

MICHAEL ZABARANKIN

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2004–present Assistant Professor, *Department of Mathematical Sciences,
Stevens Institute of Technology, Hoboken NJ*

2003–2004 Visiting Assistant Professor, *Graduate Engineering & Research Center,
University of Florida*

Education

2003 **Ph.D.**, *Operations Research with concentration in Quantitative Finance,
Department of Industrial and Systems Engineering, University of Florida*

1999 **Ph.D.**, *Applied Mathematics with specialization in Mechanics of Deformable Solids,
Kiev National Taras Shevchenko University, Kiev, Ukraine*

2001 **M.S.**, *Department of Industrial and Systems Engineering, University of Florida*

1996 **M.S.**, *Applied Mathematics, Kiev National Taras Shevchenko University, Kiev,
Ukraine*

1991 *Republican Physical-Mathematical Lyceum (Highest Honors), Kiev, Ukraine*

Dissertation (2003): Optimization Approaches in Risk Management and Financial Engineering, advisor Prof. Stan Uryasev and co-advisor Prof. R. Tyrrell Rockafellar

Dissertation (1999): Exact Solutions to Displacement Boundary-value Problems for an Elastic Medium with a Spindle-shaped Inclusion, advisor Prof. Andrei F. Ulitko

Research interests

- Optimization under Risk
- Fluid Mechanics

Awards and Fellowships

2002 Industrial and Systems Engineering Graduate Student Award for Excellence in Research, University of Florida

2002 College of Engineering International Student Award for Outstanding Academic Achievement, University of Florida

1997 Diploma of the National Academy of Sciences of Ukraine in the Competition of Young Scientists and Students for the Best Research Project

1995 Scholarship of the National Academy of Sciences of Ukraine for Scientific and Academic Achievements

Books

- Kurdila, A., Zabaranin, M. (2005) *Convex Functional Analysis*, Series: Systems & Control: Foundations & Applications, Birkhäuser, Switzerland
 - Kurdila, A., Pardalos, P., Zabaranin, M. (Eds.) (2006) *Robust Optimization-Directed Design*, Series: Nonconvex Optimization and Its Applications, Vol. 81, Springer Publishers
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Journal Articles (published and in press)

1. Zabaranin, M. (2008) *The Framework of k -Harmonically Analytic Functions for Three-dimensional Stokes Flow Problems, Part I*, SIAM Journal on Applied Mathematics, to appear
2. Zabaranin, M. (2008) *The Framework of k -Harmonically Analytic Functions for Three-dimensional Stokes Flow Problems, Part II*, SIAM Journal on Applied Mathematics, to appear
3. Pashko, S., Molyboha, A., Zabaranin, M., Gorovyy, S. (2008) *Optimal Sensor Placement for Underwater Threat Detection*, Naval Research Logistics, Vol. 55, Issue 7, pp. 684–699
4. Rockafellar, R.T., Uryasev, S., Zabaranin, M. (2008) *Risk Tuning with Generalized Linear Regression*, Mathematics of Operations Research, Vol. 33, Issue 3, pp. 712–729
5. Rockafellar, R.T., Uryasev, S., Zabaranin, M. (2007) *Equilibrium with Investors Using a Diversity of Deviation Measures*, The Journal of Banking and Finance, Vol. 31, Issue 11, pp. 3251–3268
6. Zabaranin, M. (2007) *Asymmetric Creeping Motion of a Rigid Spindle-shaped Body in a Viscous Fluid*, SIAM Journal on Applied Mathematics, Vol. 68, Issue 2, pp. 461–485
7. Zabaranin, M. (2007) *Asymmetric 3D Stokes Flows about Two Fused Equal Spheres*, Proceedings of The Royal Society of London, Ser. A, Vol. 463, No. 2085, pp. 2329–2349
8. Zabaranin, M., Krokhmal, P. (2007) *Generalized Analytic Functions in 3D Stokes Flows*, The Quarterly Journal of Mechanics and Applied Mathematics, Vol. 60, No. 2, pp. 99–123
9. Zabaranin, M., Uryasev, S., Murphey, R. (2006) *Aircraft Routing under the Risk of Detection*, Naval Research Logistics, Vol. 53, Issue 8, 728–747
10. Rockafellar, R.T., Uryasev, S., Zabaranin, M. (2006) *Optimality Conditions in Portfolio Analysis with General Deviation Measures*, Mathematical Programming, Ser. B, Vol. 108, No. 2–3, 515–540
11. Rockafellar, R.T., Uryasev, S., Zabaranin, M. (2006) *Generalized Deviations in Risk Analysis*, Finance and Stochastics, Vol. 10, No. 1, 51–74
12. Rockafellar, R.T., Uryasev, S., Zabaranin, M. (2006) *Master Funds in Portfolio Analysis with General Deviation Measures*, The Journal of Banking and Finance, Vol. 30, Issue 2, 743–778
13. Zabaranin, M., Ulitko, A.F. (2006) *Hilbert Formulas for r -Analytic Functions and Stokes Flow about a Biconvex Lens*, Quarterly of Applied Mathematics, Vol. 64., No. 4, 663–693

14. Zabaranin, M., Ulitko, A.F. (2006) *Hilbert Formulas for r -Analytic Functions in the Domain Exterior to Spindle*, SIAM Journal on Applied Mathematics, Vol. 66, No. 4, 1270–1300
15. Chekhlov, A., Uryasev, S., Zabaranin, M. (2005) *Drawdown Measure in Portfolio Optimization*, International Journal of Theoretical and Applied Finance, Vol. 8, No. 1, 1–46
16. Zabaranin, M. (2000) *The Second Fundamental Boundary-value Problem of Elasticity for a Spindle*, Visnyk (bulletin) of Kiev National Taras Shevchenko University in the field of Mathematics and Mechanics, Issue 5, 61–72 [in Ukrainian]
17. Zabaranin, M. (1999) *A Unified Approach for Solving the Generalized Cauchy-Riemann System of Equations*, Reports of the National Academy of Sciences of Ukraine, No. 5, 30–33 [in Russian]
18. Zabaranin, M. (1999) *Classical Approach for Solving the Lamé Equation for a Spindle*, Mashynoznavstvo, No. 3, 23–31 [in Ukrainian]
19. Zabaranin, M. (1999) *Classical Approach for Solving the Lamé Equation for a Spindle in Axially Symmetric Case*, Bulletin of the University of Kiev, Series: Physics & Mathematics, No. 1, 14–18 [in Ukrainian]
20. Zabaranin, M. (1999) *The Second Fundamental Axisymmetrical Boundary-value Problem of Elasticity for a Spindle*, Visnyk (bulletin) of Kiev National Taras Shevchenko University in the field of Mathematics and Mechanics, Issue 3, 66–75 [in Ukrainian]
21. Zabaranin, M., Ulitko, A.F. (1999) *The Stokes Flow about a Spindle in Axially Symmetric Case*, Visnyk (bulletin) of Kiev National Taras Shevchenko University in the field of Mathematics and Mechanics, Issue 3, 58–66 [in Ukrainian]
22. Zabaranin, M. (1998) *Schwartz Formulas for r -analytic Functions in Bipolar Co-ordinates*, Proceedings of IV International Conference “Modern Problems of Continuum Mechanics,” Vol. 1, Rostov-Don, Russia, 150–154 [in Russian]

Chapters in Referred Books

1. Grechuk, B., Molyboha, A., Zabaranin, M. (2008) *Network Algorithms for the Dual of the Constrained Shortest Path Problem*, Cooperative Networks: Control and Optimization (D. Grundel et al. Eds.), Edward Elgar Publishing, pp. 127–159
2. Zabaranin, M., Kurdila A., Prokopyev O., Goel A., Causey R., and Pardalos P. (2008) *Optimization Approaches for Vision-based Trajectory Planning for Autonomous Micro-air Vehicles*, Cooperative Networks: Control and Optimization (D. Grundel et al. Eds.), Edward Elgar Publishing, pp. 325–356
3. Chekhlov, A., Uryasev, S., Zabaranin, M. (2003) *Portfolio Optimization with Drawdown Constraints*, Asset and Liability Management Tools (B. Scherer Ed.), Risk Books, London, 263–278
4. Zabaranin, M., Uryasev, S., Pardalos, P. (2002) *Optimal Risk Path Algorithms*, Cooperative Control and Optimization (R. Murphey and P. Pardalos Eds.), Kluwer Academic Publishers, Dordrecht, 271–303

Funding

- PI: *Mathematical Programming Techniques in Variational Problems*, Air Force Office of Scientific Research (AFOSR), 2007
 - Co-PI: *Optimal Sensor Placement for Underwater Threat Detection* (Maritime Security Laboratory), Office of Naval Research (ONR), 2005–2008
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Teaching

- Graduate-level courses
 - Mathematical Models of Risk, Ma712 (Stevens Institute of Technology)
 - Theory of Games, Ma632 (Stevens Institute of Technology)
 - Convex Analysis and Nonlinear Optimization, Ma629 (Stevens Institute of Technology)
 - Numerical Analysis I, Ma615 (Stevens Institute of Technology)
 - Undergraduate-level courses
 - Engineering Economy, EIN4354 (University of Florida)
 - Numerical Methods, Ma346 (Stevens Institute of Technology)
 - Honors Mathematical Analysis IV, Ma282 (Stevens Institute of Technology)
 - Honors Mathematical Analysis III, Ma281 (Stevens Institute of Technology)
 - Honors Mathematical Analysis II, Ma182 (Stevens Institute of Technology)
 - Probability for Business and Liberal Arts, Ma118 (Stevens Institute of Technology)
 - Mathematical Analysis II, Ma116 (Stevens Institute of Technology)
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Academic Service

- Associate Editor of *Optimization Letters*, Springer Publishers
- NSF panelist: *Operations Research Proposal Panel Review, Division of Design, Manufacture and Industrial Innovation*, NSF, Arlington, VA, May 2007
- NSF panelist: *Service Enterprise Engineering Unsolicited Proposal Panel Review, Division of Design, Manufacture and Industrial Innovation*, NSF, Arlington, VA, Apr. 2005
- Co-organizer of *Workshop in Mathematical Physics*, Stevens Institute of Technology, Hoboken, NJ, Apr. 2006
- Co-organizer of *Robust Optimization-Directed Design* conference, Graduate Engineering and Research Center, University of Florida, Shalimar, FL, Apr. 2004
- Organizer of sessions *Risk Analysis in Military Applications* and *Axiomatic Foundations of Risk Analysis* at the INFORMS Annual Meetings 2006, 2007
- Reviewer for *Fluid Mechanics, Mathematical Finance, SIAM Journal on Optimization, Journal of Combinatorial Optimization, Operations Research, Mathematical Programming, The International Journal of Management Science, Computers & Operations Research, Mathematics of Operations Research, Optimization and Engineering, Journal of Global Optimization, Optimization Methods & Software, Quantitative Finance, Journal of Banking and Finance, Journal of Empirical Finance, Risk Analysis: An International Journal Letters of Optimization*

- Thesis advisor of Ph.D. students: A. Molyboha, B. Grechuk, and N. Bordyuh (Stevens Institute of Technology)
 - Dean Search Committee (2007), Undergraduate Promotions Committee (2005–2007), Graduate Committee (2007–2008)
 - Member of the INFORMS and SIAM
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Conference Presentations

1. *2008 SIAM Annual Meeting*, San-Diego, CA, July 2008. “The Framework of k -Harmonically Analytic Functions for Three-Dimensional Stokes Flow Problems”
2. *SIAM Conference on Optimization*, Boston, MA, May 2008. “Quantile-based Deviation Measures”
3. *AFOSR Annual Review*, Arlington, VA, Apr. 2008. “Semi-analytical Approach to Three-Dimensional Shape Optimization Problems”
4. *8th International Conference on Cooperative Control and Optimization*, Gainesville, FL, Jan. 2008. “Stochastic Optimization of Sensor Network for Underwater Threat Detection”
5. *INFORMS 2007 Annual Meeting*, Seattle, WA, Nov. 2007. “Deviation Measures: Theory and Application”
6. *INFORMS 2007 Annual Meeting*, Seattle, WA, Nov. 2007. Presentation “Stochastic Optimization of Sensor Network”
7. *INFORMS 2007 Annual Meeting*, Seattle, WA, Nov. 2007. Presentation “Aircraft Routing under the Risk of Detection”
8. *6th International Congress on Industrial and Applied Mathematics*, Zürich, Jul. 2007. Presentation “Generalized Analytic Functions in 3D Stokes Flows”
9. *Special session on Risk-Averse Optimization at the AMS Sectional Meeting*, Hoboken, NJ, Apr. 2007. Presentation “Optimal Security Inspection with a Single-server Queue”
10. *Fourth Rutgers-Stevens Workshop on Stochastic Systems*, Hoboken, NJ, Mar. 2007. Presentation “Optimal Security Inspection with a Single-server Queue”
11. *SIAM Conference on Computational Science and Engineering*, Costa Mesa, CA, Mar. 2007. Presentation “Generalized Analytic Functions in 3D Stokes Flows”
12. *INFORMS 2006 Annual Meeting*, Pittsburgh, PA, Nov. 2006. Presentation “Optimal Security Inspection with a Single-server Queue”
13. *Workshop in Mathematical Physics*, Hoboken, NJ, Apr. 2006. Presentation “Generalized Analytic Functions in Hydrodynamics of Axially Symmetric Stokes Flows”
14. *International Conference on Financial Engineering*, Gainesville, FL, Mar. 2006. Presentation “Quantile-based Deviation Measures”

15. *INFORMS 2005 Annual Meeting*, San-Francisco, CA, Nov. 2005. Presentation “Deviation Measures in Optimization and Risk Analysis”
16. *Third Rutgers-Stevens Workshop, Optimization of Stochastic Systems: Risk-Averse Optimization*, Rutgers University, NJ, Sep. 2005. Presentation “Deviation Measures in Risk Analysis”
17. *International Conference on Risk Management and Quantitative Approaches in Finance*, Gainesville, FL, Apr. 2005. Presentation “Deviation Measures and Asset Pricing”
18. *Columbia Practitioners Conference on the Mathematics of Finance*, Columbia University, New-York, NY, Mar. 2005. Presentation “Portfolio Optimization with Deviation Measures”
19. *The Tenth International Conference on Stochastic Programming*, University of Arizona, Tucson, AZ, Oct. 2004. Presentation “General Deviation Measures and Portfolio Analysis”
20. *INFORMS 2003 Annual Meeting*, Atlanta, GA, Oct. 2003. Presentation “Portfolio Analysis with General Deviation Measures”
21. *International Conference on Modeling, Optimization, and Risk Management in Finance*, Gainesville, FL, Mar. 2003. Presentation “Portfolio Analysis with General Deviation Measures”
22. *Annual Review Meeting: Research Institute for Autonomous Precision Guided Systems*, Graduate Engineering and Research Center, Shalimar, FL, Dec. 2002. Presentation “Analytical and Discrete Optimization Approaches in Optimal Trajectory Generation”
23. *Conference on Cooperative Control and Optimization*, Gainesville, FL, Dec. 2002. Presentation “Analytical and Discrete Optimization Approaches in Optimal Trajectory Generation”
24. *SFA 2002 Annual Meeting*, Key West, FL, Nov. 2002. Presentation “Portfolio Optimization with Drawdown Constraints”
25. *INFORMS 2002 Annual Meeting*, San Jose, CA, Nov. 2002. Presentation “Portfolio Optimization with Drawdown Constraints”
26. *982nd AMS Meeting*, Orlando, FL, Nov. 2002. Presentation “Portfolio Optimization with Drawdown Constraints”
27. *Invitational Workshop 2002: Design and Use of Flight Vehicles for a Cooperative Attack Testbed*, Graduate Engineering and Research Center, Shalimar, FL, Jul. 2002. Presentation “Analytical and Discrete Optimization Approaches in Optimal Trajectory Generation”
28. *International Conference on Financial Engineering, e-Commerce and Supply Chain, and Strategies of Development*, Athens, Greece, Jun. 2002. Presentation “Portfolio Optimization with Drawdown Constraints”
29. *SFA 2001 Annual Meeting*, Destin, FL, Dec. 2001. Presentation “Portfolio Optimization with Drawdown Constraints”
30. *INFORMS 2001 Annual Meeting*, Miami Beach, FL, Nov. 2001. Presentation “Portfolio Optimization with Drawdown Constraints”
31. *2001 Annual FMA Meeting*, Toronto, Canada, Oct. 2001. Presentation “Portfolio Optimization with Drawdown Constraints”

32. *Annual Research Conference in Financial Risk*, Budapest, Hungary, Jul. 2001. Presentation “Portfolio Optimization with Drawdown Constraints”
33. *The Workshop for Cooperative Control and Optimization*, Gainesville, FL, Dec. 2000. Presentation “Optimal Risk Path Algorithms”
34. *17th International Symposium on Mathematical Programming*, Atlanta, GA, Aug. 2000. Presentation “Portfolio Optimization with Drawdown Constraints”
35. *International Conference on Stochastic Optimization: Algorithms and Applications*, Gainesville, FL, Feb. 2000. Presentation “Portfolio Optimization with Drawdown Constraints”
36. *Columbia Practitioners Conference on the Mathematics of Finance*, Columbia University, New-York, NY, Jan. 2000. Presentation “Portfolio Optimization with Drawdown Constraints”
37. *International Conference “Modern Problems of Mechanics and Mathematics,”* Lviv, Ukraine, May 1999. Presentation “Classical Approach for Solving the Lamé Equation for a Spindle”
38. *GAMM 99 (Gesellschaft für Angewandte Mathematik und Mechanik)*, Metz, France, Apr. 1999. Presentation “Exact Solution of the Displacement Boundary-valued Problem of Elasticity for a Spindle” (Book of Abstracts, Metz, 1999, p. 165)
39. *International Conference “Modern Problems of Mechanics and Mathematics,”* Lviv, Ukraine, May 1998. Presentation “Axially Symmetric Problems of Elasticity”