

IOANA DUMITRIU  
CURRICULUM VITAE

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**Personal Data**

Date of birth: July 06, 1976  
Citizenship: Romanian

**Fields of research**

Numerical Analysis, Random Matrix Theory, Algorithmic and Probabilistic Game Theory.

**Education**

June 2003 Massachusetts Institute of Technology  
Ph. D. in Applied Mathematics  
Thesis title: "Eigenvalue Statistics for Beta-ensembles"  
Thesis advisor: Professor Alan Edelman  
May 1999 College of Arts and Science, New York University  
Bachelor of Arts in Mathematics, minor in Computer Science, *Summa Cum Laudae*

**Employment**

09/2006 - present Assistant Professor, University of Washington, Seattle  
09/2003 - 08/2006 Miller Research Fellow  
Miller Institute for Research in Basic Sciences and  
Department of Mathematics, U.C. Berkeley

**Fellowships**

Summer 2002 Clay Mathematics Institute Special Project Fellowship  
2001-2002 IBM Ph. D. Fellowship  
2000-2001 The MIT Provosts' Women/Minority Graduate Fellowship  
1999-2000 Ida Green Fellowship, Massachusetts Institute of Technology  
1995-1999 Samuel F. B. Morse Scholarship, New York University

**Awards**

2007 The 13th **Leslie Fox** Prize in Numerical Analysis  
2005 **Householder Prize** for Best Dissertation in Numerical Algebra between 2002-2004,  
**Honorable Mention**  
1999 The Perley Lenwood Thorne Prize, College of Arts and Sciences, NYU  
1999, 1998 The Mathematics Prize, Senior and Junior class, College of Arts and Sciences, NYU  
1998 The Morris Klein Award, College of Arts and Sciences, NYU  
1997 The Hollis Cooley Prize, Courant Institute of Mathematical Sciences  
1996 **Alice T. Schafer Prize**, Association for Women in Mathematics  
1996 **The Putnam Fellowship**  
1996 **The William Lowell Putnam Prize Scholarship**  
1995, 96, 97 The Elisabeth Lowell Putnam Prize

## Publications and preprints

- (1) "Fast linear algebra is stable", with James Demmel and Olga Holtz (2007), to appear in *Numerische Mathematik*.
- (2) "Distributions of the Extreme Eigenvalues of Beta–Jacobi Random Matrices", with Plamen Koev (2007), to appear in *SIAM J. Matrix Analysis*.
- (3) "Fast matrix multiplication is stable", with James Demmel, Olga Holtz, and Robert Kleinberg, *Numerische Mathematik*, **106**(2), (2007), pp. 199-224.
- (4) "Global spectrum fluctuations for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles via matrix models", with Alan Edelman, *Journal of Mathematical Physics*, **47**, 063302 (2006) (36 pages).
- (5) "MOPs: A Maple Package for Computing Multivariate Orthogonal Polynomials", with Alan Edelman and Gene Shuman, *Journal of Symbolic Computation*, **42**(6), (2007), pp. 587-620.
- (6) "Toward accurate polynomial evaluation in rounded arithmetic", with James Demmel and Olga Holtz, *Foundations of Computational Mathematics: Santander 2005* (L. Pardo et al, eds.), **Cambridge University Press** (2006), pp. 36-105.
- (7) "Toward accurate polynomial evaluation in rounded arithmetic (short version)", with James Demmel, Olga Holtz, and Robert Kleinberg, *Proceedings of the Dagstuhl Seminar "Algebraic and numerical algorithms and computer-assisted proofs"*, (B.Buchberger et al, eds.) (2006)
- (8) "The Two-Batch Liar Game over an Arbitrary Channel", with Joel Spencer, *SIAM Journal on Discrete Mathematics*, **19** (4)(2006), 1056-1064.
- (9) "The Liargame over an Arbitrary Channel", with Joel Spencer, *Combinatorica* **25** (2005), pp. 537-559.
- (10) "Eigenvalues of Hermite and Laguerre ensembles: large beta asymptotics", with Alan Edelman, *Annales de L'Institut Henri Poincaré (B)*, **41** (6) (2005), pp. 1083-1099.
- (11) "Matrix Models for all Beta-Ensembles", with Alan Edelman, *Journal of Mathematical Physics*, **43** (11) (2002), pp. 5830-5847 .
- (12) "A Halfliar's Game", with Joel Spencer, *Theoretical Computer Science, Special Issue on Algorithmic Combinatorial Game Theory*, **313**(3) (2004), pp. 353-369.
- (13) "Branching Processes with Negative Offspring Distribution", with Joel Spencer and Catherine Yan, *Annals of Combinatorics*, **7** (1) (2003), R-43.
- (14) "Path Counting and Random Matrix Theory", with Etienne Rassart, *Electronic Journal of Combinatorics*, **10**(1) (2003), 35-47.
- (15) "On Playing Golf with Two Balls", with Prasad Tetali and Peter Winkler, *SIAM Journal on Discrete Mathematics*, **16**(4) (2003), pp. 604–615.
- (16) "On Generalized Tribonacci Sequences and Additive Partitions", *Discrete Mathematics*, **219** (2000), pp. 65–83.

## Work in Progress

- (1) "Central Limit Theorem for  $C^1$  functions for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles", with Ofer Zeitouni, in preparation.
- (2) "Accurate and Efficient Expression Evaluation and Linear Algebra", with James Demmel, Olga Holtz, and Plamen Koev, in preparation.

**Conference Presentations and Invited Talks**

- July 2007 ICIAM 2007, Zurich  
Talk: "Random matrices and applications: a brief survey"
- June 2007 Oxford University  
Talk: "Toward accurate polynomial evaluation in rounded arithmetic"
- April 2007 University of Oregon, Corvallis  
Colloquium talk: "Classical ensembles of random matrices:  
from the threefold way to a  $\beta$  future"  
Talk: "Tridiagonal matrix models for general  $\beta$  ensembles"
- April 2007 AMS Sectional Meeting, U of Arizona, Tucson  
Invited Talk: "Beta ensembles: from old results (semicircle laws)  
to new (stochastic operators)"
- March 2007 Applied Math Colloquium, University of Washington  
Talk: "Fast Matrix Multiplication is Stable"
- March 2007 MathDay 2007, U of Washington  
Talk: "How to catch a liar: from games to coding theory"
- February 2007 CombinaTexas:Combinatorics in the South-Central U.S., Texas A.&M.  
Plenary Talk: "Error-correcting codes with feedback, or  
How to beat a (constrained) liar"
- November 2006 Combinatorics Seminar, U of Washington  
Talk: "The Moment Method for Random Matrices"
- September 2006 SAMSI Program on High Dimensional Inference and Random Matrices  
Opening Workshop  
Talk: "Beta ensembles: a brief survey"
- July 2006 Stochastic Eigenanalysis (SEA) 2006, MIT  
Talk: "Global fluctuations for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles"
- June 2006 SIAM Conference on Discrete Mathematics, Victoria, CA  
Talk: "Liar games with a fixed number of constrained lies"
- May 2006 Abel Symposium 2006, Alesund, Norway  
Talk: "Toward accurate polynomial evaluation" and  
"Recent developments in fast matrix multiplication"
- May 2006 Integrable Systems, Random Matrices, and Applications: Conference  
in honor of Percy Deift's 60th birthday, NYU  
Talk: "Concentration results for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles"
- February 2006 Special Applied Mathematics Seminar, Caltech  
Talk: "Classical Ensembles of Random Matrices: Gaussian, Wishart,  
MANOVA, from the threefold way to a continuous  $\beta$  future"
- February 2006 Applied Mathematics Colloquium, MIT  
Talk: "Classical Ensembles of Random Matrices: Gaussian, Wishart,  
MANOVA, from the threefold way to a continuous  $\beta$  future"
- February 2006 Applied Mathematics Seminar, U.C. Berkeley  
Talk: "Classical Ensembles of Random Matrices: Gaussian, Wishart,  
MANOVA, from the threefold way to a continuous  $\beta$  future"
- February 2006 Probability/Statistics Seminar, Brown University  
Talk: "Classical Ensembles of Random Matrices: Gaussian, Wishart,  
MANOVA, from the threefold way to a continuous  $\beta$  future"

- February 2006 Computer Science Colloquium, Cornell University  
Talk: "Toward accurate polynomial evaluation rounded arithmetic"
- January 2006 Special Mathematics Colloquium, U.C. Irvine  
Talk: "Classical Ensembles of Random Matrices: Gaussian, Wishart, MANOVA, from the threefold way to a continuous  $\beta$  future"
- January 2006 Applied Math Seminar, University of Washington  
Talk: "The Gaussian (Hermite), Wishart (Laguerre), and Jacobi (MANOVA) ensembles of random matrix theory"
- December 2005 Applied Mathematics Seminar, University of Minnesota  
Talk: "The Gaussian (Hermite), Wishart (Laguerre), and Jacobi (MANOVA) ensembles of random matrix theory"
- July 2005 Foundations of Computational Mathematics '05, Santander, Spain  
Invited Talk: "A  $\beta$  future for the classical ensembles of random matrices"
- May 2005 Householder XVI Symposium, Seven Springs, Pennsylvania;  
Invited Talk: "Tridiagonal matrices: from linear algebra structures to random matrix tools"
- April 2005 "Erdős Magic for Algorithms and Games" Meeting, Bertinoro, Italy;  
Talk: "Liar Games over an Arbitrary Channel"
- March 2005 Applied Math Colloquium, MIT;  
Talk: "Towards Accurate Polynomial Evaluation"
- January 2005 Matrix Computations and Scientific Computing Seminar, U.C. Berkeley;  
Talk: "Tridiagonal matrices: a new perspective on the old  $\beta$ -ensembles of Random Matrix Theory"
- November 2004 Applied Mathematics Colloquium, U.C. Berkeley;  
Talk: "Tridiagonal random matrices: a new perspective on the old  $\beta$ -ensembles of Random Matrix Theory"
- November 2004 Joint Special Analysis Seminar / Probability and Mathematical Physics Seminar, Courant Institute (NYU);  
Talk: "Tridiagonal random matrices: a new perspective on the old  $\beta$ -ensembles of Random Matrix Theory"
- November 2004 Probability Seminar, U.C. Berkeley;  
Talk: "On playing golf with two balls: a new presentation of an old result"
- October 2004 Analysis Seminar, Stanford U.;  
Talk: "Tridiagonal random matrices: a new perspective on the old  $\beta$ -ensembles of Random Matrix Theory"
- August 2004 Mini-course on Random Matrix Theory, MATHFEST 2004, Providence;  
Invited talk: "MOPS: Multivariate Orthogonal Polynomials (symbolically)"
- July 2004 6th World Congress of the Bernoulli Society, Barcelona;  
Invited talk: "MOPS: A Maple Library for computing Multivariate Orthogonal Polynomials (symbolically)"
- February 2004 Probability Seminar, U.C. Berkeley;  
Talk: "Central Limit Theorems at  $\beta$  large for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles of Random Matrix Theory"
- February 2004 Scientific Computing/Computational Mathematics Seminar, Stanford U.;  
Talk: "Stochastic Linear Algebra, Tridiagonal Random Matrices, and Asymptotical Analysis of Eigenvalues"
- January 2004 Joint Applied Mathematics and Probability Seminar, Stanford U.;  
Talk: "Global spectrum fluctuations for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles"

- December 2003 Analysis and Mathematical Physics Seminar, UC Davis;  
Talk: "Central Limit Theorems for the  $\beta$ -Hermite and  $\beta$ -Laguerre ensembles of arbitrary  $\beta$ "
- November 2003 Random Matrix Theory and Statistical Mechanics Seminar, UC Davis;  
Talk: "Numerical Linear Algebra Methods in Random Matrix Theory"
- October 2003 Mathematical Physics Seminar, Caltech;  
Talk: "Global spectrum fluctuations of large beta-Hermite (Gaussian) and beta-Laguerre ensembles".
- October 2003 Matrix Computations and Scientific Computing Seminar, U.C. Berkeley;  
Talks: "Introduction to Random Matrices"  
"Linear Algebra and Random Matrices"
- February 2003 Mathematics Department Colloquium, U.C. Berkeley;  
Talk: "Numerical Linear Algebra Methods in Random Matrix Theory".
- Oct 2002 Combinatorics Seminar, Massachusetts Institute of Technology;  
Talk: "Jack Polynomials and Multivariate Orthogonal Polynomials: theory, applications, and computations".
- Aug 2002 Foundations of Computational Mathematics,  
FoCM'02, Institute for Mathematics and its Applications;  
Talk: "MOPs: a Maple Package for Computing Multivariate Orthogonal Polynomials (symbolically)".
- June 2002 Householder XV Symposium, Peebles, Scotland;  
Talk: "Applying Numerical Algorithms Stochastically."
- June 2002 Random Matrix Theory and Combinatorics Conference,  
Courant Institute of Mathematical Sciences;  
Talk: "Matrix Models for  $\beta$  Ensembles and Applications".
- Feb 2002 Seminar on Algorithmic Combinatorial Game Theory  
IFBI Schloss Dagstuhl, Germany;  
Talk: "A Halfliar's Game".
- Nov 2001 Numerical Analysis Seminar, Courant Institute for Mathematical Sciences;  
Talk: "Random Tridiagonal Matrices as Models for All  $\beta$ -Ensembles".
- Aug 2001 Workshop on spectral statistics and high-energy eigenstates,  
Le Centre de Recherches Mathématiques, Montreal;  
Talk: "Beyond the 3-fold way: Random Matrix Models for all beta-ensembles".
- Aug 2001 Random Matrix Day, Massachusetts Institute of Technology;  
Talk: "Beyond the 3-fold Way".

### Teaching Experience

- Spring 2007 Math 583B (Combinatorial Methods in Random Matrix Theory)
- Winter 2007 Math 124B,C (Calculus with Analytic Geometry I)
- Fall 2003 Co-taught (with W. Kahan) an undergraduate Honors Problem Seminar (in preparation for the Putnam Math Contest) at UC Berkeley
- Fall 2001 Taught a recitation session for 18.03 (Ordinary Differential Equations) at MIT;
- Fall 2000 Taught a recitation session for 18.06 (Linear Algebra) at MIT;
- 1996-1999 Departmental Tutor for Calculus I, II, and III, Linear Algebra, and Discrete Mathematics at Courant Institute.

**Conference/Workshop Organizer**

- October 2007 *Pacific Northwest Numerical Analysis Seminar*, Seattle  
Co-organizer (with R. LeVeque)
- July 2007 *ICIAM 2007*, Zurich, Switzerland  
Co-organized minisymposium on Random Matrix theory (with A. Edelman)
- June 2006 *SIAM Discrete Math 2006*, Victoria, Canada  
Co-organized minisymposium on Liar Games and Coding Theory (with J. Spencer)
- June-July 2005 *FOCM 2005*, Santander, Spain  
Co-organized workshop on Random Matrices (with A. Edelman and R. Rao)

**Other Experiences**

- Fall 2004 Co-organized (with N. Reshetikhin) a Student Seminar on  
Random Matrices and Asymptotical Combinatorics;
- 05/2001-11/2002 Supervised and worked with an undergraduate student  
on a Maple package for Multivariate Orthogonal Polynomials (MOPs)
- Summers '99, '00 Bell Labs, Lucent Technologies  
Summer Research Intern in the Fundamental Mathematics Department
- 1997 Participated in the Research Experience for Undergraduates Program  
at University of Minnesota, Duluth

**Memberships**

Phi Beta Kappa, SIAM, AMS, MAA, AWM

**Other academic functions**

Reviewer for *FOCM*, *LAA*, *SIMAX*, *Probability Theory and Related Fields*, *Integers: EJCNT*,  
*American Journal of Mathematics*, *Advances in Applied Mathematics*, *Theoretical Computer Science*,  
*Discrete Applied Mathematics*, *J. Combinatorial Theory A*.

**References**

Prof. James Demmel, U.C. Berkeley, demmel@cs.berkeley.edu  
Prof. Alan Edelman, MIT, edelman@math.mit.edu  
Prof. Joel Spencer, Courant Institute, spencer@cs.nyu.edu  
Prof. Craig Tracy, U.C. Davis, tracy@math.ucdavis.edu  
Prof. Alexander Soshnikov, U.C. Davis, soshniko@math.ucdavis.edu  
Prof. Alexei Borodin, Caltech, borodin@its.caltech.edu