSIONAL SOCIETIES

EURO	(The Association of European Operational Research Societies) Member, 1991–Present; Founding member of EURO Working Group on Transportation
INFORMS	(Institute for Operations Research and the Management Sciences) Member, 1995–Present; Member of ORSA and TIMS, 1988–1994
MPS	(Mathematical Programming Society) Member, 1988–Present
SIAM	(Society of Industrial and Applied Mathematics) Member, 1993–Present
SORA/SOAF	(Swedish Operations Research Society) Vice President, 1992–1993; Board Member, 1991–1993; Member, 1989–1993
SULF	(Swedish University Teacher's Union) Board Member in the PhD student section, 1989–1990

SERVICES AND AWARDS

Awards

The Frisinger Stipend for 2004, awarded 30 March 2005, by the Håkan Frisinger Foundation for Transport Research. The prize is a tax free scholarship of 250,000 SEK

Svensson–Svenfeldt's Scholarship for study merits, Katedralskolan, Linköping, 1981–1983

Editorship

Member of the Editorial Advisory Board for Transportation Research, Series B, 1999–

Associate editor for Transportation Science, 2001–

Referee

Referee and reviewer on about 170 papers for, among others, Annals of Applied Probability, Annals of Operations Research, Applied Mathematics and Optimization, Applied Numerical Mathematics, Computational Optimization and Applications, Computers & Operations Research, European Journal of Operational Research, IEEE Transactions on Neural Networks, INFORMS Journal on Computing, Journal of Convex Analysis, Journal of Global Optimization, Journal of Computational and Applied Mathematics, Journal of Optimization Theory and Applications, Journal of Physics, A, Le Matematiche, Mathematical Programming, Mathematical Reviews, Mathematics of Operations Research, Networks, Networks & Spatial Economics, Numerical Algorithms, Operations Research, Operations Research Letters, Optimization, Optimization Methods and Software, SIAM Journal on Optimization, Transportation Research, Series B and C, and Transportation Science

Administration

Member of an informal team leader group at mathematics, Chalmers and Gothenburg University, 2005–

Chairman of a strategic research committee at mathematics, Chalmers and Gothenburg University, 2005

Deputy leader of the strategic research proposal GMMC (Gothenburg Mathematical Modeling Center), 2004–

Chairman of a committee for the reorganization of the mathematics library, Chalmers and Gothenburg University, 2004–05

Chairman of the library board at mathematics, Chalmers and Gothenburg University, 2001–

Deputy member of the mathematics department board, Chalmers, 2001–

Member of the program committee in Technical Mathematics at Chalmers, 1997–2005

Member of an informal team leader group at mathematics, Chalmers and Gothenburg University, 2000–2001

Member of the strategic committee for future research in mathematics at Chalmers and Gothenburg University, 1999–2000

Member of program committees for mathematics in economics studies at Chalmers and Gothenburg University, 1999–2000

Member of the Ph.D. position committee in industrial and applied mathematics at Chalmers, 1997–98

Organizer

Member of the international scientific committee for the 6th TRISTAN conference, Bentota, Sri Lanka, June 10–15, 2007

Member of the international scientific committee for the 5th TRISTAN conference, Le Gosier, Guadeloupe, French West Indies, June 13–18, 2004

Member of the local organizing committee for the International Symposium on Mathematical Programming, ISMP 2003, Copenhagen, August 2003

Member of the international scientific committee for the International Symposium on Transport Network Reliability, Kyoto University, Kyoto, 31 July, 2001

Member of the scientific committee for the 4th TRISTAN conference, Sâo Miguel, The Azores, Portugal, June 13–19, 2001

Member of the international program committee for the 8th Meeting of the EURO Working Group on Transportation, Rome, September 11–14, 2000

Member of the international program committee for "Modeling and Management in Transportation", Poznan and Cracow, Poland, October 12–16, 1999

Organizer of the 6th Meeting of the EURO Working Group on Transportation, Chalmers, September 9–11, 1998

Member of the organizing committee for "Traffic Network Models: A

Symposium in the Honour of Sven Erlander", Vadstena, June 16–20, 1996

Organizer of Invited Session, the EURO XIII/OR 36 Conference, Glasgow, July 19–22, 1994

Thesis referee

Member of the external committee, Doctoral thesis by Andreas Fhager, Chalmers University of Technology, 2006

Member of the external committee, Doctoral thesis by Wolfgang Ernst, University of Western Australia, Australia, 2003

Member of the external committee, Doctoral thesis by Ricardo García, Universidad de Castilla-La Mancha, Spain, 2001

Member of the external committee, Doctoral thesis by Bijun Han, Traffic planning division, Royal Institute of Technology, Stockholm, 2001

Member of the external committee, Doctoral thesis by Jörgen Blomvall, Division of Optimization, Department of Mathematics, Linköping University, Linköping, 2001

Member of the external committee, Doctoral thesis by Daniel Hilding, Division of Mechanics, Department of Mechanical Engineering, Linköping University, Linköping, 2000

Member of the external committee, Doctoral thesis by Johan Marklund, Division of Production Management, Lund Institute of Technology, 1999

External referee, Doctoral thesis by Patricia Daniele, Dipartimento di Matematica, Università di Catania, Italy, 1999

Faculty opponent, Licentiate thesis by Daniel Hilding, Division of Mechanics, Department of Mechanical Engineering, Linköping University, Linköping, 1998

Faculty opponent, Licentiate thesis by Torgil Abrahamsson, Department of Optimization and Systems Theory, Royal Institute of Technology, Stockholm, 1992

External advise

External reviewer of project proposals in mathematics for The Royal Swedish Academy of Sciences, 2004

External reviewer of project proposals on optimization for VR (Vetenskapsrådet, The Swedish Research Council), 2003

Member of the board of advisors of VR (Vetenskapsrådet, The Swedish Research Council), mathematics and technical mathematics, responsible for optimization, 2001

External expert in British government traffic research program DIADEM (Development of integrated assignment and demand modelling) (partner: Mott McDonald, Ltd.), 2000–2002

External reviewer of project proposals on optimization for the Swedish Natural Science Research Council (NFR), 2000

Engineering and Physical Sciences Research Council (EPSRC, UK government funding agency), projects on traffic networks, 1998–1999

EU project *Generalised Equilibrium Modelling* (Partners: MVA Systematica, University of York, Centre for Transport Studies), 1997–1998

RESEARCH INTERESTS

Mathematical programming, Algorithm theory for continuous optimization problems, Numerical algorithms for large-scale structured optimization problems, Nondifferentiable optimization, Bilevel optimization and mathematical programs with equilibrium constraints, Stochastic programming, Modelling and solution of traffic equilibrium problems, Theory and algorithms for variational inequality problems, Networks, Parallel algorithms for continuous problems over Cartesian product sets, Structural optimization in trusses and fluids, Lagrangian heuristics for integer programming problems

TEACHING INTERESTS

Mathematical programming, Operations research, Linear programming, Nonlinear programming, Convex programming, Integer programming, Combinatorial optimization, Parallel optimization, Decomposition/coordination methods, Networks, Traffic models

PUBLICATIONS

A. Books and Monographs

[**5**] M. Patriksson, *Traffic Equilibrium Models—Analysis, Applications, and Optimization Algorithms*, Springer-Verlag, Berlin (in preparation).

[**4**] N. Andréasson, A. Evgrafov, and M. Patriksson, *Introduction to Continuous Optimization*, Studentlitteratur, Lund, Sweden, 2005.

[**3**] M. Labbé and M. Patriksson (eds.), *Transportation Planning—State of the Art*, Applied Optimization Series, vol. 64, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2002.

[**2**] M. Patriksson, *Nonlinear Programming and Variational Inequality Problems—A Unified Approach*, Applied Optimization Series, vol. 23, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1998. [Reviewed by I. Konnov in Mathematical Reviews, no. 9 (1999).]

[**1**] M. Patriksson, *The Traffic Assignment Problem—Models and Methods*, Topics in Transportation Series, VSP, Utrecht, The Netherlands, 1994. [Reviewed by L. Wynter in Transportation Science, vol. 30, no. 3 (1996), pp. 271–272.]

B. Chapters in Books

[**7**] P. Marcotte and M. Patriksson, *Traffic Equilibrium*, *Handbooks in Operations Research and Management Science*, North–Holland (to appear).

[**6**] M. Josefsson and M. Patriksson, *On the applicability of sensitivity analysis formulas for traffic equilibrium models*, in Mathematical and Computational Methods for Congestion Charging, Proceedings of the Theory and Practice of Congestion Charging Symposium, Imperial College, London, August 18–20, 2003, D. Hearn, S. Lawphongpanich, and M. Smith (eds.), vol. 148 in the Applied Optimization series, Springer-Verlag, Berlin, 2005, pp. 117–141.

[**5**] M. Patriksson, *Mathematics handbook for science and engineering*, Fifth edition, Sections 15.2–15.4, Springer-Verlag, Berlin; Studentlitteratur, Lund, 2004.

[**4**] M. Patriksson, *Cost approximation algorithms*, in Encyclopedia of Optimization, P. A. Floudas and P. M. Pardalos (eds.), Kluwer Academic Publishers, New York, NY, 2002, vol. I (A–D), pp. 350–361.

[**3**] M. Patriksson, *Simplicial decomposition algorithms*, in Encyclopedia of Optimization, P. A. Floudas and P. M. Pardalos (eds.), Kluwer Academic Publishers, New York, NY, 2002, vol. V (R–Z), pp. 205–212.

[**2**] T. Larsson and M. Patriksson, *Side constrained traffic equilibrium models—Traffic management through link tolls*, in Equilibrium and Advanced Transportation Modelling, P. Marcotte and S. Nguyen (eds.), Kluwer Academic Publishers, Boston, MA, 1998, pp. 125–151.

[**1**] M. Patriksson, *Parallel cost approximation algorithms for differentiable optimization*, in Parallel Computing in Optimization, A. Migdalas, P. Pardalos, and S. Storøy (eds.), Kluwer Academic Publishers, New York, NY, 1997, pp. 295–341.

C. Articles in Refereed Journals

[**39**] M. Josefsson and M. Patriksson, *Sensitivity analysis of separable traffic equilibria,*

with application to bilevel optimization in network design, Transportation Research, B, vol. 41, no. 1 (2007), pp. 4–31.

[**38**] T. Larsson and M. Patriksson, *Global optimality conditions and Lagrangian heuristics for nonconvex optimization*, Operations Research, vol. 54, no. 3 (2006), pp. 436–453.

[**37**] A. Evgrafov and M. Patriksson, *On the convergence of stationary sequences in topology optimization*, International Journal of Numerical Methods in Engineering, vol. 64, no. 1 (2005), pp. 17–44.

[**36**] M. Patriksson, *Sensitivity analysis of traffic equilibria*, Transportation Science, vol. 38, no. 3 (2004), pp. 258–281.

[**35**] M. Patriksson, *Algorithms for computing traffic equilibria*, Networks & Spatial Economics, vol. 4, no. 1 (2004), pp. 23–38.

[**34**] A. Evgrafov and M. Patriksson, *On the existence of solutions to stochastic mathematical programs with equilibrium constraints* Journal of Optimization Theory and Applications, vol. 121, no. 1 (2004), pp. 65–76.

[**33**] T. Larsson, M. Patriksson, and C. Rydergren, *A column generation procedure for the side constrained traffic equilibrium problem*, Transportation Research, Part B, vol. 38, no. 1 (2004), pp. 17–38.

[**32**] T. Larsson, M. Patriksson, and C. Rydergren, *Inverse nonlinear multicommodity flow optimization by column generation*, Optimization Methods and Software, vol. 18, no. 5 (2003), pp. 601–613.

[**31**] T. Larsson, M. Patriksson, and A.-S. Strömberg, *On the convergence of conditional ε-subgradient methods for convex programs and convex–concave saddle-point problems*, European Journal of Operational Research, vol. 151, no. 3 (2003), pp. 461–473.

[**30**] A. Evgrafov and M. Patriksson, *Stable relaxations of stochastic stress constrained weight minimization problems*, Structural and Multidisciplinary Optimization, vol. 25, no. 3 (2003), pp. 189–198.

[**29**] A. Evgrafov and M. Patriksson, *Stochastic structural topology optimization: Discretization and penalty function approach*, Structural and Multidisciplinary Optimization, vol. 25, no. 3 (2003), pp. 174–188.

[**28**] A. Evgrafov, M. Patriksson, and J. Petersson, *Stochastic structural topology optimization: Existence of solutions and sensitivity analyses*, ZAMM (Zeitschrift für Angewandte Mathematik und Mechanik), vol. 83, no. 7 (2003), pp. 479–492.

[**27**] R. García, A. Marín, and M. Patriksson, *A class of column generation/simplicial decomposition in convex differentiable optimization, I: Convergence analysis*, Optimization, vol. 52, no. 2 (2003), pp. 171–200.

[**26**] M. Patriksson and R.T. Rockafellar, *Sensitivity analysis of variational inequalities over aggregated polyhedra, with application to traffic equilibria*, Transportation Science, vol. 37, no. 1 (2003), pp. 56–68.

[**25**] M. Patriksson and R.T. Rockafellar, *A bilevel optimization model and descent algorithm for traffic management*, Transportation Science, vol. 36, no. 3 (2002), pp. 271–291.

[**24**] M. Patriksson and J. Petersson, *Existence and continuity of optimal solutions to some structural topology optimization problems including unilateral constraints and stochastic loads*, ZAMM (Zeitschrift für Angewandte Mathematik und Mechanik), vol. 82, no. 7 (2002), pp. 435–459.

[23] S. Christiansen, M. Patriksson, and L. Wynter, *Stochastic bilevel programming in structural optimization*, Structural and Multidisciplinary Optimization, vol. 21, no. 5 (2001), pp. 361–371.

[22] M. Patriksson and L. Wynter, *Stochastic mathematical programs with equilibrium constraints*, Operations Research Letters, vol. 25, no. 4 (1999), pp. 159–167.

[21] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic, primal convergence in dual subgradient schemes for convex programming*, Mathematical Programming, vol. 86, no. 2 (1999), pp. 283–312.

[20] T. Larsson and M. Patriksson, *Side constrained traffic equilibrium models: analysis, computation and applications*, Transportation Research, Part B, vol. 33, no. 4 (1999), pp. 233–264.

[19] M. Patriksson, *Cost approximation algorithms with nonmonotone line searches for nonlinear programs*, Optimization, vol. 44 (1998), pp. 199–217.

[18] J.T. Lundgren and M. Patriksson, *The combined distribution and stochastic assignment problem.* Annals of Operations Research, vol. 82 (1998), pp. 309–329.

[17] M. Patriksson, *Cost approximation: A unified framework of descent algorithms for nonlinear programs*, SIAM Journal on Optimization, vol. 8, no. 2 (1998), pp. 561–582.

[16] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic convergence in subgradient optimization.* Optimization Methods and Software, vol. 9 (1998), pp. 93–120.

[15] M. Patriksson, *Decomposition methods for differentiable optimization problems on Cartesian product sets*, Computational Optimization and Applications, vol. 9, no. 1 (1998), pp. 5–42.

[14] T. Larsson, Z.-W. Liu, and M. Patriksson, *A dual scheme for traffic assignment problems*, Optimization, vol. 42 (1997), pp. 323–358.

[13] T. Larsson and M. Patriksson, *Traffic management through link tolls—An approach utilizing side constrained traffic equilibrium models*, Rendiconti del Circolo Matematico di Palermo, Serie II, vol. 48 (1997), pp. 147–170.

[12] M. Patriksson, *Merit functions and descent algorithms for a class of variational inequality problems*, Optimization, vol. 41, no. 1 (1997), pp. 37–55.

[11] J. Petersson and M. Patriksson, *Topology optimization of sheets in contact by a subgradient method*, International Journal of Numerical Methods in Engineering, vol. 40, no. 7 (1997), pp. 1295–1321.

[10] O. Damberg, J.T. Lundgren, and M. Patriksson, *An algorithm for the stochastic user equilibrium problem*, Transportation Research, Part B, vol. 30, no. 2 (1996), pp. 115–131.

[9] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Conditional subgradient optimization—theory and applications*, European Journal of Operational Research, vol. 88, no. 2 (1996), pp. 382–403.

[8] T. Larsson and M. Patriksson, *An augmented Lagrangean dual algorithm for link capacity side constrained traffic assignment problems*, Transportation Research, Part B, vol. 29, no. 6 (1995), pp. 433–455.

[7] T. Larsson and M. Patriksson, *Equilibrium characterizations of solutions to side constrained asymmetric traffic assignment models*, Le Matematiche, vol. 49, no. 2 (1994), pp. 249–280.

[6] M. Patriksson, *On the convergence of descent methods for monotone variational inequalities*, Operations Research Letters, vol. 16, no. 5 (1994), pp. 265–269.

[5] T. Larsson and M. Patriksson, *A class of gap functions for variational inequalities*, Mathematical Programming, vol. 64, Series A, no. 1 (1994), pp. 53–79.

[4] T. Larsson, A. Migdalas, and M. Patriksson, *A partial linearization algorithm for the traffic assignment problem*, Optimization, vol. 28, no. 1 (1993), pp. 47–61.

[3] M. Patriksson, *A unified description of iterative algorithms for traffic equilibria*, European Journal of Operational Research, vol. 71, no. 2 (1993), pp. 154–176.

[2] M. Patriksson, *Partial linearization methods in nonlinear programming*, Journal of Optimization Theory and Applications, vol. 78, no. 2 (1993), pp. 227–246.

[1] T. Larsson and M. Patriksson, *Simplicial decomposition with disaggregated representation for the traffic assignment problem*, Transportation Science, vol. 26, no. 1 (1992), pp. 4–17.

D. Articles in Refereed Conference Proceedings

[22] T. Larsson, J. Lundgren, M. Patriksson, and C. Rydergren, *Numerical experiments with a decision support system methodology for strategic traffic management*, In: Urban and Regional Transportation Modeling: Essays in Honor of David Boyce, D.-H. Lee (ed.), Edward Elgar, Northampton, MA, 2004, pp. 337–364.

[21] M. Patriksson and R.T. Rockafellar, *Variational geometry and equilibrium*, In: Equilibrium Problems and Variational Models, Proceedings of the International School of Mathematics "G. Stampacchia" 32th Workshop, held June 23–July 2, 2000, in Erice, Italy, P. Daniele, F. Giannessi, and A. Maugeri (eds.), Kluwer Academic Publishers, 2003, Dordrecht, The Netherlands, pp. 347–368.

[20] A. Evgrafov, M. Patriksson, and J. Petersson, *On stochastic structural topology optimization*, In: Nonsmooth/Nonconvex Mechanics: With Applications in Engineering, Proceedings of the International Conference in memory of Professor P. D. Panagiotopoulos, 5–6 July 2002, Thessaloniki, Greece, C. C. Baniotopoulos (ed.), Editions ZITI, Thessaloniki, Greece, pp. 97–104.

[19] T. Larsson, J. Lundgren, M. Patriksson, and C. Rydergren, *A decision support methodology for strategic traffic management*, In: Transportation and Network Analysis: Current Trends, M. Gendreau and P. Marcotte (eds.), Kluwer Academic Publishers, 2002, Dordrecht, The Netherlands, pp. 147–164.

[18] M. Patriksson and R.T. Rockafellar, *Sensitivity analysis of traffic equilibria revisited*, In: Preprints of TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001, vol. 1/3, pp. 189–194.

[17] R. García, A. Marín, and M. Patriksson, *Network equilibrium models: A class of column generation/simplicial decomposition algorithms*, In: Preprints of TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001, vol. 1/3, pp. 119–124.

[16] T. Larsson, J. Lundgren, M. Patriksson, and C. Rydergren, *A decision support methodology for strategic traffic management*, In: Preprints of TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001, vol. 1/3, pp. 75–79.

[15] T. Larsson and M. Patriksson, *Modèles d'équilibre du trafic en présence de contraintes—gestion du trafic au maoyen des péages*, French translation of the article **[B.2]** made by M. J. Mingotaud, INRETS, in Modélisation du Trafic, Actes de groupe de travail 1997, Les Collections de l'INRETS, Actes 74, M. Aron, F. Boillot, and J.-P. Lebaque (eds.), Institut

National de Recherche sur les transports et leur sécurité (INRETS), Arcueil, France, 2001, pp. 95–126.

[14] T. Larsson, P.-O. Lindberg, J. Lundgren, M. Patriksson, and C. Rydergren, *On traffic equilibrium models with a nonlinear time/money relation*, In: Transportation Planning: State of the Art, Proceedings of the 6th Meeting of the EURO Working Group on Transportation, 9–11 September 1998, Gothenburg, Sweden, M. Patriksson and M. Labbé (eds.), Kluwer Academic Publishers, 2002, pp. 19–31.

[13] T. Larsson, J. Lundgren, M. Patriksson, and C. Rydergren, *Most likely traffic equilbrium route flows: Analysis and computation*, In: Equilibrium Problems: Nonsmooth Optimization and Variational Inequality Models, Proceedings of an international Workshop in Memory of Marino De Luca, Hotel Villa Diodoro, Taormina, Italy, December 3–5, 1998, F. Giannessi, A. Maugeri, and P. M. Pardalos (eds.), Kluwer Academic Publishers, 2001, pp. 129–159.

[12] T. Larsson, J. Lundgren, M. Patriksson, and C. Rydergren, *Outline to a decision support tool for traffic management*, In: Urban Transport Systems, Proceedings of the 2nd KFB Research Conference, Lund Institute of Technology, June 7–8, 1999.

[11] M. Patriksson, *A new merit function and an SQP method for non-strictly monotone variational inequalities*, In: Nonlinear Optimization and Related Topics, Proceedings of the International School of Mathematics "G. Stampacchia" 28th Course on Nonlinear Optimization and Applications, held June 23–July 2, 1998, in Erice, Italy, G. Di Pillo and F. Giannessi (eds.), Kluwer Academic Publishers, New York, NY, 2000, pp. 257–276.

[10] T. Larsson and M. Patriksson, *Price-directive traffic management—Applications of side constrained traffic equilibrium models*, In: Transportation Networks: Recent Methodological Advances, Selected Proceedings of the 4th EURO Transportation Meeting, Newcastle University, Newcastle, UK, September 9–11, 1996, M. G. H. Bell (ed.), Pergamon Press, Amsterdam, 1998, pp. 83–97.

[9] J.T. Lundgren and M. Patriksson, *An algorithm for the combined distribution and assignment model*, In: Transportation Networks: Recent Methodological Advances, Selected Proceedings of the 4th EURO Transportation Meeting, Newcastle University, Newcastle, UK, September 9–11, 1996, M. G. H. Bell (ed.), Pergamon Press, Amsterdam, 1998, pp. 239–253.

[8] T. Larsson, M. Patriksson, and C. Rydergren, *Applications of simplicial decomposition with nonlinear column generation to nonlinear network flows*, In: Network Optimization, Proceedings of the Network Optimization Conference, University of Florida, Gainesville, FL, February 12–14, 1996, P. Pardalos, W.W. Hager, and D.W. Hearn (eds.), Lecture Notes in Economics and Mathematical Systems, vol. 450, Springer-Verlag, 1997, pp. 346–373.

[7] M. Patriksson and J. Petersson, *A subgradient method for contact structural optimization*, In: Complementarity and Variational Problems—State of the Art, Proceedings of the International Conference on Complementarity Problems (ICCP-95) held at The Johns Hopkins University, Baltimore, Maryland, November 1995, Proceedings in Applied Mathematics, vol. 92, M.C. Ferris and J.-S. Pang (eds.), SIAM, Philadelphia, PA, 1997, pp. 295–314.

[6] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic results in subgradient optimization*, In: Nonlinear Optimization and Applications, Proceedings of the International School of Mathematics "G. Stampacchia" 21st Workshop on Nonlinear Optimization and Applications, held June 13–21, 1995, in Erice, Italy, G. Di Pillo and F. Giannessi (eds.), Plenum Press, New York, NY, 1996, pp. 229–248.

[5] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic results and bounds on the optimal value in subgradient optimization*, In: Operations Research Proceedings 1995, Selected Papers of the Symposium on Operations Research (SOR '95), Passau, September 13–

15, 1995, P. Kleinschmidt, A. Bachem, U. Derigs, D. Fischer, U. Leopold-Wildburger, and R. Möhring (eds.), Springer-Verlag, Berlin, 1996, pp. 30–35.

[**4**] T. Larsson and M. Patriksson, *Equilibrium characterizations of solutions to side constrained asymmetric traffic assignment models*, In: Proceedings of the 3rd Meeting of the EURO Working Group on Transportation, Universitat Politecnica de Catalunya, Barcelona, Spain, September 27–29, 1995, J. Barcelo (ed.), Institut Catala d'Estudis del Transport, 1995, pp. 143–164.

[**3**] T. Larsson and M. Patriksson, *On side constrained models of traffic equilibria*, In: Variational Inequalities and Network Equilibrium Problems, Proceedings of the International School of Mathematics "G. Stampacchia" 19th Course on Variational Inequalities and Network Equilibrium Problems, held June 19–25, 1994, in Erice, Italy, F. Giannessi and A. Maugeri (eds.), Plenum Press, New York, NY, 1995, pp. 169–178.

[**2**] T. Larsson and M. Patriksson, *An augmented Lagrangean scheme for capacitated traffic assignment problems*, In: Proceedings of the 2nd Meeting of the EURO Working Group on Urban Traffic and Transportation, Paris, France, September 15–17, 1993, F. Boillot, N. Bhouri and F. Leurent (eds.), Actes INRETS no. 38, INRETS, Arcueil, France, 1994, pp. 163–199.

[**1**] O. Damberg, J.T. Lundgren, and M. Patriksson, *An algorithm for the stochastic user equilibrium problem*, In: Proceedings of the 1st Meeting of the EURO Working Group on Urban Traffic and Transportation, Landshut, Germany, October 1–3, 1992, J. C. M. Baños, B. Friedrich, M. Papageorgiou and H. Keller (eds.), Technical University of Munich, Munich, Germany, 1993.

E. Articles in Nonrefereed Conference Proceedings

[**2**] M. Patriksson, *A descent algorithm for a class of generalized variational inequalities*, In: Proceedings of the 3rd Meeting of the Nordic Section of the Mathematical Programming Society, Linköping, Sweden, February 12–13, 1994, K. Holmberg (ed.).

[**1**] M. Patriksson, *Gap functions for variational inequalities*, In: Mathematical Programming in Decision and Planning, Nordisk Forskerkursus, Sandbjerg Slot, Sønderborg, Denmark, September 24–October 2, 1990, Publication No: 90/15, Afdelning for Operationsanalyse, Aarhus Universitet, Aarhus, Denmark, pp. 179–182.

F. Popular Articles and Journey Accounts

[**1**] M. Patriksson, *Reseberättelse*, Svenska Operationsanalysföreningens Nyhetsmeddelande, no. 1–2 (1991), pp. 7–9 (in Swedish).

G. Submitted Manuscripts

[**3**] Torbjörn Larsson, Johan Marklund, Caroline Olsson, and Michael Patriksson, *Early primal recovery in Lagrangian dual schemes for nonlinear minimum cost network flows*, Report, Department of Mathematics, Chalmers University of Technology, Göteborg, Sweden (2006), submitted to *European Journal of Operational Research*.

[**2**] M. Patriksson, *A survey on the continuous nonlinear resource allocation problem*, Report, Department of Mathematics, Chalmers University of Technology, Göteborg, Sweden (2006), submitted to *European Journal of Operational Research*.

[**1**] T. Larsson, A. Migdalas, and M. Patriksson, *A generic column generation scheme*, Report LiTH-MAT-R-94-18, Department of Mathematics, Linköping Institute of Technology, Linköping, Sweden (2005), submitted to *Optimization Methods and Software*.

H. Unpublished Reports

[**9**] R. García, A. Marín, and M. Patriksson, *A class of column generation/simplicial decomposition in convex differentiable optimization, II: Numerical experiments*, Report, Depart-

ment of Mathematics, Chalmers University of Technology, Göteborg, Sweden (2005).

[**8**] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Convergence properties of a divergent subgradient algorithm for inconsistent linear programs*, Report, Department of Mathematics, Chalmers University of Technology, Göteborg, Sweden (in preparation).

[**7**] F. Altenstedt and M. Patriksson, *Policy optimization: Parameterized decision rules vs. stochastic programming for asset liability management*, Report, Department of Mathematics, Chalmers University of Technology, Göteborg, Sweden (2003).

[**6**] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Optimeringslära* (in Swedish).

[**5**] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic primal solutions from dual subgradient schemes in discrete optimization*, Report, Department of Mathematics, Chalmers University of Technology, Göteborg, Sweden (in preparation).

[**4**] T. Larsson, M. Patriksson, and A.-B. Strömberg, *Ergodic convergence in subgradient optimization*, Report, Department of Mathematics, Linköping Institute of Technology, Linköping, Sweden (1997).

[**3**] T. Larsson, M. Patriksson, and C. Rydergren, *Simplicial decomposition algorithms with nonlinear column generation*, Report, Department of Mathematics, Linköping Institute of Technology, Linköping, Sweden (1996).

[**2**] M. Patriksson, *A taxonomy of classes of descent algorithms for nonlinear programs and variational inequalities*, Report LiTH-MAT-R-94-07, Department of Mathematics, Linköping Institute of Technology, Linköping, Sweden (1994). Revised version, Department of Mathematics, Box 354350, University of Washington, Seattle, WA 98195-4350 (1994).

[**1**] M. Patriksson, *On the properties of solution sets of monotone variational inequalities*, Report LiTH-MAT-R-93-21, Department of Mathematics, Linköping Institute of Technology, Linköping, Sweden (1993).

ORAL PRESENTATIONS
I. Invited Lectures

[**16**] *Optimization subject to equilibrium: recent developments of sensitivity analysis instruments*, at the symposium on *Networks: Modelling and Control* organised by the Royal Society, London, September 24–25, 2007.

[**15**] *Optimization that utilizes simulation*, at the meeting arranged by STM (Stiftelsen tillämpad matematik) and FCC (Fraunhofer–Chalmers centrum för industrimatematik), Stenungsbaden, Stenungsund, Sweden, October 14, 2004.

[**14**] *Robust design*, at the meeting arranged by STM (Stiftelsen tillämpad matematik) and FCC (Fraunhofer–Chalmers centrum för industrimatematik), Stenungsbaden, Stenungsund, Sweden, October 13, 2004.

[**13**] Seminar series on sensitivity analysis of variational inequality problems, University of Modena, Modena, Italy, November, 2000.

[**12**] *Traffic equilibrium models and algorithms*, INRIA, Rocquencourt, France, October 25, 2000.

[**11**] *Ergodic primal convergence for mixed integer programming problems*, PRiSM, Université de Versailles, October 20, 1999.

[**10**] *Mathematical programs with equilibrium constraints*, PRiSM, Université de Versailles, October 13, 1999.

[**9**] *Column generation approaches*, PRiSM, Université de Versailles, October 6, 1999.

[**8**] Seminar series on convergence theory for convex programming and variational inequality problems, University of Modena, Modena, Italy, June 1999.

[**7**] *Primal and dual convergence in Lagrangean relaxation schemes for convex and combinatorial optimization*, PRiSM, Université de Versailles, June 10, 1997.

[**6**] *Traffic management through link tolls—New developments*, INRETS, Paris, June 3, 1997.

[**5**] *Equilibrium problems with side constraints*, at Equilibrium and Advanced Transportation Modelling Colloqium, organized on the occasion of the 25th Anniversary of Centre de recherche sur les transport (CRT), Université de Montréal, Montréal, Canada, October 10–11, 1996.

[**4**] *Side constraints in traffic assignment*, Centre de recherche sur les transport, Université de Montréal, Montréal, Canada, September 8, 1995.

[**3**] *Parallel cost approximation algorithms for differentiable optimization*, at the Nordic Summmer Course on Mathematical Programming and Parallel Algorithms, Rimforsa, Sweden, August 7–16, 1995.

[**2**] Seminar Series on optimization methods with application to the field of transportation, University of York and University of Leeds, England, Autumn 1993 and Summer 1994.

[**1**] *Five years of research at the Division of Optimization in Linköping*, University of Oslo, Norway, October 14, 1993.

J. Conference Presentations ([I] Invited, [R] Refereed)

[**32**] *A survey on the continuous nonlinear resource allocation problem*, at the 21st EURO Conference, Reykjavik, Iceland, July 2–6, 2006.

[**31**] *Global optimality conditions for discrete and nonconvex optimization, with applications to Lagrangian heuristics and column generation*, at the Nordic MPS '04, the Ninth Meeting of the Nordic Section of the Mathematical Programming Society, Norrköping, Sweden, October 22–23, 2004.

[**30**] [**R**] *A precise sensitivity analysis of traffic equilibria, with applications*, at the TRISTAN V, Le Gosier, Guadeloupe, French West Indies, June 13–18, 2004.

[**29**] *Global optimality conditions for discrete and nonconvex optimization, with applications to Lagrangian heuristics and column generation*, at the ISMP 2003, Technical University of Denmark, Copenhagen, Denmark, August 18–22, 2003.

[**28**] [**I**] *Sensitivity analysis of traffic equilibria revisited*, at the ICCP 2002, University of Cambridge, Cambridge, England, July 29–August 2, 2002.

[**27**] [**R**] *Sensitivity analysis of traffic equilibria revisited*, at the TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001.

[**26**] [**I**] *Sensitivity analysis of traffic equilibria revisited*, at the Transportforum i Linköping, Linköpings Konsert och Kongress, January 13–14, 2001.

[**25**] [**I**] *A mathematical model and descent algorithm for bilevel traffic management*, at the 8th Meeting of the EURO Working Group on Transportation, Rome Jubilee 2000 Conference, Rome, September 11–14, 2000.

[**24**] *Column generation/simplicial decomposition for smooth convex optimization and variational inequality problems*, at ISMP2000—16th International Symposium on Mathematical Pro-

gramming, Atlanta, GA, August 7–11, 2000.

[23] **[I]** *A mathematical model and descent algorithm for bilevel traffic management*, at the Equilibrium Problems and Variational Models workshop, Erice, June 23–July 2, 2000.

[22] **[I]** *Structural topology optimization problems including unilateral constraints and stochastic loads*, at the ICM Workshop on Optimization in Solid and Fluid Mechanics, Linköping university, Division of Mechanics, February 9–10, 2000.

[21] **[R]** *A class of column generation/simplicial decomposition algorithms in convex differentiable optimization*, at the Sixth SIAM Conference on Optimization, Atlanta, May 10–13, 1999.

[20] **[I]** *Mathematical models for optimal traffic management*, at Transportforum i Linköping, Linköpings Konsert och Kongress, January 13–14, 1999.

[19] **[I]** *A decision tool for traffic management*, at Equilibrium Problems and Variational Problems: International Workshop in Memory of Marino De Luca, Hotel Villa Diodoro, Taormina, Italy, December 3–6, 1998.

[18] **[R]** *Adaptive SQP methods for non-strictly monotone variational inequality problems*, at the 28th Course, Nonlinear Optimization and Applications, of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 23–July 2, 1998.

[17] **[I]** *Opportunities for optimisation techniques in transport*, at the workshop MUSIC + INCOME: Managing Transport Using Traffic Control, Zürich, Switzerland, March 19, 1998.

[16] **[I]** *Traffic management through link tolls—New developments*, at the 16th International Symposium on Mathematical Programming, Lausanne, August 24–29, 1997.

[15] **[I]** *Traffic management through link tolls—New developments*, at the EURO XV–INFORMS XXXIV Joint International Meeting, Universitat Politècnica de Catalunya, Barcelona, Spain, July 14–17, 1997.

[14] **[R]** *An algorithm for the combined distribution and assignment model*, at the 4th Meeting of the EURO Working Group on Transportation, University of Newcastle upon Tyne, Newcastle upon Tyne, England, September 9–11, 1996.

[13] **[R]** *Price-directive traffic management—Applications of side constrained traffic equilibrium models*, at the 4th Meeting of the EURO Working Group on Transportation, University of Newcastle upon Tyne, Newcastle upon Tyne, England, September 9–11, 1996.

[12] **[I]** *Traffic management through link tolls—An application of side constrained traffic equilibrium models*, at the 2nd Workshop on Equilibrium Problems with Side Constraints, Lagrangean Theory and Duality, Scilla, Reggio Calabria, Italy, May 17–18, 1996.

[11] **[I]** *Applications of nonlinear column generation in simplicial decomposition to nonlinear network flows*, at the Network Optimization Conference, University of Florida, Gainesville, FL, February 12–14, 1996.

[10] **[R]** *Equilibrium characterizations of solutions to side constrained asymmetric traffic assignment models*, at the 3rd Meeting of the EURO Working Group on Urban Traffic and Transportation, Universitat Politecnica de Catalunya, Barcelona, Spain, September 27–29, 1995.

[9] **[I]** *Queue equilibrium characterizations of solutions to side constrained traffic assignment models*, at the Workshop on Equilibrium Problems with Side Constraints, Lagrangean Theory and Duality, Catania, Italy, December 9–10, 1994.

[8] **[I]** *On the linear convergence of cost approximation algorithms*, at the West Coast

Optimization Meeting, Simon Fraser University, Vancouver, Canada, October 28–29, 1994.

[**7**] [**R**] *On the relationship between side constrained and asymmetric models of traffic equilibria*, at the 19th Course, Variational Inequalities and Network Equilibrium Problems, of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 19–25, 1994.

[**6**] *A descent algorithm for a class of generalized variational inequalities*, at the 3rd Meeting of the Nordic Section of the Mathematical Programming Society, Linköping, Sweden, February 12–13, 1994.

[**5**] [**R**] *An augmented Lagrangean scheme for capacitated traffic assignment problems*, at the 2nd Meeting of the EURO Working Group on Urban Traffic and Transportation, Paris, France, September 15–17, 1993.

[**4**] [**R**] *An algorithm for the stochastic user equilibrium problem*, at the 1st Meeting of the EURO Working Group on Urban Traffic and Transportation, Landshut, Germany, October 1–3, 1992.

[**3**] *Simplicial decomposition with disaggregated representation for the traffic assignment problem*, at the 11th EURO Conference, Aachen, Germany, July 16–19, 1991.

[**2**] [**R**] *A unified description of some iterative algorithms for traffic equilibria*, at the 7th EURO Summer Institute on Urban Traffic Management, Cetraro, Italy, June 21–July 7, 1991.

[**1**] *Partial linearization techniques for the traffic assignment problem*, at the Forskerkursus in Discrete Optimization, Afdelning for Operationsanalyse, Aarhus Universitet, Aarhus, Denmark, November 21–23, 1988.

K. Popular Presentations

[**2**] *Optimerings innersta kärna*, at the Informationsdag för nya doktorander, Chalmers, August 29, 2003 (in Swedish).

[**1**] (with Ann-Brith Strömberg) *Att finna den kortaste vägen—Snören, algoritmer och varför det är trångt i Tingstadstunneln*, at the Vetenskapsfestivalen, Chalmers, April 22, 2002 (in Swedish).

L. Joint Papers Presented by Colleagues ([I] Invited, [R] Refereed)

[**27**] C. Rydergren, *Sensitivity analysis of a bilevel equilibrium problem with welfare constraints*, at the Nordic MPS '04, the Ninth Meeting of the Nordic Section of the Mathematical Programming Society, Norrköping, Sweden, October 22–23, 2004.

[**26**] A. Evgrafov, *Smoothing by relaxing the equilibrium conditions in topology optimization for truss structures in contact*, at the ISMP 2003, Technical University of Denmark, Copenhagen, Denmark, August 18–22, 2003.

[**25**] F. Altenstedt, *A comparison between stochastic programming and parameterized policies for asset liability management*, at the ISMP 2003, Technical University of Denmark, Copenhagen, Denmark, August 18–22, 2003.

[**24**] [**I**] L. Wynter, *Obtaining robust solutions to general variational inequalities*, at the ICCP 2002, University of Cambridge, Cambridge, England, July 29–August 2, 2002.

[**23**] A. Marín, *Network equilibrium models: A class of column generation/simplicial decomposition algorithms*, at TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001.

[**22**] [**R**] C. Rydergren, *A decision support tool for strategic traffic management*, at TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001.

[21] **[R]** C. Rydergren, *Outline to a decision support tool for traffic management*, at the 2nd KFB Research Conference, Urban Transport Systems, Lund Institute of Technology, Lund, Sweden, June 7–8, 1999.

[20] **[I]** C. Rydergren, *Outline to a decision support tool for traffic management*, at an ITS seminar, Leeds University, Leeds, June 5, 1999.

[19] **[R]** A.-B. Strömberg, *Convergence and applications of ergodic primal solutions generated by dual subgradient schemes for large-scale mixed binary programs*, at the Sixth SIAM Conference on Optimization, Atlanta, May 10–13, 1999.

[18] **[R]** P.-O. Lindberg, *Traffic equilibrium problems with nonlinear time/money relations*, at the 6th Meeting of the EURO Working Group on Transportation, Chalmers University of Technology, Gothenburg, Sweden, September 9–11, 1998.

[17] **[R]** C. Rydergren, *An algorithm for finding most likely traffic equilibrium route flows*, at the 6th Meeting of the EURO Working Group on Transportation, Chalmers University of Technology, Gothenburg, Sweden, September 9–11, 1998.

[16] **[I]** L. Wynter, *Stochastic bilevel programming in structural optimization*, at the PAREO '98, First Meeting of the PAREO Working Group on Parallel Processing in Operations Research, Université de Versailles, Versailles, France, July 8–10, 1998.

[15] **[R]** C. Rydergren, *An algorithm for finding most likely traffic equilibrium route flows*, at the TRISTAN III, San Juan, Puerto Rico, June 17–23, 1998.

[14] **[I]** P.-O. Lindberg, *Traffic equilibrium problems with nonlinear time/money relations*, at the 16th International Symposium on Mathematical Programming, Lausanne, August 24–29, 1997.

[13] **[R]** S. Christiansen, *Bilevel stochastic optimization in truss topology design*, at the 16th International Symposium on Mathematical Programming, Lausanne, August 24–29, 1997.

[12] **[I]** L. Wynter, *Stochastic mathematical programs with equilibrium constrains: An application to equilibrium rail freight pricing*, at the 16th International Symposium on Mathematical Programming, Lausanne, August 24–29, 1997.

[11] **[R]** C. Rydergren, *On the usage of route flow output from traffic assignment algorithms*, at the NATO ASI Seminar on Operations Research and Decision Aid Methodologies in Traffic and Transportation Management, Balatonfüred, Hungary, March 10–22, 1997.

[10] **[R]** C. Rydergren, *Applications of simplicial decomposition with nonlinear column generation in nonlinear network flows*, at the 7th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 24–25, 1996.

[9] **[R]** A.-B. Strömberg, *A simplicial decomposition scheme for nonsmooth optimization*, at the 7th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 24–25, 1996.

[8] **[I]** R.T. Rockafellar, *Equilibrium models with toll parameters*, at the Traffic Network Models Symposium in the Honour of Sven Erlander, Vadstena, Sweden, June 16–20, 1996.

[7] **[R]** J. Petersson, *A subgradient method for contact structural optimization*, at the International Conference on Complementarity Problems: Engineering & Economic Applications, and Computational Methods (ICCP-95), The Johns Hopkins University, Baltimore, MD, November 1–4, 1995.

[6] **[R]** A.-B. Strömberg, *Ergodic results and bounds on the optimal value in subgradient optimization*, at the Annual Conference of the DGOR, GMÖOR, and ÖGOR (SOR '95), Universität

Passau, Passau, Germany, September 13–15, 1995.

[**5**] J.T. Lundgren, *An algorithm for the combined distribution and assignment model*, at the 14th EURO Conference, Jerusalem, Israel, July 13–16, 1995.

[**4**] [**R**] A.-B. Strömberg, *Ergodic results in subgradient optimization*, at the 6th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 26–27, 1995.

[**3**] [**R**] A.-B. Strömberg, *Ergodic results in subgradient optimization*, at the 21st Workshop, Nonlinear Optimization and Applications, of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 13–21, 1995.

[**2**] [**R**] A.-B. Strömberg, *Conditional subgradient optimization—theory and applications*, at the 5th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 27–28, 1994.

[**1**] Z.-W. Liu, *A dual scheme for traffic assignment problems*, at the 11th EURO Conference, Aachen, Germany, July 16–19, 1991.

CONFERENCES ATTENDED

[**50**] The 21st EURO Conference, Reykjavik, Iceland, July 2–6, 2006.

[**49**] Eight SIAM Conference on Optimization, Stockholm, Sweden May 15–18, 2005.

[**48**] TRISTAN V, Le Gosier, Guadeloupe, French West Indies, June 13–18, 2004.

[**47**] ISMP 2003—17th International Symposium on Mathematical Programming, Technical University of Denmark, Copenhagen, Denmark, August 18–22, 2003.

[**46**] ICCP 2002, University of Cambridge, Cambridge, England, July 29–August 2, 2002.

[**45**] TRISTAN IV, Sâo Miguel, The Azores, Portugal, June 13–19, 2001.

[**44**] Transportforum i Linköping, Linköpings Konsert och Kongress, January 13–14, 2001.

[**43**] 8th Meeting of the EURO Working Group on Transportation, Rome Jubilee 2000 Conference, Rome, September 11–14, 2000.

[**42**] ISMP 2000—16th International Symposium on Mathematical Programming, Atlanta, GA, August 7–11, 2000.

[**41**] The 32th Workshop—Equilibrium Problems and Variational Models—of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 23–July 2, 2000.

[**40**] ICM Workshop on Optimization in Solid and Fluid Mechanics, Linköping university, Division of Mechanics, February 9–10, 2000.

[**39**] Sixth SIAM Conference on Optimization, Atlanta, May 10–13, 1999.

[**38**] INCOME and MUSIC Joint Open Workshop, Crowne Plaza Hotel, Brussels, February 16, 1999.

[**37**] Transportforum i Linköping, Linköpings Konsert och Kongress, Linköping, January 13–14, 1999.

[**36**] Equilibrium Problems and Variational Problems: International Workshop in Memory of Marino De Luca, Hotel Villa Diodoro, Taormina, Italy, December 3–5, 1998.

[**35**] Modelling Traffic Networks: Current Research and Future Directions, Institute for Trans-

port Studies, The University of Leeds, Leeds, November 26, 1998.

[**34**] 6th Meeting of the EURO Working Group on Tramsportation, Chalmers University of Technology, Gothenburg, Sweden, September 9–11, 1998.

[**33**] 28th Course—Nonlinear Optimization and Applications—of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 23–July 2, 1998.

[**32**] MUSIC + INCOME: Managing Transport Using Traffic Control, Zürich, Switzerland, March 19, 1998.

[**31**] 16th International Symposium on Mathematical Programming, Lausanne, August 24–29, 1997.

[**30**] EURO XV–INFORMS XXXIV Joint International Meeting, Universitat Politècnica de Catalunya, July 14–17, 1997.

[**29**] Equilibrium and Advanced Transportation Modelling Colloqium, organized on the occasion of the 25th Anniversary of Centre de recherche sur les transport (CRT), Université de Montréal, Montréal, Canada, October 10–11, 1996.

[**28**] 4th Meeting of the EURO Working Group on Transportation, University of Newcastle upon Tyne, Newcastle upon Tyne, England, September 9–11, 1996.

[**27**] 7th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 24–25, 1996.

[**26**] Traffic Network Models: A Symposium in the Honour of Sven Erlander, Vadstena, Sweden, June 16–20, 1996.

[**25**] 2nd Workshop on Equilibrium Problems with Side Constraints, Lagrangean Theory and Duality, Scilla, Reggio Calabria, Italy, May 17–18, 1996.

[**24**] Network Optimization Conference, University of Florida, Gainesville, FL, February 12–14, 1996.

[**23**] 3rd Meeting of the EURO Working Group on Transportation, Universitat Politecnica de Catalunya, Barcelona, Spain, September 27–29, 1995.

[**22**] Nordic Summmer Course on Mathematical Programming and Parallel Algorithms, Rimforsa, Sweden, August 7–16, 1995.

[**21**] West Coast Optimization Meeting, University of Washington, Seattle, WA, March 3–4, 1995.

[**20**] Workshop on Equilibrium Problems with Side Constraints, Lagrangean Theory and Duality, Catania, Italy, December 9–10, 1994.

[**19**] West Coast Optimization Meeting, Simon Fraser University, Vancouver, Canada, October 28–29, 1994.

[**18**] EURO XIII/OR 36 Conference, Glasgow, Scotland, July 19–22, 1994.

[**17**] 5th Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, June 27–28, 1994.

[**16**] 19th Course—Variational Inequalities and Network Equilibrium Problems—of the International School of Mathematics "G. Stampacchia," Erice, Italy, June 19–25, 1994.

[**15**] 3rd Meeting of the Nordic Section of the Mathematical Programming Society, Linköping,

Sweden, February 12–13, 1994.

[**14**] Symposium on Traffic Problems, Nottingham University, Nottingham, England, September, 1993.

[**13**] 2nd Meeting of the EURO Working Group on Urban Traffic and Transportation, Paris, France, September 15–17, 1993.

[**12**] 1st Meeting of the EURO Working Group on Urban Traffic and Transportation, Landshut, Germany, October 1–3, 1992.

[**11**] Nordic Workshop on Parallel Processing and Large Scale Optimization Problems, Linköping, Sweden, August 21–23, 1992.

[**10**] 3rd Stockholm Optimization Days, Royal Institute of Technology, Stockholm, June 25–26, 1992.

[**9**] 11th EURO Conference, Aachen, Germany, July 16–19, 1991.

[**8**] 7th EURO Summer Institute on Urban Traffic Management, Cetraro, Italy, June 21–July 7, 1991.

[**7**] 2nd Stockholm Optimization Days, Royal Institute of Technology, Stockholm, Sweden, August 12–13, 1991.

[**6**] Summer School in Mathematical Programming in Decision and Planning, Sandbjerg Slot, Sønderborg, Denmark, September 24–October 2, 1990.

[**5**] Stockholm Optimization Day, Royal Institute of Technology, Stockholm, Sweden, June 7, 1990.

[**4**] Summer School in Supercomputing—Numerical Methods, Chemical and Seismic Applications, Technical University of Denmark, Lyngby, Denmark, August 14–23, 1989.

[**3**] OR and Decision Support Systems, NOAS 89, Linköping, Sweden, June 12–13, 1989.

[**2**] Transportforskar-seminarium, Hotel Royal Viking, Stockholm, February 8–9, 1989.

[**1**] Forskerkursus in Discrete Optimization, Afdelning for Operationsanalyse, Aarhus Universitet, Aarhus, Denmark, November 21–23, 1988.

RESEARCH VISITS

INRIA, Rocquencourt, France, October, 2000

Princeton University (Princeton, NJ, USA), June, 1999

University of Modena, Modena, Italy, June, 1999; November, 2000

PRiSM, Université de Versailles (Versailles, France), June, 1997; October, 1999

University of Washington (Seattle, WA, USA) September, 1994–September, 1995

University of York (Heslington, York, England) September–December, 1993; August–September, 1994

Polytechnic University of Catalunya (Barcelona, Spain) July, 1991

RESEARCH VISITORS

R. Tyrrell Rockafellar, University of Washington (Seattle, WA, USA), May, 1999; November, 1999; May, 2002

Patrice Marcotte, Centre de recherche sur les transports, Université de Montréal (Montréal, Canada), March, 1999

Ricardo García, E. U. Politécnica de Almadén, Universidad de Castilla–La Mancha (La Mancha, Spain), 1998

Xiaojun Chen, University of New South Wales (Sydney, Australia), September, 1997

Panos Pardalos, University of Florida (Gainesville, FL, USA), August, 1997

Laura Wynter, University of Versailles (Versailles, France), December, 1996; March, 1997; February, 1998

David Boyce, University of Chicago (Chicago, IL, USA), November–December, 1996

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Torbjörn Hillerström (`Torbjorn.Hillerstrom@volvo.com`)

SOFTWARE DEVELOPED

DSD: A disaggregate simplicial decomposition algorithm for the solution of the traffic equilibrium problem (1989–1990 and 1998–1999). The Fortran software has been distributed to and used by the Swedish Road and Traffic Research Institute (VTI) and several transportation research groups in Europe and North America, and was also included in the commercial transportation planning software VIPS, before it was bought by the German company PTV.

RESEARCH PROJECTS ([A] Grant applicant, [C] Grant co-applicant), [Amount granted]

2007–2009 [C] *Process integration—multiparameter optimization*, supported by Energimyndigheten [0.3M SEK]

2006–2008 [C] *Aircraft engine maintenence*, supported by Volvo Aero and NFFP (grant NFFP515) [1.2M SEK]

2006–2010 [C] *GMMC—Gothenburg Mathematical Modelling Center*, grant applied for at Vetenskapsrådet (VR) (The Swedish Research Council) [22M SEK]

2006–2008 [C] *Improved radiation treatment of cancer through multiple objective optimisation of beam angles and intensity distributions in intensity-modulated radiation therapy (IMRT) inverse planning*, supported by Cancerfonden

2005 [C] *GMMC—Gothenburg Mathematical Modelling Center*, application update grant supported by VR [0.1M SEK]

2005 [C] *Toward the development of techniques or designing equitable, efficient & acceptable urban transport systems*, continuation grant supported by Volvo Research Foundation, Volvo Educational Foundation, and Dr. Pehr G. Gyllenhammar Research Foundation (grant SP-U03/24) [0.8M SEK]

2004–2005 [C] *Mathematical simulation of reactors*, supported by Akzo Nobel Surface Chemistry [0.3M SEK]

2004–2005 [C] *Aircraft engine maintenence*, supported by Volvo Aero and NFFP (grant NFFP515) [0.8M SEK]

2004 [**C**] *Toward the development of techniques or designing equitable, efficient & acceptable urban transport systems*, supported by Volvo Research Foundation, Volvo Educational Foundation, and Dr. Pehr G. Gyllenhammar Research Foundation [0.8M SEK]

2003–2004 [**A**] *Mathematical models and optimization methods for robust optimal design*, supported by VR (The Swedish Research Council) (grant 2002-5780), [0.974M SEK]

2001–2004 [**C**] *Aircraft engine maintenence*, supported by Volvo Aero and NFFP (grant NFFP485) [2.8M SEK]

2001–2003 [**A**] *Optimization under uncertainty for Livia*, supported by Nordea Liv [1.5M SEK]

1999–2000 [**A**] *Guest researchers at Chalmers 1999 and 2000*, supported by KFB (the Swedish Transport and Communications Research Board) (grant KFB 1999-0045), [0.06M SEK]

1998–2000 [**A**] *Mathematical models and optimization methods for robust optimal design*, supported by TFR (the Swedish Research Council for Engineering Sciences) (grant TFR 98-125), [0.99M SEK]

1998–1999 [**C**] *Planning, analysis and management of flows in traffic networks—Optimization models and methods*, supported by KBF (the Swedish Transport and Communications Research Board) (grant KFB 1998-0185), [1.26M SEK]

1998 [**A**] *Conference support, 6th Meeting of the EURO Working Group on Transportation*, supported by KFB (the Swedish Transport and Communications Research Board), [0.075M SEK]

1998–2000 [**A**] *New natural and technical sciences projects*, supported by Chalmers Stiftelse (Chalmers Foundation) (grant C 43-97) [0.45M SEK]

1996–1998 [**C**] *Planning, analysis and management of flows in traffic networks—Optimization models and methods*, supported by KFB (the Swedish Transport and Communications Research Board) (grant KFB 96-206-33)

1995–1996 [**C**] *Development of a program package for traffic assignment*, supported by KFB (the Swedish Transport and Communications Research Board) (grant KFB 95-122-33), [0.415M SEK]

1994–1995 [**A**] *Variational inequalities and saddle point problems—An algorithmic analysis*, supported by TFR (the Swedish Research Council for Engineering Sciences) (grant 282-93-1195) [postdoctoral scholarship]

1993–1994 [**A**] *Research stay at the University of York*, supported by TFB (the Swedish Transport and Communications Research Board) (grant TFB 93-131-63) [25K SEK], the Swedish Institute (grant 303 GH/MLH) [2K SEK], and the Royal Swedish Academy of Sciences, [0.237M SEK]

1992–1996 [**C**] *Equilibria in transportation networks—development of mathematical models and methods*, supported by TFB (the Swedish Transport and Communications Research Board) (grants TFB 92-128-63 and KFB 95-118-63)

1989–1992 *System and Scenario Simulation for Testing RTI Systems (ASTERIX)*, EEC DRIVE program, Project V1054

1988–1992 *Methods for planning and control of person traffic in urban areas*, supported by TFB (the Swedish Transport and Communications Research Board) (grant TFB 16/88-62)

RESEARCH ADVISEMENT
Ph.D. Students

Peter Lindroth	Advisor, 2005– Subject: Truck configuration optimization Affiliation: Volvo 3P, Gothenburg
Anna Nyström	Advisor, 2004– Subject: Optimal batch processes Affiliation: Department of mathematics, Chalmers University of Technology
Michael Nganda	Assistant advisor, 2003– (main advisor: Jöran Bergh) Subject: Waste management in Uganda Affiliation: Department of mathematics, Chalmers University of Technology
Niclas Andreasson	Advisor, 2001–06 Subject: The maintenence of aircraft engines under uncertainty Licentiate thesis: *Optimization of opportunistic replacement activities in deterministic and stochastic multi-component systems* (2004) Affiliation: Department of mathematics, Chalmers University of Technology; Volvo Aero, Trollhättan
Mattias Grönkvist	Assistant advisor, 2001–05 (main advisor: Dag Wedelin) Subject: Fleet scheduling Ph.D. thesis: *The tail assignment problem* (2005) Licentiate thesis: *Tail assignment—A combined column generation and constraint programming approach* (2003) Affiliation: Computer science, Chalmers University of Technology; Carmen Systems, Gothenburg
Anton Evgrafov	Advisor, 2000–04 Subject: Topology optimization of mechanical structures under uncertainty Ph.D. thesis: *Approximation of topology optimization problems using sizing optimization problems* (2004) Licentiate thesis: *Stochastic Optimization of Structural Topology* (2002) Affiliation: Department of mathematics, Chalmers University of Technology
Jacob Hultén	Advisor, 1999–2001 Subject: Optimization of jet engines Licentiate thesis: *Waterjet inlet design optimization using CFD and direct search* (2001) Affiliation: Kamewa/Rolls-Royce, Gothenburg; Department of mathematics, Chalmers University of Technology
Emad Nassar	Advisor, 1999–2001 Subject: Traffic planning and management, bilevel optimization Affiliation: Department of mathematics, Chalmers University of Technology
Fredrik Altenstedt	Advisor, 1998–2003 Subject: Stochastic programming approaches for insurance companies Ph.D. thesis: *Aspects on asset liability management via stochastic programming* (2003) Licentiate thesis: *Asset-liability management via stochastic programming for a Swedish life insurance company* (2001) Affiliation: Department of mathematics, Chalmers University of Technology

Tuomo Takkula	Assistant advisor, 1998–2003 (main advisor: Dag Wedelin) Subject: Integer optimization for airline scheduling Ph.D. thesis: *Aspects of duality in integer programming* (2003) Licentiate thesis: *The dual of integer linear programs* (2001) Affiliation: Department of computer science, Chalmers University of Technology
Clas Rydergren	Assistant advisor, 1996–2001 (main advisor: Torbjörn Larsson) Subject: Operations research for transportation planning and control Ph.D. thesis: *Decision Support for Strategic Traffic Management: An Optimization-Based Methodology* (2001) Affiliation: Department of mathematics, Linköping University
Ann-Brith Strömberg	Assistant advisor, 1996–1997 Subject: Nonsmooth optimization Ph.D. thesis: *Conditional Subgradient Methods and Ergodic Convergence in Nonsmooth Optimization* (1997) Affiliation: Department of mathematics, Linköping University
Zuangwei Liu	Assistant advisor, 1991–1992 Subject: Nonsmooth optimization, Lagrangian relaxation Ph.D. thesis: *A Lagrangean Dual Scheme for Structured Linear Programs with Applications and Extensions* (1992) Affiliation: Department of mathematics, Linköping University

M.Sc. and B.Sc. Theses

Einar Gudfinnsson	*Minimax stress structural optimization for a linkage arm* Fraunhofer–Chalmers Research Centre for Industrial Mathematics (FCC) (2005–06)
Nikulás Árni Sigfússon	*Minimax stress structural optimization for a linkage arm* Fraunhofer–Chalmers Research Centre for Industrial Mathematics (FCC) (2005–06)
Tomas Jansson	*Optimization of resource allocation in multi-task machines*, Volvo Aero Corporation (2005–06)
Maja Olsson Uppenberg	*Optimsation of fresh water consumption for Doggy AB using simulation*, Doggy AB, Vrgrda (2005)
Moa Ryberg	*Optimsation of fresh water consumption for Doggy AB using simulation*, Doggy AB, Vrgrda (2005)
Caroline Olsson	*Lagrangian heuristics for strictly convex quadratic minimum cost network flow problems* (2004–05)
Hicham Rifai	*Turbojet engine performance modelling using multi-objective optimization algorithms* (2004–05)
Lova Carlsson	*Optimization of beam orientation in intensity modulated radiation therapy using a genetic algorithm*, Sahlgrenska University Hospital (2004–05)
Lena Krantz	*Optimization of beam orientation in intensity modulated radiation therapy using a genetic algorithm*, Sahlgrenska University Hospital (2004–05)
Carl-Peter Sellman	*Ruttplanering fr hemtjnsten i Torslanda*, Torslanda hemtjnst (2004–05)

Mikael Andersson	*Route optimization applied to school transports—A method combining column generation with greedy heuristics*, Tekis & Kartena (2004–05)
Peter Lindroth	*Route optimization applied to school transports—A method combining column generation with greedy heuristics*, Tekis & Kartena (2004–05)
Johan Lööf	*Allokering av symmetriska toleranser i komplexa sammansättningar*, Lingqvistlaboratoriet, Chalmers (2004)
Tomas Hermansson	*Allokering av symmetriska toleranser i komplexa sammansättningar*, Lingqvistlaboratoriet, Chalmers (2004)
Martin Önneflod	*Advantages of utilizing new global optimality conditions when constructing column generation algorithms for integer programming problems*, Carmen Systems AB (2003–04)
Carl Bohman	*Black box optimization in engine development*, Volvo Car Corporation (2003–04) (joint with A.-B. Strömberg)
Jorild Engkvist	*Black box optimization in engine development*, Volvo Car Corporation (2003–04) (joint with A.-B. Strömberg)
Petra Hugosson	*Driftoptimering av vettenkraftverken i Helgeå*, Sydkraft Vattenkraft AB, Malmö (2003–04) (joint with A.-B. Strömberg)
Reine Säljö	*Bundle methods for Lagrangian dual optimization problems*, (2003–04)
Magnus Josefsson	*Sensitivity analysis of separable traffic equilibria*, (2002–03)
Fredrik Hedenus	*Stochastic modelling of bioenergy vs. carbon sinks at the global scale*, Fysikalisk resursteori, Chalmers (2002) (joint with F. Altenstedt)
Andreas Tapani	*Policy optimization in financial planning*, (2001–2002) (joint with F. Altenstedt)
Mikael Fredriksson	*Rule sensitivity analysis for staff planning problems*, Carmen Systems AB (2000–)
Mats Werme	*Newton methods for nonmonotone variational inequalities*, KTH (2000–2001) (joint with L. Wynter)
Anders Holmström	*Model-based optimization techniques in engineering design*, Volvo Car Corporation (1999–2000)
Jonas Forsberg	*Optimering med NMSQP* (1999–2000)
Niklas Eliasson	*Nonlinear pricing and surrogate column generation in linear programming* (1999) (joint with T. Larsson)
Snorre Christiansen	*Structural optimization with subgradient optimization*, Université de Versailles (1997) (joint with L. Wynter)
Kinga Ulman	*A toll scheme for traffic management* (1997)
Clas Rydergren	*Regularized simplicial decomposition with application to network flow problems* (1995) (joint with T. Larsson)
Patrik Ingström	*Simplicial decomposition with quadratic subproblems for the traffic assignment problem* (1994) (joint with T. Larsson)
Louise Lychou	*Studies of flows on overlapping routes in a stochastic user equilibrium model* (1994) (joint with J.T. Lundgren)
Johan Marklund	*A study of Lagrangian heuristics for convex network flow problems* (1993) (joint with T. Larsson)

Mari Skröder	*An experimental comparison between user and system optimum principles*, Swedish Road and Traffic Research Institute (VTI), Linköping (1991) (joint with J.T. Lundgren)
Håkan Fortell	*Capacitated traffic assignment by an augmented Lagrangean and disaggregate simplicial decomposition* (1991) (joint with T. Larsson)

RESEARCH ACTIVITIES ([R] Currently resting, [P] Planned)

Models and algorithms for IMRT (joint with Karl-Axel Johansson and Anna Bäck, Sahlgrenska)

Logistics and maintenence optimization of aircraft engines (joint with M. Palmgren, RiL, Linköping, A.-B. Strömberg, FCC, and Torgny Almgren, Volvo Aero, Trollhättan)

Maintenence optimization in industry (joint with A.-B. Strömberg, FCC)

Algorithms for chemical engineering problems (joint with Anna Nyström, Chalmers)

Truck configuration optimization (joint with Peter Lindroth, Volvo PPP and A.-B. Strömberg, FCC)

Optimality conditions and Lagrangian heuristics for nonconvex optimization (joint with T. Larsson, Department of Mathematics, Linköping University)

Applications of ergodic sequences in dual subgradient optimization to integer programming problems (joint with T. Larsson, Department of Mathematics, Linköping University, and A.-B. Strömberg)

Nonlinear simplicial decomposition (joint with T. Larsson, Department of mathematics, Linköping University)

Optimal resource allocation algorithms

Primal heuristics for strictly convex network flows

PEDAGOGICAL MATERIAL

[2] N. Andréasson, A. Evgrafov, and M. Patriksson, *Introduction to Continuous Optimization*, Studentlitteratur, Lund, Sweden, 2005.

[1] *Optimization*, Chapter 14 in *BETA—Mathematics Handbook for Science and Engineering*, L. Råde and B. Westergren, Studentlitteratur (2003).

COURSE DEVELOPMENT (Collaborator), [Program], (Contents)

[2003–2004] *Applied optimization* (joint with A. Evgrafov and N. Andréasson), [Engineering and mathematics students], (Re-defined course curriculum and the development of a set of course notes)

[1998–2000] *Optimization for Chemical Engineers* (joint with L. Vamling, chemistry, CTH), [Developed for international master's students in chemistry], (Integrated course given jointly by the departments of mathematics and chemistry; course material based on text book by Edgar and Himmelblau (1988). Course adapted for use in computer studios)

[2000] *Transportation Optimization* (joint with D. Wedelin, computer science, CTH), [Developed for master's students in optimization and computer science], (Course material based mainly on case studies presented by external lecturers coming from local industry and planning agencies)

[1999–2000] *Optimization Under Uncertainty* (joint with A.-B. Strömberg), [Developed for master's students in applied mathematics], (Course material based mainly on text books by Kall and Wallace (1994) and Haneveld and van der Vlerk (2000), and articles, from which course projects have also been created)

[1999] *Optimization, Project Course* (joint with A.-B. Strömberg), [Developed for master's students in applied mathematics], (Course material based mainly on text book by Wolsey (1998) and articles, from which course projects have also been created)

[1998–1999] *Operations Research* [Developed for students in structural engineering], (Course material based mainly on text book by Rardin (1998) and engineering examples from other sources)

[1998–1999] *Nonlinear Optimization* [Developed for Ph.D. students in optimization], (Course material based on text books by Bazaraa et al. (1993) and Bertsekas (1995 and 1999))

[1998–1999] *Linear Optimization* [Developed for Ph.D. students in optimization], (Course material based on text books by Murty (1983) and Vanderbei (1997))

[1995–1996] *Optimization in Traffic Networks* (joint with S. Erlander and J. Lundgren), [Developed for Ph.D. students in optimization and regional science], (Course material developed from the monograph [**A.1**], partly in collaboration with previous users of the book in Ph.D. courses at the universities of Chicago and California at Irvine)

TEACHING (Program), [Contents], (Responsibilities)
A. Courses at the Undergraduate Level

2004–2005 Applied Optimization (Engineering schools and Mathematics), [Optimization models, convexity theory, primal and primal–dual optimality conditions, Lagrangian duality, linear optimization, simplex method, duality theory and sensitivity analysis, nonlinear optimization, unconstrained and constrained optimization methods, interior point algorithms], (course planning, lectures and examination)

Optimization for Chemical Engineers (Master's course) (Chemical Engineering), [Optimization models, nonlinear optimization, unconstrained and constrained optimization, optimality conditions, Lagrangian duality, penalty and multiplier methods, linear optimization, simplex method, integer optimization, heuristic methods], (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), [Large-scale optimization, modelling, relaxation/restriction methods, decomposition/co-ordination methods, Lagrangean duality, heuristics, derivative-free optimization], (course planning, lectures, project definition and examination)

Optimization, Honours course (Engineering schools and Mathematics), [Traffic models, traffic equilibria, sensitivity analysis, bilevel optimization in transportation models, project work together with Västtrafik], (course planning, project definition and examination)

2003–2004 Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), (course planning, lectures, project definition and examination)

2002–2003 Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), (course planning, lectures, project definition and examination)

Transport Optimization (Engineering schools and Mathematics), [Transportation optimization problems, traffic planning, timetable optimization, logistics, aircraft and crew scheduling, crew pairing and assignment, vehicle routing problems, column generation and constraint programming], (course planning, lectures and examination)

2001–2002 Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), (course planning, lectures, project definition and examination)

Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Transport Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

2000–2001 Optimization under uncertainty (Engineering schools and Mathematics), (course planning, lectures and examination)

Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), (course planning, lectures, project definition and examination)

Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Transport Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

1999–2000 Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Optimization, Project Course (Engineering schools and Mathematics), (course planning, lectures, project definition and examination)

Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Applied Mathematics (Structural engineering), [Optimization modelling, applications of optimization to project planning, scheduling, and structural mechanics, integer optimization, network optimization], (course planning, lectures and examination)

Transport Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

1998–1999 Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Applied Optimization (Engineering schools and Mathematics), (course planning, lectures and examination)

Applied Mathematics (Structural engineering), (course planning, lectures and examination)

1997–1998 Optimization for Chemical Engineers (Master's course) (Chemical Engineering), (course planning, lectures and examination)

Applied Optimization (Engineering schools), (course planning, seminars and examination)

1996–1997 Optimization (Mathematics), [Optimization models, linear optimization, simplex method, duality theory and sensitivity analysis, nonlinear optimization, unconstrained and constrained optimization, optimality conditions, Lagrangean duality, interior point algorithms], (course planning, seminars and examination)

Optimization 1 (Mathematics), [Optimization models, linear optimization, simplex method, duality theory and sensitivity analysis, nonlinear optimization, unconstrained and constrained optimization, optimality conditions, Lagrangean duality], (course planning, seminars and examination)

1995–1996 Traffic models (Exchange program), [Transportation planning, trip distribution, efficiency, traffic equilibrium, combined models], (course planning and examination)

Optimization 1 (Mathematics), (seminars and examination)

Optimization 2 (Mathematics), [Combinatorial optimization, problem complexity, integer programming, graph search, Lagrangean duality, dual methods, subgradient optimization, branch and bound, heuristics and approximative methods], (seminars and examination)

Combinatorial Optimization (Computer Science and Engineering), [Combinatorial optimization models, graph theory, linear optimization, simplex method, integer programming, combinatorial optimization, complexity, optimizing algorithms, heuristics], (classes and examination)

1992–1993 Introduction to Operations Research (Industrial Engineering and Management), [Optimization models, linear optimization, simplex method, duality theory and sensitivity analysis, transportation networks, nonlinear optimization, unconstrained and constrained optimization, optimality conditions, Lagrangean duality], (seminars and examination)

1991–1992 Introduction to Operations Research (Industrial Engineering and Management), (seminars and examination)

Combinatorial Optimization (Computer Science and Engineering), (classes and examination)

1990–1991 Combinatorial Optimization (Computer Science and Engineering), (classes and examination)

Linear and Nonlinear Optimization (Applied Physics and Electrical Engineering), [Optimization models, linear optimization, simplex method, duality theory and sensitivity analysis, nonlinear optimization, unconstrained and constrained optimization, optimality conditions], (classes and examination)

1989–1990 Linear and Nonlinear Optimization (Applied Physics and Electrical Engineering), (classes and examination)

Linear Optimization (Computer Science and Engineering), [Linear optimization models, linear programming, simplex method, duality theory and sensitivity analysis, networks and graphs, minimum cost network flows], (lectures, classes and examination)

1988–1989 Linear and Nonlinear Optimization (Mechanical Engineering), [Optimization models, linear optimization, simplex method, duality theory and sensitivity analysis, nonlinear optimization, unconstrained and constrained optimization, optimality conditions, Lagrange duality], (classes)

Linear and Nonlinear Optimization (Applied Physics and Electrical Engineering), (classes)

Linear Optimization (Computer Science and Engineering), (classes)

B. Courses at the Postgraduate Level

2004–2005 Convex Analysis (Ph.D. students in applied mathematics) [book by J.M. Borwein and A.S. Lewis], (course planning, supervision and examination)

Integer Programming (Ph.D. students in optimization) [book by Nemhauser and Wolsey], (course planning, supervision and examination)

Linear Programming (Ph.D. students in optimization) [books by K.G. Murty, Vanderbei], (course planning, supervision and examination)

2003–2004 Convex Analysis (Ph.D. students in applied mathematics) [book by J.M. Borwein and A.S. Lewis], (course planning, supervision and examination)

Integer Programming (Ph.D. students in optimization) [book by Nemhauser and Wolsey], (course planning, supervision and examination)

Linear Programming (Ph.D. students in optimization) [books by K.G. Murty, Vanderbei], (course planning, supervision and examination)

2002–2003 Linear Programming (Ph.D. students in optimization) [books by K.G. Murty, Vanderbei], (course planning, supervision and examination)

Nonlinear Programming (Ph.D. students in optimization) [books by H.S. Sherali et al. and D.P. Bertsekas], (course planning, supervision and examination)

Convex Analysis (Ph.D. students in applied mathematics) [book by J.M. Borwein and A.S. Lewis], (course planning, supervision and examination)

2001–2002 Convex Analysis (Ph.D. students in applied mathematics) [notes by R.T. Rockafellar], (course planning together with R.T. Rockafellar)

2000–2001 Bilevel optimization and sensitivity analysis (Ph.D. students in optimization) [books by Outrata et al., Luo et al., Bonnans and Shapiro], (course planning, supervision and examination)

Linear Programming (Ph.D. students in optimization) [book by K.G. Murty], (course planning, supervision and examination)

Nonlinear Programming (Ph.D. students in optimization) [book by H.S. Sherali et al.], (course planning, supervision and examination)

1999–2000 Nonlinear Programming (Ph.D. students in applied mathematics), [book by D.P. Bertsekas], (course planning, lectures, and examination)

Linear Programming (Ph.D. students in optimization) [book by K.G. Murty], (course planning, supervision and examination)

Nonlinear Programming (Ph.D. students in optimization) [book by H.S. Sherali et al.], (course planning, supervision and examination)

Stochastic Programming (Ph.D. students in applied mathematics) [Lecture notes by R.T. Rockafellar], (course planning, supervision and examination)

1998–1999 ECMI 11th Modelling Week, Università degli Studi di Milano (Ph.D. students in the ECMI program), [Applied mathematics], (lecture, supervision and examination)

Linear Programming (Ph.D. students in optimization) [book by K.G. Murty], (course planning, supervision and examination)

Nonlinear Programming (Ph.D. students in optimization) [book by H.S. Sherali et al.], (course planning, supervision and examination)

Stochastic Programming (Ph.D. students in applied mathematics) [Lecture notes by R.T. Rockafellar], (course planning, supervision and examination)

1997–1998 Nonlinear Programming (Ph.D. students in applied mathematics) (course planning, lectures, and examination)

1995–1996 Optimization in Traffic Networks (Ph.D. students in optimization and regional science), [Transportation planning, trip distribution, efficiency, traffic equilibrium, combined models], (course planning, lectures, and examination)