

CURRICULUM VITAE

John A. Toth

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Citizenship: Canadian

Education: BSc(Hon), McMaster 1988
MSc(Hon), McMaster 1989
PhD, Massachusetts Institute of Technology 1993

Academic Honours: Editor of International Mathematics Research Papers (IMRP) 2005-2008
Editor of International Mathematics Research Notices (IMRN) 2004-2008
Reviewer for the Senior Killam Fellowship, Canada Council 2004
Board of Governors of the Canadian Mathematical Society 2004-
Member of the Mathematical Sciences Research Institute,
U.C. Berkeley 2002
William Dawson Scholar, McGill University 2001-
Alfred P. Sloan Foundation Research Fellow 2000-2004
Member of the Centre de Recherche Mathematiques (CRM) 2000-
Recipient of the André Aisenstadt Prize in Mathematics, CRM 1998
Member of the Fields Institute of Mathematical Sciences,
University of Toronto 1997
Recipient of the Milton Prize in Science, Harvard University 1994
Reviewer for the Senior Killam Fellowship, Canada Council 1994
Benjamin Pierce Assistant Professor, Harvard University 1993-95

	NSERC Postdoctoral Fellow	1993-95
	Norman Levinson Graduate Fellow, M.I.T.	1990.
Appointments:	Professor, McGill University	2007-
	Associate Professor, McGill University	2001-2007
	Assistant Professor, McGill University	1995-2001
	Benjamin Pierce Assistant Professor, Harvard University	1993-1995.
Affiliations:	American Mathematical Society	1991-
	Canadian Mathematical Society	2000-
Grants:	Principal Investigator: John A. Toth	2005-10
	Co-Investigators: none	
	Title: Spectral asymptotics for quantum integrable systems	
	Agency: National Science and Engineering Research Council	
	Amount: \$165,000 (\$33,000/yr.)	
	Principal Investigator: John A. Toth	2000-04
	Co-Investigators: none	
	Title: Spectral asymptotics	
	Agency: National Science and Engineering Research Council	
	Amount: \$120,000 (\$30,000/yr.)	
	Principal Investigator: John A. Toth (responsible)	2006-09
	Co-Investigators: D. Jakobson, I. Polterovich and A. Schnirelman	
	Title: Spectral Asymptotics (analysis team grant)	
	Agency: Fonds Quebecois de la Recherche sur la Nature et les Technologies	
	Amount: \$180,000	
	Principal Investigator: D. Jakobson (responsible)	2002-05
	Co-Investigators: G. Dafni, V. Jaksic, I. Klemes, J. Toth	
	Title: Harmonic Analysis and Spectral Theory (analysis team grant)	
	Agency: Fonds Quebecois de la Recherche sur la Nature et les Technologies	
	Amount: \$148,000	
	Principal Investigator: John A. Toth	2000-04
	Co-Investigators: none	
	Title: High Energy Eigenfunctions	

Agency: Alfred P. Sloan Foundation

Amount: \$40,000(U.S.)

Principal Investigator: John A. Toth 1995-99

Co-Investigators: none

Title: Eigenvalues and Eigenfunctions

Agency: National Science and Engineering Research Council

Amount: \$60,000 (\$15,000/yr.)

Principal Investigator: John A. Toth 1993-95

Co-Investigators: none

Title: Semiclassical Limits of Eigenfunctions

Agency: National Science Foundation

Amount: \$56,800(U.S.)

Principal Investigator: John A. Toth 1993-95

Co-Investigators: none

Title: NSERC Postdoctoral Fellowship

Agency: National Science and Engineering Research Council

Amount: \$40,000 (20,000/yr.)

Refereed Publications:

- Christopher D. Sogge, John A. Toth and Steve Zelditch. About the blowup of quasimodes on Riemannian manifolds. *Journal of Geometric Analysis*, 2010 (to appear), 20 pages. (arXiv:0908.0688v1)
- John A. Toth and Igor Wigman. Counting nodal lines of random waves on planar domains. *International Mathematics Research Notices (IMRN)* 18, 2009, 3337-3365. doi:10.1093/imrn/rnp052 (arXiv:0810.1276).
- John A. Toth. L^2 -restriction bounds for eigenfunctions along curves in the quantum completely integrable case. *Communications in Mathematical Physics* 288, 2009, 379-401 (arXiv:0803.0978).
- John A. Toth, Steve Zelditch. Counting nodal lines which touch the boundary of an analytic domain. *Journal of Differential Geometry* 81, 2009, 649-686 (arXiv:0710.010).
- John A. Toth, Dmitry Jakobson and Iosif Polterovich. A Lower Bound for the Remainder in Weyl's Law on Negatively Curved Surfaces. *Inter-*

national Mathematics Research Notices, Vol. 2007, Article ID rnm142, 38 pages. doi:10.1093/imrn/rnm1421 (arXiv:math/0612250).

- John A. Toth. Eigenfunctions of quantum integrable systems. *Encyclopedia of Mathematical Physics (Vol. 2)*, Kluwer, 2006, 1563–1583.
- John A. Toth and Yiannis Petridis. Lattice counting for deformations of convex domains. *Journal of Differential Geometry* 72(2), 2006, 339–352.
- John A. Toth and Mahta Khosravi. Cramer’s formula for Heisenberg manifolds. *Annales de l’Institut Fourier* 55(7), 2005, 1–32.
- John A. Toth, Derrick Chung and Yiannis Petridis. The remainder in Weyl’s law for Heisenberg manifolds II. Proceedings of the Session in Analytic Number Theory and Diophantine Equations, *Bonner Mathematische Schriften* 360, 2003, 1–16.
- John A. Toth, Dmitry Jakobson and Maung Min-Oo. A law of large numbers for the zeroes of Heine-Stieltjes polynomials. *Letters in Mathematical Physics* 64(2), 2003, 105–118.
- John A. Toth. A small-scale density of states formula. *Communications in Mathematical Physics* 238(1-2), 2003, 225–256.
- John A. Toth and Steve Zelditch. L^p norms of eigenfunctions in the completely integrable case. *Annales de l’Institut Henri Poincaré* 4(2), 2003, 343–368.
- John A. Toth and Steve Zelditch. Norms of modes and quasi-modes revisited. *Contemporary Mathematics (AMS)* 320, 2003, 435–458.
- John A. Toth and Yiannis Petridis. The remainder in Weyl’s law for Heisenberg manifolds. *Journal of Differential Geometry* 60(3), 2002, 455–483.
- John A. Toth and Yiannis Petridis. The remainder in Weyl’s law for random two-dimensional flat tori. *Geometric and Functional Analysis (GAFA)* 12 (4), 2002, 756–775.
- John A. Toth and Steve Zelditch. Riemannian manifolds with uniformly bounded eigenfunctions. *Duke Mathematical Journal* 111(1), 2002, 97–132.

- John A. Toth, Dmitry Jakobson and Nikolai Nadirashvili. Geometric properties of eigenfunctions. *Russian Mathematical Surveys* 56(6), 2001, 1085-1106.
- John A. Toth and Alain Bourget. Asymptotic statistics of zeroes for the Lamé ensemble. *Communications in Mathematical Physics* 222 (3), 2001, 475-493.
- John A. Toth and Maung Min-Oo. The Levy concentration phenomenon for special functions on rank-one symmetric spaces. *Methods and Applications of Analysis* 7(1), 2000, 151-163.
- John A. Toth. On the quantum expected values of integrable metric forms. *Journal of Differential Geometry* 52, 1999, 327-374.
- John A. Toth. On the small-scale mass concentration of modes, *Communications in Mathematical Physics*, 206, 1999, 409-428.
- John A. Toth. Erratum to: "Eigenfunction decay estimates in the quantum integrable case". *Duke Mathematical Journal*, 96(2), 1999, pg.469.
- John A. Toth. Eigenfunction decay estimates in the quantum integrable case, *Duke Mathematical Journal* 93(2), 1998, 231-255.
- John A. Toth. Eigenfunction localization in the quantized rigid body, *Journal of Differential Geometry* 43, 1996, 844-858.
- John A. Toth. Various quantum mechanical aspects of quadratic forms, *Journal of Functional Analysis* 130, 1995, 1-42.
- John A. Toth. On a class of spherical harmonics associated with rigid body motion, *Mathematical Research Letters* 1, 1994, 203-210.
- John A. Toth. The quantum C. Neumann problem, *International Mathematics Research Notices (IMRN)* 5, 1993, 137-139.

Preprints:

- John A. Toth and Steve Zelditch. Quantum ergodic restriction theorems, I: Interior hypersurfaces in analytic domains. Preprint 2010 (60 pages).
- John A. Toth and Steve Zelditch. Quantum ergodic restriction theorems, II: Manifolds without boundary. Preprint 2010 (21 pages).

- John A. Toth. Eigenfuncitons of conformal families of Laplace Operators I: Generic pointwise bounds. Preprint 2010 (17 pages).
- John A. Toth and Dmitry Jakobson. Eigenfuncitons of conformal families of Laplace Operators II: Generic quantum unique ergodicity. Preprint 2010 (10 pages).
- John A. Toth, Chris Sogge and Steve Zelditch. Geodesic recurrence and maximal growth of eigenfunctions, I and II. Preprints 2009.

Invited Talks:

- Dartmouth Spectral Geometry Conference, Dartmouth University (2010).
- Workshop on "Local and global properties of eigenfunctions", Northwestern University (2010).
- Differential Geometry Seminar, Dartmouth University (2009).
- University of London Analysis Seminar, London, UK (2009).
- Kavli lecture series of the U.S. National Academy of Sciences , University of California, Irvine (2008).
- CRM workshop on " Mathematical aspects of quantum chaos", Universite de Montreal (2008).
- CRM workshop on "Spectrum and dynamics", Universite de Montrtreal (2008).
- AMS special session on "Inverse spectral problems", University of California at San Diego (2007).
- AMS special session on "Analysis on singular spaces", University of Arizona (2007)
- Colloquium Address, Queen's University (2006)
- Analysis/PDE Seminar, University of British Columbia (2006)
- NSF Focused Research Grant workshop on "Global harmonic analysis and its applications", Johns Hopkins University (2006)
- Conference on "Spectral theory and global analysis", Oldenburg, Germany (2006)

- European Science Foundation conference on “Geometrical aspects of spectral theory”, Tirol, Austria (2005)
- NSF Focused Research Grant workshop on “Eigenfunctions of the Laplacian”, University of Washington (2005)
- AMS special session on “Scattering and spectral problems in geometry”, University of Nebraska (2005)
- AMS special session on “Analysis problems in mathematical physics”, Atlanta (2005)
- CRM/Fields Institute conference on “Semiclassical analysis”, Toronto (2004)
- Geometry Seminar, CUNY Graduate Center (2004)
- Courant Institute Analysis Seminar, NYU (2004)
- Conference on “Arithmetic aspects of quantum chaos”, Newton Institute, Cambridge, UK (2004)
- Geometry Seminar, CUNY Graduate Center (2003)
- MSRI conference on “Semiclassical Analysis”, Berkeley (2003)
- Analysis Seminar, Columbia University (2002)
- NSF conference on “Spectral Geometry”, University of Kentucky (2002)
- Geometry Seminar, Dartmouth University (2002)
- Colloquium Address, Dartmouth University (2002)
- Analysis Seminar, Johns Hopkins University (2001)
- Analysis Seminar, Massachusetts Institute of Technology (2001)
- AMS special session on Spectral Geometry, Université de Montréal (2002)
- Colloquium Address, Queen’s University (2001)
- Colloquium Address, McMaster University (2001)
- European Science Foundation conference on “Partial differential equations and mathematical physics”, Barcelona, Spain (2001)

- CMS special session on Partial Differential Equations, Université de Montréal (2000)
- Colloquium Address, University of Kentucky (2000)
- Colloquium Address, University of Toronto (2000)
- Analysis Seminar, Johns Hopkins University (1999)
- Aisenstadt Prize Lecture, C.R.M. (1999)
- Analysis Seminar, Johns Hopkins University (1999)
- Colloquium Address, University of Hawaii (1999)
- Analysis/PDE Seminar, University of Michigan (1999)
- C.M.S. Winter Meeting, Queens University (1998)
- A.M.S. special session on “Spectral Asymptotics”, University of Arizona (1998)
- Colloquium Address, Florida International University (1998)
- Geometry/Topology Seminar, UQAM (1998)
- Conference on Microlocal Methods in Geometric Analysis and Mathematical Physics, Fields Institute, Toronto(1997).
- Geometry Seminar, McMaster University (1997)
- Colloquium Address, University of Ottawa (1997)
- Analysis Seminar, University of Toronto (1997)
- Conference on “Asymptotic properties of classically chaotic systems”, Harvard University (1996)
- Carl Herz Memorial Symposium, McGill University (1996)
- Geometry-Topology Seminar, McGill University (1996)
- Differential Geometry Seminar, Harvard University (1995)
- Differential Geometry Seminar, Harvard University (1994)
- Analysis Seminar, Massachusetts Institute of Technology (1994)

Conferences Organized:

- Special Year in Analysis (CRM and Fields Institute), 2003-04
- Workshop on Semiclassical Theory of Eigenfunctions and Partial Differential Equations (CRM) 2004
- Session on Spectral Geometry (American Mathematical Society Sectional Meeting), Montreal 2002
- Workshop on Spectral Statistics and High Energy Eigenstates (CRM) 2001
- Conference on Asymptotic Properties of Classically Chaotic Systems, Harvard University 1999-00

Refereeing

and Editorial Work: I served on the Editorial Boards of both the International Mathematics Research Notices (IMRN) and International Mathematics Research Papers (IMRP) (2005-2008).

I have reviewed grants for the NSF, ISF and NSERC, as well as the Canada Council. I have refereed for many journals including: Journal of Geometric Analysis, Transactions of the American Mathematical Society, Journal of Functional Analysis, Communications in Mathematical Physics, Duke Mathematical Journal, International Mathematics Research Notices (IMRN), Journal of the CMS, Journal of Mathematical Physics, Annales de l'Institut Fourier, Michigan Mathematical Journal, American Journal of Mathematics, Les Annales Scientifiques de l'Ecole Normale Supérieure and Mathematical Research Letters.

Student Supervision: **Mahta Khosravi** (PhD 2005). Mahta Khosravi completed her PhD at McGill under my supervision in September, 2005. In her thesis, she proved a Cramer-type formula for the spectrally-averaged remainder in Weyl's law for Heisenberg manifolds. She also established sharp pointwise estimates for the remainder function in the case where dimension is larger than three.

Mahta Khosravi is currently a Member of the Institute for Advanced Study (Princeton) (2005-) and is working on several joint projects with Jean Bourgain as well as myself. She has been offered several positions

including a John Wesley Young Assistant Professorship at Dartmouth and a J.J. Sylvester Assistant Professorship at Johns Hopkins.

Alain Bourget (PhD 2001). Alain Bourget completed his PhD at McGill under my supervision in September, 2001. In his thesis, he determined the asymptotics of zeros of (joint) eigenfunctions of some well-known quantum completely integrable Gaudin spin chains in the thermodynamic regime.

Alain Bourget was visiting Assistant Professor at Johns Hopkins in 2001-2002. Subsequently, he had postdoctoral appointments at McMaster University and the University of Massachusetts (Amherst). He is currently tenure track Assistant Professor at California State University (Fullerton).

Gordon Craig (MSc 1999) Gordon Craig completed an MSc degree under my supervision in April, 1999. His Master's thesis dealt with issues related to Isoperimetric Inequalities in both Geometry and Analysis.

Gordon Craig completed his PhD in Mathematics at SUNY Stony Brook in 2004 under the supervision of Michael Anderson. He was CRM-ISM Postdoctoral Fellow in 2005 and is now a Faculty Lecturer and Bishop's University.

Farnaz Taherkani (MSc expected 2006) Farnaz Taherkani is currently completing her MSc degree under my supervision at McGill. Her thesis deals with high-energy asymptotics of the Weyl remainder for the spectral counting function of the Laplace-Beltrami operator.

Dominique Rabet (MSc in progress) Dominique Rabet is completing his MSc thesis under my supervision. His thesis deals with various aspects of spectral asymptotics for bounded domains, including two-term asymptotics for the Dirichlet spectral counting function and the asymptotics of nodal sets of eigenfunctions.

Layan El-Hajj (MSc in progress) Dominique Rabet has just started working on her MSc thesis under my supervision. His thesis will deal with complex analytic techniques in the analysis of nodal sets and critical points for planar domains.

Joel Barnes (MSc in progress) Joel Barnes has just started in the MSc program. He is currently completing coursework and I cosupervising (with Dima Jakobson) his thesis which is on "small-scale properties of eigenfunctions".

Postdoctoral Fellows:

- Yiannis Petridis (PhD Stanford), 1998-2002.
- Shannon Starr (PhD Princeton), 2003-2004.
- Emily Dryden (PhD Dartmouth), 2004-2005.
- Igor Wigman (PhD Tel Aviv), 2006-2008.
- Julie Rowlett (PhD Stanford), 2006-2007.
- Dan Mangoubi (PhD Tel Aviv), 2006-2007.

Visitors: I have hosted many visitors/collaborators including: Steve Zelditch (Johns Hopkins), Richard Melrose (M.I.T.), Victor Guillemin (M.I.T.), Alejandro Uribe (University of Michigan), Nikolai Nadirashvili (University of Chicago), Bernard Helffer (Paris), Maciej Zworski (Berkeley), Peter Perry (University of Kentucky), Carolyn Gordon (Dartmouth), Alexander Soshnikov (UC Davis), Maung Min-Oo (McMaster) and Victor Ivrii (University of Toronto).

Summer Projects: I have supervised and co-supervised summer research projects for the following undergraduate students: Derrick Chung (co-supervised), Eugene Kritchevski (co-supervised), Bogdan Nica (supervised), Ivo Panayotov, and Thomas Zamojski (co-supervised).

Committee Work:

- Chair of the Departmental Leo Yaffe and Principal's Prize Nominations Committee (2006-08)
(This committee is responsible for nominating faculty for the Principal's Prize in Teaching and the Leo Yaffe Award. The committee actively solicits letters/input from undergraduate and graduate students. In addition, as Chair, I was responsible for assembling dossiers and writing nomination letters.)

- Dean's Advisory Committee on the Selection of the Chair (2005)
(This committee is responsible for consulting with the Dean regarding nominees for Chair as well soliciting input from faculty.)
- Chair's Advisory Committee (2005-07)
(This is the executive committee of the department. It is directly involved in issues such as hiring and tenure.)
- Chair of the Scholarships and Fellowships Subcommittee (2000-)
(This subcommittee is responsible for the departmental ranking of graduate student applications for scholarships and fellowships including NSERC, FQRNT and ISM).
- Graduate Subcommittee on Part A & B examinations (2000-)
(This subcommittee is responsible for the setting of Part A and Part B graduate qualifying examinations.)
- Library Committee (2000-03)
(This committee is responsible for book acquisitions for the Rosenthal Mathematics and Statistics Library.)
- Chair's Advisory Committee (1996-98)
- Faculty of Science Scholarships and Fellowships Committee (1996-98)
(This committee is responsible for ranking undergraduate applications for a wide variety of awards and scholarships in the Faculty of Science.)