

10.8.2011

Curriculum Vitae – Emanuel Milman

Date and place of birth: January 12, 1977, Israel.

Marital Status: Married + 2.

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Academic Degrees:

2007 - Ph.D., Pure Mathematics, The Weizmann Institute of Science.

Supervisor: Prof. Gideon Schechtman.

Thesis: *On the Distribution of Volume in Convex Bodies*.

2000 - M.Sc. Summa Cum Laude (GPA 99), Pure Mathematics, Tel-Aviv University.

Supervisor: Prof. Ehud Lehrer.

Thesis: *Uniform Properties of Stochastic Games and Approachability*.

1996 - B.Sc. Summa Cum Laude (GPA 98), Mathematics and Computer Science, Tel-Aviv University.

Academic Appointments:

2009-Present – Senior Lecturer, Department of Mathematics, Technion - I.I.T., Haifa.

2010 – Post-Doctoral Fellow, Fields Institute, Toronto.

2009 - 2010 – Post-Doctoral Fellow, Department of Mathematics, University of Toronto.

2007 - 2009 – Post-Doctoral Member, School of Mathematics, Institute for Advanced Study, Princeton.

2008 – Researcher, Technion - I.I.T, Haifa.

Professional Experience:

2003-2007 – ioIMAGE (20% employment): Head of Special Projects.

Invented and analyzed algorithms used by Intelligent Video Appliances.

2001-2003 – ioIMAGE: Head of Algorithms Team.

Created company's Video Threat Detection Core-Technology. Invented and implemented numerous image-processing, statistical-analysis and learning algorithms.

1995-2000 – Military Service: Senior Academic Officer in the Intelligence Corp.

Research Interests:

Isoperimetric, functional and concentration inequalities on Riemannian manifolds with density, Bakry-Émery Curvature-Dimension Condition and its consequences, Generalized Ricci Curvature and Ricci Flow, Wasserstein space, optimal transport and the Monge-Ampère equation, Asymptotic Convex and Geometric Analysis, distribution of volume in convex bodies, metric entropy and covering numbers, empirical processes, general phenomena in high dimensions, convexity in Statistical Physics, geometry of isoperimetric minimizing surfaces, Geometric Measure Theory, diffusion semi-group and heat-kernel estimates in convex manifolds, convexity of solutions to elliptic and parabolic PDE, classical Convex Geometry, “local theory” of Banach Spaces, convexity in graphs, Sobolev spaces.

Teaching Experience:

- 2009-2010 – University of Toronto: 1st year *Calculus* course (parts I & II) for science majors.
2010 – Fields Institute: Graduate course on “*Isoperimetric Inequalities with applications to Asymptotic Geometric Analysis*” – organizer and lecturer.
2010-2011 –
Technion – 2nd year *Probability* course.
Paris-Est – short-course on “*Isoperimetric Inequalities: Methods and Applications*”.
SMS, Montreal – mini-course on “*Isoperimetric and Concentration Inequalities*”.

Professional Activities:

- 2009 – Co-organizer of international conference on “*Concentration, Functional Inequalities, and Isoperimetry*” in Florida, including a Special Session of the AMS 2009 Fall Southeastern Meeting with same title.
2010-11 – Co-editor of volume 545 of the AMS’s *Contemporary Mathematics* journal, dedicated to the proceedings of the above conference.
2011-12 – Co-organizer of conference on “Interactions between Mathematical Physics and Asymptotic Geometric Analysis”, Technion and Eilat.
2005-2011 – Selected Refereeing: *Advances In Mathematics*, *Annales de l'institut Henri Poincaré (B)*, *Annals of Probability*, *Compositio Mathematica*, *Geometric and Functional Analysis (GAFA)*, *Israel Journal of Mathematics*, *Journal of Differential Geometry*, *Journal of the EMS*, *Journal of Functional Analysis*, *Mathematische Annalen*, *Probability Theory and Related Fields*, *Studia Mathematica*, *Transactions of the AMS*.

Awards:

- 2010-2012 – Landau Fellowship of the Taub Foundation.
2010-2013 – Allon Fellowship.
2007 – Fulbright Post-Doctoral Scholar Award (declined).
2007 – The Gad Resheff Memorial Prize.
2007 – The Dr. Otto Schwarz Graduate Scholarship Fund Award.

During Military Service:

- Served as “IDF Outstanding Student”.
Commendation for part in the Israel National Security Award.

During Studies:

- Dean and Rector's lists at Tel-Aviv University and the Weizmann Institute.
Undergraduate 4-year Scholarship under “Program for Distinguished Students”.
Shie Bleiman Award for High-School's final project in technology.

Grants:

- 2010-2013 – Israel Science Foundation: “Generic Chaining in Asymptotic Geometric Analysis” (joint with Shahar Mendelson), ~238,000 USD.
2011 – German-Israeli Foundation’s Young Scientist Program: “Isoperimetric Inequalities via Contracting Maps”, 33,500 Euros.
2011-2014 – Bi-national Science Foundation: “The Hierarchy of Mass Concentration on Convex Bodies” (joint with Grigoris Paouris), 76,000 USD.

Publications¹:

¹ Electronic copies available at tx.technion.ac.il/~emilman. All authors ordered alphabetically.

Refereed Journal Papers (published):

1. E. Milman, “The semi-algebraic theory of stochastic games”, *Math. Oper. Res.* 27, 401-418, 2002.
2. E. Milman, “Approachable sets of vector payoffs in stochastic games”, *Games and Economic Behavior* 56, 135-147, 2006.
3. E. Milman, “Dual mixed volumes and the Slicing Problem”, *Adv. Math.* 207 (2), 566-598, 2006.
4. E. Milman, “Generalized Intersection Bodies”, *J. Func. Anal.* 240 (2), 530-567, 2006.
5. E. Milman, “A comment on the low-dimensional Busemann-Petty problem”, Lecture Notes in Math. 1910, *GAFSA Seminar Notes 2004-5*, 245-253, 2007.
6. E. Milman, “A remark on two duality relations”, *Integral Equations and Operator Theory* 57 (2), 217-228, 2007.
7. B. Klartag and E. Milman, “On volume distribution in 2-convex bodies”, *Israel J. Math.* 164, 221-249, 2008.
8. E. Milman and S. Sodin, “An isoperimetric inequality for uniformly log-concave measures and uniformly convex bodies”, *J. Func. Anal.* 254 (5), 1235-1268, 2008.
9. E. Milman, “Generalized Intersection Bodies are not equivalent”, *Adv. Math.* 217 (6), 2822-2840, 2008.
10. E. Milman, “Uniform tail-decay of Lipschitz functions implies a linear isoperimetric inequality under convexity assumptions”, *C. R. Math. Acad. Sci. Paris* 346, 989-994, 2008.
11. E. Milman, “On Gaussian marginals of uniformly convex bodies”, *J. Theor. Probab.* 22 (1), 256-278, 2009.
12. E. Milman, “On the role of convexity in isoperimetry, spectral-gap and concentration”, *Invent. Math.* 177 (1), 1-43, 2009.
13. E. Milman, “On the role of convexity in functional and isoperimetric inequalities”, *Proc. London Math. Soc.* 99 (3), 32-66, 2009.
14. E. Milman, “Concentration and isoperimetry are equivalent assuming curvature lower bound”, *C. R. Math. Acad. Sci. Paris* 347, 73-76, 2009.
15. E. Milman, “Isoperimetric and concentration inequalities - equivalence under curvature lower bound”, *Duke Math. J.* 154 (2), 207-239, 2010.
16. E. Milman, “Isoperimetric bounds on convex manifolds”, Concentration, Functional Inequalities and Isoperimetry, *Contemporary Mathematics* 545, Amer. Math. Soc., 195-208, 2011.

Refereed Journal Papers (accepted):

17. E. Milman, “Properties of isoperimetric, functional and transport-entropy inequalities via concentration”, 29 pages, to appear in *Prob. Theor. Rel. Fields*.
18. Y.-H. Kim and E. Milman, “A generalization of Caffarelli’s contraction theorem via (reverse) heat flow”, 36 pages, to appear in *Math. Annalen*.
19. O. Guédon and E. Milman, “Interpolating thin-shell and sharp large-deviation estimates for isotropic log-concave measures”, 29 pages, to appear in *Geom. Funct. Anal. (GAFSA)*.

Refereed Journal Papers (submitted):

20. B. Klartag and E. Milman, “Centroid Bodies and the logarithmic Laplace Transform – a Unified Approach”, 23 pages, submitted.
21. B. Klartag and E. Milman, “Inner Regularization of Log-Concave Measures and Small-Ball Estimates”, 12 pages, submitted.
22. E. Milman, “Sharp Isoperimetric Inequalities and Model Spaces for Curvature-Dimension-Diameter Condition”, 36 pages, submitted.

In Collection:

23. E. Milman, "A converse to the Maz'ya inequality for capacities under curvature lower Bound", Springer's International Mathematical Series Vol. 11, *Around the Research of Vladimir Maz'ya I*. Function Spaces, 321-348, 2010.

Talks:

Plenary and Invited Talks in Conferences:

- Jul 2011, Mini-Course in Séminaire de Mathématiques Supérieures 2011 on "Metric Measure Spaces: Geometric and Analytic Aspects", Montreal.
- Apr 2011, Conference on "Asymptotic Geometric Analysis and Convexity", Israel.
- Jan 2011, Plenary Talk / Short Course in workshop on "Functional Inequalities and Discrete Spaces", Université Paris-Est.
- Nov 2010, Workshop on "Optimal Transport and Geometric Probability", Fields Institute.
- Sep 2010, Plenary Talk, Workshop on "Asymptotic Geometric Analysis", Fields Institute.
- Sep 2010, SAGE Workshop on "Optimal Transport and Riemannian Geometry", UT Austin.
- Aug 2010, ICM Satellite Conference on "Probability and Stochastic Processes", Bangalore (did not attend due to personal reasons).
- Aug 2010, Plenary Talk, Conference on "Perspectives in High Dimensions", CWRU, Cleveland.
- Jul 2010, Conference on "Asymptotic Geometric Analysis", EIMI, St. Petersburg.
- Mar 2010, Workshop on "Volume Inequalities", Banff.
- Jun 2009, Conference on "State of Geometry and Functional Analysis", Tel-Aviv University.
- Jun 2008, Fourth annual conference on "Phenomena in High Dimensions", Sevilla.
- May 2008, Fifth Conference on "Probability in High Dimensions", CIRM, Luminy.
- Mar 2008, Plenary Talk, Conference on "Asymptotic Convex Geometry", University of Missouri.
- Nov 2007, Workshop on "Algorithmic Convex Geometry", AIM, Palo-Alto.
- Sep 2007, Workshop on "Geometrization of Probability", Fields Institute, Ottawa.
- Aug 2007, Workshop on "Fourier Analytic Methods in Convex Geometry", AIM, Palo-Alto.
- Jun 2007, Third annual conference on "Phenomena in High Dimensions", Samos.
- Jun 2007, Workshop on "Convex Geometry - Analytic aspects", Cortona.
- May 2007, Israel Mathematical Union annual meeting, Ben-Gurion University.
- Sep 2006, Workshop on "Convexity and Probability", Freudenstadt.
- Jun 2006, Second annual conference on "Phenomena in High Dimensions", IHP, Paris.
- Jul 2005, First annual conference on "Phenomena in High Dimensions", TU Vienna.

Future Invited Talks:

- Aug 2011, Plenary Talk, "Introductory workshop on quantitative geometry", MSRI (most probably will have to cancel due to personal reasons).
- Jan 2012, Plenary Talk, "Concentration inequalities and their applications", CIRM, Luminy.

Other:

Many further invitations to give seminars and colloquia both in Israel and abroad, including at the Institute for Advanced Study, Isaac Newton Institute, NYU, MIT and Max-Planck-Institut für Gravitationsphysik (Albert-Einstein-Institut).