Alex V. Kontorovich — CURRICULUM VITAE

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Born: September 22nd, 1980

Education

Ph.D. in Mathematics, **Columbia University**, New York, NY, 2007.
Advisors: Dorian Goldfeld and Peter Sarnak.
Thesis: *The Hyperbolic Lattice Point Count in Infinite Volume with Applications to Sieves.*
- M.Phil. in Mathematics, 2004.
- M.A. in Mathematics, 2003.

B.A. in Mathematics, Magna Cum Laude, **Princeton University**, Princeton, NJ, 2002.
Advisor: Yakov Sinai. Senior Thesis: *Structure Theorem for the Generalized* $3x+1$ *Problem.*
- Minors in Applied Math, Jazz and Classical Saxophone Performance.

Positions Held

Tamarkin Assistant Professor and NSF Postdoctoral Fellow, Department of Mathematics, **Brown University** 2007-2010.

Research Fellow with S. J. Miller, Vertically Integrated Summer Program in Computational Number Theory, **The Ohio State University**, summer 2004.
- Helped design research program for guided undergraduate/graduate research and actively participated in research projects. Lectured on subjects ranging from stochastic processes to analytic number theory.

Research Fellow, with J. F. Nash, Jr., **Princeton University**, Dept of Mathematics, 2001-2002.
- Developed fast numerical solver to calculate solutions of a new class of cooperative games.

Research Fellow with A. S. Fraenkel, Dept of Mathematics, **Weizmann Institute of Sciences**, Israel, 2000-2002.
- Developed combinatorial games on directed graphs; proved a geometric and combinatorial connection between Nim Sums and binomial coefficients.

Research Fellow, with N. Chriss and J. Goodman, **Courant Institute for Mathematical Sciences**, NYU, 1999-2000.
- Implemented non-linear simplex search for proprietary equity trading; used maximum likelihood model to forecast equity values.

Teaching Experience

Multivariable Calculus and *Linear Algebra*, Brown University, Fall 2007 and Spring 2008.

Instructor, *Undergraduate Seminar*, "Proofs from THE BOOK", Columbia University, Fall 2005.

Instructor, *Calculus I* and *II*, Columbia University, Summer, Fall and Spring 2004.

Undergraduate Research Program Supervisor, with D. Glass, Columbia University, Summer 2004.
- Lectured on elliptic curves, modular forms, Taniyama-Shimura and the Birch and Swinnerton-Dyer conjectures; Helped guide undergraduate student research.

Teaching Assistant in *Lie Groups and Representations, Multivariable Calculus, Arithmetic Number Theory, Making and Breaking Codes* and *Real Analysis*, Columbia University, 2003-2007.

PUBLICATIONS

"The Hyperbolic Lattice Point Count in Infinite Volume with Applications to Sieves", preprint.

"The Prime Number Theorem on the Nose", preprint.

With Aviezri S. Fraenkel. "The Sierpinski Sieve of Nim-varieties and Binomial Coefficients" in *Combinatorial Number Theory*, Proc. Integers Conference 2005, B. Landman, M. Nathanson, J. Nesetril, R. Nowakowski, C. Pomerance, eds., de Gruyter, pp. 209-227, 2007.

With Melvyn B. Nathanson. "Quadratic Addition Rules for Quantum Integers," *Journal of Number Theory*, Vol 117, Issue 1, March 2006, pp. 1-13.

With Steven J. Miller. "Benford's Law, Values of L-functions and the $3x+1$ Problem," *Acta Arithmetica* 120 (2005), 269-297.

With Yakov G. Sinai. "Structure Theorem for (d, g, h)-Maps," *Bulletin of the Brazilian Mathematical Society*, New Series 33(2), 2002, pp. 213-224.

CONFERENCES

L-functions and Automorphic Forms, in honor of Dorian Goldfeld's 60^{th} birthday, **Columbia University**, May 2007.

Stanford Workshop on Multiple Dirichlet Series, **Stanford University**, July 2006.

CRM-Clay School/Workshop on Additive Combinatorics, **University of Montreal**, April 2006.

Lie Groups, Representations and Discrete Mathematics, **Institute for Advanced Study**, February 2006.

Gaps Between Primes, **American Institute of Mathematics**, November-December 2005.

Gauss - Dirichlet Conference, **University of Gottingen**, Germany, June 2005.

Recent Perspectives in Random Matrix Theory and Number Theory, **Newton Institute**, Cambridge, UK, April 2004. Funded by AIM Fellowship.

SELECTED TALKS

The Affine Linear Sieve on the Cone, Invited Lectures at **NYU AMS Meeting**, March 2008, **U Mass Amherst** Number Theory Seminar, March 2008, **MIT** Number Theory Seminar, May 2008.

The Hyperbolic Lattice Point Count in Infinite Volume with Applications to Sieves, Invited Lectures at **University of Toronto** Number Theory/Representation Theory Seminar, February 2007, **Brown University** Group Actions Seminar, September 2007 and Algebraic Geometry Seminar, December 2007, **IAS** Mini-Conference on Arithmetic Combinatorics, December 2007.

The Prime Number Theorem on the Nose, **New York Number Theory Seminar**, November 2005 and **Princeton University** Graduate Student Seminar, December 2005.

Benford's Law for the $3x+1$*-Problem and values of L-functions*, **Combinatorial and Additive Number Theory Conference**, May 2005.

Pseudorandom measures and the primes, **New York Number Theory Seminar**, March 2005.

On Tao's proof of Szemeredi's Theorem, **New York Number Theory Seminar**, November 2004.

TALKS CONT'D

Poisson Summation and Benford's Law: Applications from the 3x+1 Problem to L-functions, Invited Colloquium at the **Institute for Defense Analysis: Center for Communications Research**, Princeton, NJ, October 2004.

The Riemann Hypothesis for a Diffusion Analogue of the Sieve of Eratosthenes, Probability Seminar, **Columbia University**, April 2004.

Brownian Excursions and the Riemann Zeta Function, Probability Seminar, **Columbia University**, February 2004.

Brownian Motion of the 3x+1 Problem, **Hawaii International Conference on Statistics**, Honolulu, HI, June 2003.

FELLOWSHIPS AND AWARDS

NSF Postdoctoral Fellow, 2008-2010.

Boyer Memorial Fellowship, Columbia University Mathematics Department, 2004.

AIM Fellowship to attend Random Matrix Theory and Number Theory conference, 2004.

SERVICE

Organized Junior Colloquium, introducing Columbia faculty to 1st and 2nd year graduate students, 2004-2005.

- Speakers included: **Herve Jacquet, Dorian Goldfeld, Shou-Wu Zhang, Eric Urban, John Morgan, Ioannis Karatzas, Duong Phong, Michael Thaddeus, Patrick Gallagher, Peter Ozsvath, Joan Birman,** and **Dave Bayer**.

Referee services for *Journal of the American Math Society* and *Journal of Integer Sequences*.

Lectured at Graduate Student Seminar (Columbia University), Graduate Seminar (Princeton University), Undergraduate Math Society (Columbia University), Undergraduate Math Club (Princeton University) and Math Club (Phillips Exeter Academy – high school) on topics such as "On the Effective Solution to Gauss's Class Number Problem", "Weird and Wonderful Chemistry of Modular Audioactive Decay", and "Geometry of Modular Nim-Sums Through Binomial Coefficients".

Advised high school student in a project for the Intel Science Competition, summer 2006.

OTHER

Languages: Russian, Hebrew.

Computer Skills: Windows, Unix, Mac, LaTeX, Mathematica, MatLab, C, html.

Member, Graduate Board of Trustees, Princeton Tower Club, 2002-present.

- The club has approximately 180 members and a $1.2 million annual operating budget.

Professional jazz, classical, klezmer, ska, and reggae musician (clarinet and saxophone).

- Faculty in Performance, Theory and Composition, and Repertoire at music festivals in New York, Montreal, Weimar, Furth, and Ukraine.

3rd Dan Black Belt, United States International All Styles Martial Arts Association

- Founder, Instructor, Soft Tiger Kung Fu School, Princeton University, 2000-2002.
- Founder, Instructor, Shaolin Kung Fu School, Columbia University, 2004-2007.