

## CURRICULUM VITAE

### Personal:

- Name: **Oleg P. Burdakov**
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- Electronic Mail: oleg.burdakov@liu.se
- WWW : <http://users.mai.liu.se/olebu87/>
- Date and place of birth: September 29, 1953, Moscow, USSR
- Citizenship: Russian and Swedish.
- Languages: English (fluent), Swedish (speaking and reading at present), French and German (speaking and reading in the past)

### Education and Degrees:

- Docent in Optimization (2003), from Linköping University
- Ph.D. in Physical-Mathematical Sciences (1980), from the Department of Management Theory and Operational Research, Faculty of Management and Applied Mathematics, Moscow Institute of Physics and Technology (MPhTI).  
Advisor: Prof. Yuri Evtushenko
- M.S. in Applied Mathematics (1977) from the same department of MPhTI.

### Research Interests:

Numerical methods for solving optimization problems and systems of nonlinear equations, in particular, Newton-type, stable secant and interpolation methods, globalization strategies. Cardinality-constrained optimization. Inverse problems, multilinear least-squares, nonsmooth optimization and equations. Monotonic regression: data fitting and interpolation. Hop-restricted shortest path and Steiner tree problems in graphs.

### Academic Experience:

- 3/99–present **Biträdande Professor** (2/13–present)  
**Universitetslektor, Docent** (equiv. to Associate Professor, 3/99–1/13)  
Division of Optimization, Department of Mathematics, Linköping University, Sweden
- 1/11–present **Affiliated Faculty** of the Center for Applied Optimization at the University of Florida, USA
- 2/98–12/98 **Visiting Professor** of the grade MS6 (**Full Professor**)  
Department of Applied Mathematics, Institute of Mathematics, Statistics and Scientific Computing, University of Campinas, Brazil
- 1/95–12/97 **Senior Scientific Visitor**  
Parallel Algorithms Group, CERFACS (Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique), Toulouse, France

- 10/80–12/94    **Senior Research Scientist** (3/87–12/94)  
**Research Scientist** (1/87–3/87)  
**Junior Research Scientist** (10/80–12/86)  
 Department of Applied Optimization, Computing Center of the Russian  
 (USSR) Academy of Sciences, Moscow, Russia
- **Short Term Visiting Positions**  
 City University of Hong Kong (Hong Kong, 2002)  
 ICASE, NASA (USA, 1996)  
 DIMACS (USA, 1996)  
 University of Bologna (Italy, 1992, 1993)  
 University of Calabria (Italy, 1992)  
 INRIA (France, 1992)  
 Technical University of Köthen (Germany, 1989, 1991)  
 Technical University of Dresden (Germany, 1986, 1988, 1991)  
 Argonne National Laboratory (USA, 1990)  
 University of Bergamo (Italy, 1990)  
 Martin–Luther University of Halle (Germany, 1986)  
 International Institute for Applied System Analysis (Austria, 1984)

### Professional Activities and Memberships:

- **Editor-in-Chief** of the journal “Optimization Methods and Software” (Taylor & Francis)
- **Conference Chair** for the 3rd International Conference on Optimization Methods and Software (2012, Crete, Greece); the Joint EUROPT-OMS Conference on Optimization (2007, Prague, Czech Republic); the 1st International Conference on Optimization Methods and Software (2002, Hangzhou, China)
- **Workshop Organizer** for the Workshop on Linear Algebra in Optimization (1996, Albi, France); the Workshop on Optimum Design of Multibody Systems (1996, Toulouse, France)
- **Conference Organizer** for the 1st Biennial Italian–Soviet Conference on Methods and Applications of Mathematical Programming (1992, Cetraro, Italy)
- **Mathematical Optimization Society** member.
- **International Society of Global Optimization** member.
- **Reviewer** for the Research Council of Norway; the Research Foundation Flanders (Belgium); the Israel Science Foundation; the Agency for Science, Technology and Research of Singapore; Research Grants Council of Hong Kong; the Natural Sciences and Engineering Research Council of Canada
- **Reviewer** for the journals: SIAM Journal on Optimization, Journal of Optimization Theory and Applications, Optimization Letters, Optimization Methods and Software, Annals of Operations Research, Applied Numerical Mathematics, Computational Statistics and Data Analysis, Computational Mathematics and Mathematical Physics, Cybernetics

**Awards:**

- A **winner** of the International Implementation Challenge in Solving Steiner Tree Problems organized in 2014 by the US Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) which is a collaboration between Rutgers University, Princeton University, and the research firms AT&T, Bell Labs, NEC, and Applied Communication Sciences.
- **Bronze Medal** of the USSR Exhibition of National Economic Achievements (1985) for the development of interactive optimization software DISO

**Recognition:**

- **Key-note / plenary invited speaker** at the conferences (last five years):  
 Workshop on Advances in optimization with application to data assimilation (France, 2016);  
 10th Intl Conference on Numerical Optimization and Numerical Linear Algebra (China, 2015);  
 5th Intl Conference on Network Analysis (Russia, 2015);  
 2nd Intl Conf. on computational and experimental science and engineering (Turkey, 2015);  
 Workshop on Steiner Tree Problems (USA, 2014);  
 4th Intl Conference on Electronics, Communications and Networks (China 2014);  
 Intl Conf. on Methods of Optimization and Their Applications (Russia, 2014);  
 3rd Intl Conf. on Optimization and Numerical Analysis (Oman, 2014);  
 1st Intl Conf. on computational and experimental science and engineering (Turkey, 2014);  
 3rd World Congress of Global Optimization (China, 2013);  
 NATO Advanced Research Workshop (Ukraine, 2013);  
 8th Intl Conf. on Numerical Optimization and Numerical Linear Algebra (China, 2011);  
 2nd Intl Conf. on Optimization and Numerical Analysis (Oman, 2011).

**Experience in Applied Research:**

- 01/07–pres.     **LinkLab Project “Optimal placement of communications relay nodes”**  
 in the framework of a collaboration between SAAB and Linköping University (LinkLab - Center for Future Aviation Systems). The project’s purpose is to develop efficient optimization methods for solving a multi-extremal problem of placement of unmanned aerial vehicles used as communications relay nodes.
- 11/04–2/14.     **Design of filter networks**  
 in the framework of a collaboration between Center for Medical Image Science and Visualization and the Division of Optimization at the Linköping University (Linköping University Center for Industrial Information Technology CENIIT project 2009-2011).
- 2/03–4/04     **Project “Optimization of Biological Production Systems through Fluxomic Modelling”**  
 between the Division of Biotechnology and the Division of Optimization at the Linköping University. The project’s purpose was to model and optimize industrial-scale production of proteins and other metabolic products.
- 10/02–03/03   **Consulting on optimization in vehicle crashworthiness design**  
 in the framework of a collaboration between Linköping University and Saab. The consulting was related to structural optimization in computational crash simulations, characterized by very time-consuming function evaluations.

- 4/99–12/99     **Project “Optimization of Robot Movements”**  
between the Division of Assembly Technology and the Division of Optimization at the Linköping University. The project’s purpose was to optimize both geometric parameters of robot and its trajectory.
- 1/96–9/97     **European ESPRIT Project “ODESIM”**  
The project’s purpose was to develop software for the optimal design of multi-body mechanical systems.
- 1/97–10/97    **Consulting on image restoration and dense image matching**  
in the framework of a collaboration between École Nationale Supérieure de l’Aéronautique et de l’Espace (SUPAERO), Centre National d’Études Spatiales (CNES) and École Nationale Supérieure d’Électrotechnique, d’Électronique, d’Informatique et d’Hydraulique de Toulouse (ENSEEIH). The consulting was related to the optimization part, in particular, to the inexact Newton method and its globalization.
- 9/77–12/90    **Project “DISO”**  
of the USSR Academy of Sciences and of the USSR Ministry of Research and Technology. The project’s purpose was to develop interactive optimization software “DISO” for solving unconstrained and constrained minimization, and optimal control problems. The library was based on more than 30 different numerical methods.
- 1/87–12/89    **Surface Reconstruction Project**  
The project’s purpose was to develop numerical methods and software for the inverse problems of scattering and surface reconstruction.
- 1/80–12/81    **Seismic Inverse Calculations Project**  
The project’s purpose was to refine inferences about the subsurface on the base of seismic data.
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#### Personal Grants (Last Five Years):

- 2008-present    from LinkLab (Center for Future Aviation Systems established by SAAB and Linköping University) for research project “Optimal allocation of communications relay nodes” (principal investigator, 280 000 SEK a year);
- 2013-2015     from the Australian Research Council for Discovery Project “State-trace analysis: theory and application” (co-investigator, approx. 500 000 SEK a year);
- 2009-2011     from CENIIT (Center for Industrial Information technology at Linköping University) for research project “A novel approach in multilinear least-squares with application to design of filter networks” (principal investigator, 475 000 SEK a year);

**Teaching Experience:**

- 4/99–present     **Lecturing** on optimization for students of various specialization at Linköping University. Involvement: lectures, tutorials, computer lab sessions, exams etc. Courses: Mathematical programming; Linear and nonlinear optimization; Combinatorial optimization; Integer programming; Operation System Analysis for master program in Manufacturing Management; Advanced course on optimization; Algorithms and optimization.
- 2000–present     **PhD course** on nonlinear optimization, equations and least squares at Linköping University (development, teaching and exams since 2000). It receives annual recognition from the University Council of Postgraduate Education as an all-university course (2003-present).
- 11/96–2/97       **Series of lectures at CERFACS** (Toulouse, France) reviewing the state of the art of numerical methods for solving systems of nonlinear equations (attended by students and researchers from local institutions).
- 9/82–2/85        **Lecturing** (part-time, 240 hours a year) at the Department of Mathematics of the Moscow Institute of Wood Technology for 1st, 2nd and 3rd year students of the Faculty of Electronic and Computer Engineering. One lecture and two seminars a week on calculus, advanced calculus, linear algebra, complex variables, probability and statistics.
- 9/81–present     **Supervising and co-supervising**  
**Ph.D. students** at the Linköping Institute of Technology:  
S. Zikrin (2009-present, main supervisor),  
O. Sysoev (2005-2010, co-supervisor),  
B. Svensson (2007-2008, co-supervisor),  
M. Hussian (2003-2005, co-supervisor),  
P. Flisberg (Tehnisk Licentiatexamen in 1999, co-supervisor),  
**Ph.D. students:** at the Moscow Institute of Physics and Technology (MPhTI):  
A. Kuznetsov (1994-95, main supervisor),  
B. Merkulov (1993-96, main supervisor),  
**Ph.D. student** at the University of Campinas, Brazil:  
E. Pilotta (Ph.D. Degree in 1999, co-supervisor),  
**Ph.D. student** at CERFACS, Toulouse, France:  
B. Merkulov (1997-99, main supervisor),  
**Ph.D. student** at École Nationale Supérieure de l’Aéronautique et de l’Espace:  
S. Sokol (Ph.D. Degree “très honorable avec félicitations du jury” in 1997, co-supervisor),  
**M.S. graduation thesis works** at the Linköping Institute of Technology:  
Amirhossein Sadoghi (2010-11, main supervisor),  
Rana Yazdan (2009-10, main supervisor),  
**M.S. graduation thesis works** at MPhTI:  
O. Sysoev (2004, Honours M.S. Degree, main supervisor),  
A. Kuznetsov (1990-94, Honours M.S. Degree, main supervisor),  
B. Merkulov (1989-93, Honours M.S. Degree, main supervisor),  
V. Rat’kin (1983-86, Honours M.S. Degree, main supervisor),  
F. Sharykin (1981-84, main supervisor).

**Ph.D. thesis committee member or examiner for:**

- 2013 D. Petersson “A Nonlinear Optimization Approach to H<sub>2</sub>-Optimal Modeling and Control” (Linköping University, Sweden)
- 2012 J. Ekström “Optimization approaches for design of congestion pricing schemes” (Linköping University, Sweden)
- 2012 Z.U. Sheikh “Efficient realizations of wide-band and reconfigurable FIR systems” (Linköping University, Sweden)
- 2011 D. Ankelhed “On Design of low order H-infinity controllers” (Linköping University, Sweden)
- 2009 C. Cromvik “Nonlinear Programming — Robust Models and Applications” (Chalmers University, Gothenburg, Sweden)
- 2008 D. Axehill “Integer Quadratic Programming for Control and Communication” (Linköping University, Sweden)
- 2007 M. Ekdahl “On Approximations and Computations in Probabilistic Classification and in Learning of Graphical Models” (Linköping University, Sweden)
- 2003 G. Korotkikh “A computational approach in dealing with uncertainty in financial markets” (Central Queensland University, Australia)
- 1998 E. Birgin “Computational differentiation and applications” (University of Campinas, Brazil)
- 1997 S. Sokol “Multi-scale approach to image matching by elastic models” (École Nationale Supérieure de l’Aéronautique et de l’Espace, France)

**Opponent at the Ph.D. thesis defence:**

- 1985 A.B. Smirnov “Strategies of optimal control in registration of stochastic flows of events”

**Reviewer representing institution leading in subject of Ph.D. theses:**

- 1990 A.A. Antonyuk “Development and application of optimization algorithms using orthogonalization processes”
- 1988 V.M. Zadachin “Modified Newton- and quasi-Newton-type methods with pseudo-inverses for solving degenerate problems”
- 1987 A.E. Perekatov “Development of numerical methods for minimization on sphere, simplex and parallelepiped”
- 1984 O.V. Zhuk “Models and algorithms for development of hierarchical links in multi-modular computer systems”
- 1984 P.P. Vasil’ev “Min-max-type algorithms for solving some classes of equations and systems of equations”
- 1983 L.A. Sobolenko “Acceleration methods for some optimization algorithms and their effective implementation”
- 1983 V.V. Gershovich “Development of effective methods for solving nonsmooth optimization problems”