Curriculum Vitae of

Mihály Csaba Markót

Personal details

- Date of birth: March 17, 1976.
- Place of birth: Tiszaföldvár, Hungary
- Citizenship: Hungarian
- Affiliation: Faculty of Mathematics, University of Vienna
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Education and Degrees

- 1994–97: B. Sc. Degree in Computer Science, József Attila University (predecessor of the present University of Szeged), Hungary. Record mark of the degree: 4.7 (outstanding). Title of the thesis: *Multisection strategies in interval global optimization algorithms* (in Hungarian).
- 1997–98: two semesters spent at the University of Economics, Budapest, Hungary
- 1997–99: M. Sc. Degree in Computer Science, József Attila University. Record mark of the degree: 5.0 (excellent). Title of the thesis: *A method for solving 'circle packing' problems with guaranteed accuracy* (in Hungarian).
- 1999–2002: Ph.D. studies in Informatics, Doctoral School of Mathematics and Computer Science, University of Szeged. Record mark of the final exam: 5.0 (excellent).
- 2004: Ph.D. Degree in Mathematics and Computer Science. Qualification: summa cum laude. Title of the thesis: *Reliable Global Optimization Methods for Constrained Problems and Their Application for Solving Circle Packing Problems* (in Hungarian).

Awards

- The Excellent Student of the Faculty of Sciences prize, József Attila University, Szeged (1998)
- Farkas prize of the János Bolyai Mathematical Society for young researchers in Applied Mathematics (2005)

Employment

- September, 2002 – August, 2003: Teaching Assistant. Department of Informatics, University of Szeged, Szeged, Hungary.
- September, 2003 – December, 2003: Research Assistant. Research Group on Artificial Intelligence, University of Szeged, Szeged, Hungary.
- February, 2004 – January, 2006: Internal Research Fellow. European Space Agency, European Space Research and Technology Centre, Noordwijk, The Netherlands. (The first ever Hungarian postdoc fellow at ESA.)
- February, 2006 – June, 2007: Research Fellow. Laboratory and Department of Operations Research and Decision Systems, Computer and Automation Research Institute, Hungarian Academy of Sciences, Budapest, Hungary.
- July, 2007 –: Postdoc Researcher, Faculty of Mathematics, University of Vienna.

Main research areas

- nonlinear programming; constrained and unconstrained global optimization; branch–and–bound methods; interval arithmetic; scientific computing; location and packing problems; applications of optimization in chemical engineering, civil engineering, biology and economics
- *Research fields at the ESA (2004–2006):* reliable numerical methods in spacecraft design and trajectory optimization, robust system design (uncertainty modeling), distributed computing, optimization heuristics, interactive internet agents, natural language processing

Research experience:

- *Publication summary:*

	In English	In Hungarian
Books	1	0
Referred papers	15	0
Chapters of books	2	0
Conference proceedings	5	1
Conference abstracts	30	7
Other (contest works, etc.)	1	7

Sum of journal impact factors of published articles: 13.973

Number of citations (without self-citations): 266, out of which fully independent: 192

– *Selected publications:*

  – M. C. Markót and H. Schichl: Comparison and automated selection of local optimization solvers for interval global optimization methods. *SIAM J. Optimization* 21, 1371–1391, 2011.

  – C. Menon, R. Vertechy, M. C. Markót and V. Parenti-Castelli: Geometrical optimization of parallel mechanisms based on natural frequency evaluation: application to a spherical mechanism for future space applications. *IEEE Transactions on Robotics* 25(1), 12–24, 2009.

  – P. G. Szabó, M. C. Markót, T. Csendes, E. Specht, L. G. Casado, and I. García: New Approaches to Circle Packing in a Square. *Springer Optimization and Its Applications* 6, Springer, 2007.

  – E. R. Frits, M. C. Markót, T. Csendes, Z. Lelkes, Zs. Fonyó, and E. Rév: Finding limiting flows of batch extractive distillation with interval arithmetic. *Am. Inst. Chem. Eng. (AIChE) J.* 52, 3100–3108, 2006.

  – M. C. Markót, J. Fernández, L. G. Casado and T. Csendes: New interval methods for constrained global optimization. *Math. Programming* 106, 287–318, 2006.

  – M. C. Markót and T. Csendes: A New Verified Optimization Technique for the "Packing Circles in a Unit Square" Problems. *SIAM J. Optimization* 16, 193–219, 2005.

  – M. C. Markót, T. Csendes and A. E. Csallner: Multisection in Branch-and-Bound Interval Methods for Global Optimization II. Numerical Tests. *J. Global Optimization* 16, 219-228, 2000.

  – A. E. Csallner, T. Csendes and M. C. Markót: Multisection in Interval Branch-and-Bound Methods for Global Optimization I. Theoretical Results. *J. Global Optimization* 16, 371-392, 2000.

– *Invited talks:*

  – 2001: 'Theoretical and numerical methods for finding solutions of the problems of packing equal circles into the unit square'. Given at the University of Murcia, Spain.

  – 2001: 'Solving circle packing problems with interval methods'. Given at the Alfréd Rényi Institute of Mathematics (Hungarian Academy of Sciences).

  – 2002: 'New interval methods for constrained global optimization'. Given at the Max–Planck–Institut für Informatik, Saarbrücken, Germany.

  – 2005: 'The Advanced Concepts Team of the European Space Agency'. Given at the Fifth Annual Forum for Young Researchers in Space Research, Budapest, Hungary.

  – 2011: 'Bound constrained interval global optimization in the COCONUT Environment'. Given at the Conference on Simulation and Optimization, June 29 – July 1, Győr, Hungary.

– *Referee work:*

  – for scientific journals: Central European J. Operations Research, J. Computational and Applied Mathematics, J. Global Optimization, Computational Optimization

and Applications, European J. Operational Research, Discrete Applied Mathematics, Mathematical Methods of Operations Research, Informs J. Computing, Optimization Letters, Reliable Computing, Computers & Operations Research, Computing, Mathematical Programming

- for the Hungarian Scientific Research Fund (OTKA)

Knowledge of languages

- English: fluent (written, spoken, reading)
- German: basic level (spoken, reading)
- Hungarian: native language

Visiting research periods

- 2001: 4 months at the University of Almeria, Spain
- 2001: 2 weeks at the University of Karlsruhe, Germany
- 2002: 3 weeks at the Technical University Ilmenau, Germany
- 2003–2004: 3 months at the University of Vienna, Vienna
- 2006: 3 weeks at the Erwin Schrödinger International Institute for Mathematical Physics, Vienna

Other scientific prizes

- *Student Research Contests:*
  - 1997: National Student Research Contest (OTDK), 2nd prize
  - 1999: National Student Research Contest (OTDK), 2nd prize
- *Competition essays, conference prizes:*
  - 1999: M. C. Markót and P. G. Szabó: New theoretical and computational results for the problem of densest packings of equal circles in the square (in Hungarian). 2nd prize awarded by the Hungarian Academy of Sciences, Committee of Szeged.
  - 2000: M. C. Markót, P. G. Szabó, B. Tóth and T. Vinkó: Verification Solutions of Packing Circle Problems. Best talk award of the CSCS-2000 Conference, Szeged.
  - 2001: M. C. Markót: New interval methods for constrained global optimization (in Hungarian). Competition for young researchers at the XXV. Hungarian Operational Research Conference, 1st prize.
  - 2002: M. C. Markót, J. Fernández, L. G. Casado: New Interval Methods for Constrained Global Optimization: Solving 'Circle Packing' Problems in a Reliable Way. Best talk award of the CSCS-2002 Conference, Szeged.

Teaching experiences

- University of Szeged: seminar lectures – Introduction to Informatics (1998-2000, 2002-2003), Operations Research (1998), Artificial Intelligence (2000-2002)
- University of Vienna: proseminar – Optimization and Variational Calculus (2011)

Technical skills

- *Programming languages:* C/C++ (Windows: MS Win32 / MFC, Unix/Linux: gcc), MATLAB, Java, x86 assembly
- *Modeling languages:* AMPL, GAMS
- *Usage of scientific software:* interval arithmetic libraries (Profil/BIAS, C–XSC, filib++), glpk, CPLEX, MPI, etc.
- *Other software development utilities:* lex/flex, yacc/bison, Doxygen, Windows Installer, etc.

Management and participation in industrial and academic research projects

- Industrial projects:
  - 'Cutting problems for the steel industry' (2000): *member of contractor research group (University of Szeged).* Contract awarded by KÉSZ Ltd., Hungary (civil engineering).
  - 'Cutting problems for the steel industry II. – storage management issues' (2000): *member of contractor research group (University of Szeged).* Contract awarded by KÉSZ Ltd., Hungary (civil engineering).
  - Modelling and solving optimization problems related to the European energy market (2009, 2010): *employed by DAGOPT Optimal Solutions KG* in their contract with EVN Naturkraft AG.
- Contract management at the European Space Agency:
  - 'Natural Language Techniques in Support of Spacecraft Design' (2004): *contract supervisor (ESA).* Contractor: University of Roma Tor Vergata.
  - 'Assessing the Accuracy of Interval Arithmetic Estimates in Space Flight Mechanics' (2005): *study initiator and contract supervisor (ESA).* Contractor: Politecnico di Milano.
  - 'The application of clouds for modelling uncertainties in robust space system design' (2006): *study initiator (ESA).* Contractor: University of Vienna.
- Academic projects:
  - 'Developments of global optimization procedures' (2001–2004), grant OTKA T 034350, *participant.*
  - 'Global optimization procedures' (2001–2003), grant OMFB D-30/00 (Hungarian–German Bilateral), *participant.*

- 'Application of global optimization methods in approximation problems, (2001–2002), grant MÖB-DAAD 11/01 (Hungarian–German Bilateral), *participant*.
- 'COCONUT: Continuous Constraints - Updating the Technology' (2003–2004): *participating researcher*, University of Vienna. An EU funded IST Project.
- 'A software environment for global optimization' (2007–), FWF P18704-N13, *participating researcher*, University of Vienna.

Software development

- *GOP* (1997–): interval branch–and–bound methods for bound constrained and inequality constrained global optimization.
- *circpack* (2000–2004): computer–aided optimality proofs for solving circle packing problems.
- *ACT–DC* (2004–2006): a distributed (idle time) computing environment for global optimization and data processing at the European Space Agency.
- participation in the development and testing of the *COCONUT Environment* (EU funded IST Project) for global optimization and continuous constraint satisfaction (2003–2004).
- *SMPL/glparser* (2006–2007): a simplified modeling language and an accompanying parser for the GloptLab (University of Vienna) optimization software.
- (2007–): participation in the further improvements of the *COCONUT Environment*.

Conference organization

- Member of the Organizing Committee of the conferences
  - IMACS/GAMM SCAN-98 Conference, Budapest, Hungary
  - CSCS-2000 (Conference of Ph.D. Students in Computer Science), Szeged, Hungary