

AHMET DURAN

University of Michigan-Ann Arbor
Department of Mathematics
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Curriculum Vitae

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APPOINTMENTS

- **Assistant Professor**, Mathematics, University of Michigan 2006 - Present
- **Teaching Assistant/Fellow**, Mathematics, University of Pittsburgh 2000 - 2001, 2003 - 2006
- **Graduate Student Researcher**, Mathematics, University of Pittsburgh (May - Aug.) 2005, 2006
- **Teaching Assistant**, Computer & Information Sciences, University of Delaware (June - Aug.) 2003
- **Research Assistant**, Computer & Information Sciences, University of Delaware 2001 - 2003
- **Researcher/Programmer**, Electronics & Cryptology, TUBITAK (NSF of Turkey) 1997 - 2000
- **Research Assistant**, Mathematics, Middle East Technical University, Turkey 1995 - 1997

EDUCATION

- Ph.D., Mathematics**, University of Pittsburgh, Pittsburgh, PA 2006
Thesis: *Overreaction Behavior and Optimization Techniques in Mathematical Finance*
Thesis Advisor: Professor Gunduz Caginalp
- M.S., Computer and Information Sciences**, University of Delaware, Newark, DE 2003
- M.A., Mathematics**, University of Pittsburgh 2001
- M.S., Mathematics**, Middle East Technical University, Ankara, Turkey 1998
Master's Thesis: *Asymptotic Behavior of Solutions of Semilinear Heat Equations with Source*
Thesis Advisors: Professor Okay Celebi and Prof. Varga Kalantarov
- B.S., Mathematics**, Middle East Technical University 1995

RESEARCH INTERESTS

- Mathematical finance and economics
- Numerical/nonlinear optimization
- Financial optimization
- Financial engineering
- Risk management
- Investments and capital markets
- Behavioral finance
- Financial economics
- Algorithmic trading
- Mathematical modeling
- Stochastic volatility models
- Data analysis and programming
- Inverse problems
- Numerical analysis
- Differential equations (ODE, PDE, SDE)
- Dynamical systems
- Wireless networking algorithms and simulation
- Computer algebra

RESEARCH IN THE NEWS

- Cover story: Mind games, an interview with Professor Caginalp about quantitative behavioral finance, *Wilmott* Sept 2009 (a mainstream quantitative finance magazine), pp. 52-53

PROFESSIONAL ACTIVITIES

1. **Minisymposium organizer**, Advances in financial mathematics, *the World Congress of Nonlinear Analysts (WCNA)* 2008, Orlando, FL, July 2008
2. **Invited session chair**, Finance, *SIAM Conference on Computational Science & Engineering*, Costa Mesa, CA, Feb. 19-23, 2007

3. **Minisymposium organizer**, New horizons in quantitative methods for finance and economics, *SIAM Conference on Financial Mathematics and Engineering*, Boston, MA, July 2006
4. **Referee** for National Science Foundation; *Quantitative Finance*; *Mathematics of Operations Research*; *Optimization Methods and Software*; *Journal of Communications and Networks*; *Ad Hoc Networks*; *IEEE Wireless Communications & Networking Conference*
5. **Book reviewer** for *Pearson Addison-Wesley* in numerical analysis
6. **Book reviewer** for *MIT Press* in quantitative finance
7. **Book reviewer** for *Wiley-Blackwell*

REFEREED PUBLICATIONS

1. Duran, A. and M.J. Bommarito, A profitable trading and risk management strategy despite transaction cost, 27 pages, *Quantitative Finance*, accepted, (2009), DOI: 10.1080/14697680903449815
2. Duran, A., Sensitivity analysis of asset flow differential equations and volatility comparison of two related variables, *Numerical Functional Analysis and Optimization*, **30**, 82-97 (2009), cited by 1 paper
3. Duran, A. and G. Caginalp, Parameter optimization for differential equations in asset price forecasting, *Optimization Methods and Software*, **23**, 551-574 (2008), cited by 2 papers
4. Duran, A. and G. Caginalp, Overreaction diamonds: Precursors and aftershocks for significant price changes, *Quantitative Finance*, **7**, 321-342 (2007), cited by 5 papers including *Quantitative Finance* and *J. of Futures Markets*
5. Duran, A. and G. Caginalp, Data mining for overreaction in financial markets, *Proc. IASTED International Conference on Software Engineering and Applications (SEA)*, Phoenix, AZ, **467**, 28-35 (2005), cited by 3 papers
6. Duran, A. and C. Shen, Mobile ad hoc P2P file sharing, *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, Atlanta, GA, **1**, 114-119 (2004), cited by 16 papers/book chapters
7. Duran, A., B.D. Saunders, and Z. Wan, Hybrid algorithms for rank of sparse matrices, *Proc. SIAM Int. Conference on Applied Linear Algebra (SIAM-LA)*, Williamsburg, VA, 12 pages (2003), cited by 1 paper and 1 thesis

OTHER PUBLICATIONS

8. Duran, A., *Overreaction Behavior and Optimization Techniques in Mathematical Finance*, PhD thesis, University of Pittsburgh, Pittsburgh, PA, Aug. 1st 2006, 128 pages, cited by 3 papers
9. Cheng, L., A. Duran, S.N. Predoiu, and A. Yu, Asset correlation implied by historical default data, working paper, University of Pittsburgh, Dec. 2003, 22 pages
10. Duran, A., B.D. Saunders and Z. Wan, Rank of sparse $\{0, 1\}$ matrices, poster, *East Coast Computer Algebra Day (ECCAD)*, Clemson University, Clemson, SC, Apr. 5, 2003
11. Duran, A., *Asymptotic Behavior of Solutions of Semilinear Heat Equations with Source*, Master's thesis, METU, Ankara, Turkey, Sep. 1998, 101 pages

CONFERENCE PRESENTATIONS

1. Duran, A., Sensitivity analysis to AFDE and transitions between microeconomic stability and non-equilibrium states, *Joint Midwest Numerical Analysis Day & SIAM Great Lakes Numerical PDEs Spring Conference*, Wayne State University, Detroit, MI, April 17-18, 2009
2. Duran, A., Sensitivity analysis of asset flow differential equations and a new volatility approach, *AMS session on Financial Mathematics, Joint Mathematics Meetings*, Washington, DC, January 7, 2009

3. Duran, A. and M.J. Bommarito, A profitable risk management despite transaction cost, *SIAM Conference on Financial Mathematics and Engineering*, New Brunswick, NJ, Nov. 21-22, 2008
4. Duran, A. and G. Caginalp, Parameter optimization algorithm for differential equations in market return prediction, *SIAM Conference on Computational Science & Engineering*, Costa Mesa, CA, Feb. 19-23, 2007
5. Duran, A. and G. Caginalp, Deviation model for financial overreaction, *AMS Special Session on Financial and Actuarial Mathematics*, Cincinnati, OH, October 21-22, 2006
6. Duran, A., Overreaction and optimization in stock markets, *SIAM Conference on Financial Mathematics and Engineering*, Boston, MA, July 9-12, 2006
7. Duran, A. and G. Caginalp, A comparison of numerical optimization techniques for financial markets, *SIAM Annual Meeting*, Boston, MA, July 10-14, 2006
8. Duran, A. and G. Caginalp, Differential equations and computational optimization for closed-end funds, *AMS Joint Mathematics Meetings*, San Antonio, TX, Jan. 12-15, 2006
9. Duran, A and B.D. Saunders, GenBLAS: Basic linear algebra subroutines in C++ over any fields, poster, *East Coast Computer Algebra Day (ECCAD)*, *Association for Computing Machinery (ACM) SIGSAM Bulletin, Communications in Computer Algebra* **36**(3), pp. 6, New York, NY, 2002

INVITED/OTHER TALKS

10. Stability analysis for a high-dimensional dynamical system of stochastic differential equations, *Applied and Interdisciplinary Mathematics Seminar*, University of Michigan, Dept. of Mathematics, April 2, 2010
11. A profitable trading and risk management strategy in presence of transaction cost, Courant Institute of Mathematical Sciences, New York University, March 9, 2010
12. Mathematical modeling in health economics during economic crisis, *Financial/Actuarial Mathematics Seminar*, University of Michigan, Dept. of Mathematics, December 10, 2009
13. A multi-start approach for parameter optimization of asset flow differential equations, *AMS Special Session on Financial Mathematics*, Indiana University, Bloomington, IN, April 5-6, 2008
14. Spectral analysis in mathematical finance: Intelligent walk, *Financial/Actuarial Mathematics Seminar*, University of Michigan, Dept. of Mathematics, March 27, 2008
15. Computational parameter optimization and differential equations in asset price forecasting, *Mathematics Colloquium*, Bogazici University, July 11, 2007
16. Computational parameter optimization and differential equations for stock markets, *Financial/Actuarial Mathematics Seminar*, University of Michigan, Dept. of Mathematics, September 21, 2006
17. Overreaction and computational optimization in stock markets, University of Michigan, Dept. of Mathematics, August 28, 2006

AWARDS & HONORS

- Spring/Summer 2008 Research Fellowship award by the Department of Mathematics at the University of Michigan-Ann Arbor
- B.S. in Mathematics, with rank in class: **2nd** among 159 students
- University of Delaware offered teaching assistantship. Exceptional score, **300 out of 300**, from Instructional Assessment (UDIA) for Teaching Assistants, 2001
- TUBITAK scholarship for high school and undergraduate education, 1987-1995

SOFTWARE DEVELOPMENT

- Overreaction Detector, mathematical finance package (version 1.0, Mar. 2005)
- Gen_SuperLU package (version 1.0, August 2002), referenced as GSLU also, to solve large sparse linear system $A*X=B$ over any fields, http://www.math.pitt.edu/~ahd1/Gen_SuperLU.doc
- GenBLAS package (version 1.0, May 2002), <http://www.math.pitt.edu/~ahd1/GenBLAS.tar.gz>

GRADUATE STUDENT

- Michael Bommarito, master's student in Applied & Interdisciplinary Mathematics and Financial Engineering, GSR of Center for the Study of Complex Systems, doing research project with me.

PROFESSIONAL/RESEARCH EXPERIENCE

Assistant Professor, Department of Mathematics, University of Michigan-Ann Arbor
2006 - Present

- Researched in financial/actuarial mathematics

Graduate Student Researcher, Department of Mathematics, University of Pittsburgh
May 2005 - Aug. 2005

- Performed mathematical finance projects for IFREE and LGT Capital Management

Research Assistant, Department of Computer & Information Sciences, University of Delaware
2001 - 2003

- Designed, implemented, and tested sequential and parallel algorithms in LinBox project
- Implemented GSLU and GenBLAS in C++
- Compared performances of the algorithms running on different computers for random, sparse, dense and patterned matrices

TEACHING EXPERIENCE

Assistant Professor, Department of Mathematics, University of Michigan-Ann Arbor

- Lectured
 - Math 623 Computational Finance, Winter 2010
 - Math 423 Mathematics of Finance, Fall 2006, Winter 2007, Fall 2007, Winter 2008, Fall 2008, Winter 2009, Fall 2009
 - Math 472 Numerical Methods with Financial Applications, Fall 2007, Fall 2008, Fall 2009
 - Math 216 Differential Equations, Spring 2007
 - Fortunes Made and Lost: Financial Mathematics, Michigan Math and Science Scholars, summer program for high school students, Ann Arbor, MI, July 2008

Teaching Assistant/Fellow, Department of Mathematics, University of Pittsburgh

- Lectured
 - Math 0120 Business Calculus, Spring 2006
- Solved problems in classroom as lab/recitation instructor for six undergraduate courses
 - Math 0120 Business Calculus, Spring 2001
 - Math 0100 Prep for Business Calculus, Fall 2000
 - Math 0220 Calculus 1, Spring 2001, Summer 2004, Spring 2005
 - Math 0220 Integrated Calculus, Fall 2005
 - Math 0413 Introduction to Theoretical Mathematics, Summer 2001, Spring 2005
 - Math 0250 Differential Equations & Linear Algebra, Spring 2003, Fall 2003, Spring 2004, Fall 2004
- Graded quizzes and assignments for two graduate courses
 - Math 1540 Advanced Calculus 2, Spring 2004
 - Math 2370 Matrices & Linear Operators, Fall 2005
- Taught Calculus with Maple and Mathematica in Computer Lab
- Employed SMART Board interactive whiteboard while teaching Integrated Calculus

Teaching Assistant, Department of Computer & Information Sciences, University of Delaware

- Graded projects, assignments, and tests for two courses
 - CISC 220 Data Structures, Summer 2003
 - CISC 370 Object-Oriented Programming, Java, and the World Wide Web, Summer 2003

CERTIFICATES

- Java Programming Language, Sun Microsystems, University of Pittsburgh, 2001
- Securing E-Commerce with Digital Certificates, PKI training of VeriSign, Boston, Mar. 2000

COMPUTER & OTHER SKILLS/EXPERIENCE

- Operating Systems: Windows XP, UNIX, and Linux
- Programming Languages: C/C++, Java, Fortran, and Pascal
- Parallel Programming: MPI, cilk, pthreads, CC++ and RPC
- Software Development and Code Optimization: Cray T3E at the Pittsburgh Supercomputing Center
- Computational Products: Maple, Matlab, and Mathematica
- Statistical Software: Statistical Program for Social Sciences (SPSS) and Minitab
- Software for Linear, Integer and Nonlinear Optimization: Lindo and Lingo
- Database Management Systems: MySQL and Oracle
- Scripting Languages: Shell scripts
- Simulation: PARSEC Language and QualNet Simulator
- Artificial Intelligence Programming: Lisp, ML, Prolog, and Leonardo
- Web Design: JavaScript, Macromedia Dreamweaver, and MS FrontPage
- GUI Design: X windows and Java
- Misc.: LATEX, Scientific Work Place, MS Word, Excel, Access & PowerPoint

OTHER CONFERENCES ATTENDED

- Workshop on Financial Engineering for Actuarial Mathematics, University of Michigan-Ann Arbor, MI, May 4-6, 2007
- SIAM-LA, Williamsburg, VA, July 15-19, 2003
- LinBox Workshop, University of Waterloo, Jan. 4-9, 2003
- LinBox Workshop, University of Delaware, 2002
- Parallel Programming Techniques Workshop, Pittsburgh Supercomputing Center, Dec. 4-6, 2000
- International Financial Cryptography Association (IFCA) Financial Cryptography Conference, Anguilla, BWI, Feb. 22-25, 1999

INTERESTS

- Painting
- Planting flowers
- Traveling
- Basketball

MEMBERSHIPS

- Society for Industrial and Applied Mathematics (SIAM)
- American Mathematical Society (AMS)
- The Institute of Electrical and Electronics Engineers (IEEE)