

## CURRICULUM VITAE

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### Education:

*M.Sc.*, Mathematics, 1995, Moscow State University, Russia.

*Cand. Sc.*, Mathematics, 1999, Moscow State University.

*Ph.D.*, Mathematics, 2000, Weizmann Institute of Science,  
Rehovot, Israel.

### Positions held:

*2012* — *present*: *Professor*, Université de Montréal, Canada.

*2015* — *present*: *Adjunct Professor*, McGill University, Montréal.

*2002* — *present*: *Member*, Centre de recherches mathématiques, Montréal.

*2007* — *2012*: *Associate Professor*, Université de Montréal.

*2002* — *2007*: *Assistant Professor*, Université de Montréal.

*2001* — *2002*: *visiting scientist*, Max Planck Institute of Mathematics, Bonn.

*2001*: *postdoctoral fellow*, Mathematical Sciences Research Institute, Berkeley.

*2000* — *2001*: *postdoctoral fellow*, Centre de recherches mathématiques and  
Institut des sciences mathématiques, Montréal.

### Awards and honours:

*2009–2014, 2014–2019*: Canada Research Chair in Geometry and Spectral Theory (Tier II).

*January – March 2017*: Weston Visiting Professorship, Weizmann Institute of Science.

*2011*: Coxeter–James Prize, Canadian Mathematical Society.

*2008*: G. de B. Robinson Award, Canadian Mathematical Society.

*2006*: André Aisenstadt Prize, Centre de recherches mathématiques.

*2000*: J.F. Kennedy Prize for Ph.D. research, Weizmann Institute of Science.

### Recent Research Grants:

*2003–2007, 2007 – 2012, 2012–2017, 2017–2022*: Discovery grant, NSERC, Canada.  
Current funding: CAD \$43,000/year.

*2008–2011, 2012–2015, 2015–2018*: Team grant (with Dmitry Jakobson et al.),  
FRQNT, Québec.

*2013–2017*: Team grant (with Luc Hillairet et al.), Programme Blanc, ANR, France.

### Academic service:

- Director, Séminaire de mathématiques supérieures, Montréal, 2019–present.
- Member of the CMS Canadian Mathematical Olympiad Committee, 2019–present.

- Member of the CMS Research Committee, 2016-2018.
- Member of the CMS Doctoral Prize Committee, 2016-2018 (Chair in 2018).
- Deputy Director - Scientific Programs, CRM, Montréal, 2014-2015.
- Member of the Local Scientific Committee of the CRM, Montreal, 2013-2014.
- Member of the editorial board of *Annales Mathématiques du Québec*, 2013–present.

#### **Supervision of research students and postdocs:**

##### *Ph.D. students:*

- Antoine Metras (in progress).
- Philippe Charron (in progress).
- Vladimir Medvedev (in progress).
- Broderick Causley (in progress, joint with Dmitry Jakobson, McGill University)
- Mikhail Karpukhin (2018, joint with Dmitry Jakobson, McGill University). CMS Doctoral Prize (2019) and Carl Herz Prize recipient. Currently Visiting Assistant Professor at UC Irvine.
- Jean Lagacé (2018). Currently Research Associate at University College London.
- Guillaume Roy-Fortin (2015). Carl Herz Prize recipient. Currently Maître d'enseignement, École de technologie supérieure (ÉTS), Montréal.
- Guillaume Poliquin (2015). Currently Professor at Collège Ahuntsic and Associate Member, Centre de recherches mathématiques.
- Hugues Lapointe (2010). Deceased.
- Alexandre Girouard (2008, joint with M. Frigon). Carl Herz Prize recipient. Currently Associate Professor at Université Laval, Québec.

##### *Postdoctoral fellows (co-supervised):*

- Dmitry Faifman (in progress).
- Siran Li (2018-2019). Currently Evans Instructor at Rice University.
- Niko Laaksonen (2017-2018). Currently researcher at Alfréd Rényi Institute of Mathematics, Budapest, Hungary.
- Donato Cianci (2016-2017). Currently Post-Doctoral Assistant Professor, University of Michigan at Ann Arbor, USA.
- Jeff Galkowski (2016-2017). Currently Associate Professor at the University College London, UK.
- Yannick Bonthonneau (2015-2016). Currently Chargé de recherche at CNRS, Université Rennes 1, France.
- Damir Kinzebulatov (2015). Currently Assistant Professor at Université Laval, Québec, Canada.
- Asma Hassannezhad (2014). Currently Lecturer in Pure Mathematics, University of Bristol, UK.
- Suresh Eswarathasan (2011-2013, 2014-2015). Currently Lecturer in Analysis, University of Cardiff, UK.
- David Sher (2012-2013). Currently Assistant Professor at DePaul University, Chicago, USA.
- Dan Mangoubi (2006, 2009). Currently Associate Professor, Hebrew University of Jerusalem, Israel.
- Igor Wigman (2006-2009). Currently Professor in Number Theory, King's College, London, UK.
- Julie Rowlett (2006). Currently Associate Professor at Chalmers University, Sweden.

- Emily Dryden (2004-2005). Currently Professor at Bucknell University, Lewisburg, USA.
- Alex Ivrii (2003-2006). Currently Researcher at IBM, Haifa, Israel.
- Alexei Penskoi (2002-2003). Currently Professor at Higher School of Economics and Independent University of Moscow, Russia.

*M.Sc. students:* Simon St-Amant (in progress), Fabrice Nonez (2019), Rosalie Bentz-Moffet (2019), Antoine Metras (2018), Joanie Martineau (2017), Philippe Charron (2015), H el ene P eloquin Tessier (2014), Viktor Marushka (2012), Elena Lavrova (2011), Guillaume Lavoie (2011), Elisabeth Lapierre (2008), Claude Gravel (2007), Eveline Legendre (2006), Jean-S ebastien Gagn e (2004).

*Undergraduate students:* Supervised about 20 undergraduate summer research students.

**Recent scientific activities (co-organized):**

- CRM Nirenberg Lectures in Geometric Analysis, 2014–present.
- Montr el Analysis Seminar, 2013–present.
- Workshop “Spectral geometry: theory, numerical analysis and applications”, Banff International Research Station, July 2018.
- ISM Discovery School on “Spectral Geometry and Shape Optimization”, ISM, Montr el, May, 2018.
- Workshop “Steklov eigenproblems: geometry and computation”, American Institute of Mathematics, April-May 2018.
- Colloque des sciences math ematiques du Qu ebec, CRM, 2011-2013, 2014–2018.
- Workshop “Dirichlet-to-Neumann maps: spectral theory, inverse problems and applications”, Casa Matematica Oaxaca, Mexico, May-June 2016.
- Workshop “Topology, geometry, dynamics. In honour of Fran ois Lalonde”, CRM, August-September 2015.
- Summer school “Geometric and computational spectral theory”, Montr el, June 2015.
- Workshop “Spectral Theory of Laplace and Schr odinger operators”, Banff International Research Station, July 2013.
- Workshop “Applications of Analysis: Game Theory, Spectral Theory and Beyond. A workshop in honor of Y. Kannai’s 70th birthday”, Weizmann Institute of Science, December 2012.
- Special session of the CMS Winter meeting on “Partial Differential Equations and Spectral Theory”, Montr el, December 2012.
- Workshop “Geometric aspects of spectral theory”, Mathematisches Forschungsinstitut Oberwolfach, Germany, July 2012.
- Workshop “Eigenvalues, eigenfunctions and applications”, CRM, June 2012.

**Selected recent talks:**

- Colloquium, Stanford University, March 2020.
- Geometry Seminar, Stanford University, March 2020.
- Conference on Shape optimization and isoperimetric and functional inequalities, Levico Terme, Italy, September 2019.
- Conference on Geometric aspects of harmonic analysis and spectral theory, Technion, Haifa, June 2019.
- Spectral geometry seminar, Independent University of Moscow, December 2018.

- Analysis seminar, Université Laval, Québec, April 2018.
- PDE seminar, University of North Carolina, Chapel Hill, April 2018.
- Colloquium, University of Miami, Coral Gables, April 2018.
- Colloquium, DePaul University, Chicago, February 2018.
- Workshop on Spectral geometry, Graphs and Semiclassical Analysis, Aussois, December 2017.
- Workshop on Geometric Spectral Theory, Université de Neuchatel, June 2017.
- Special course on Modern problems of spectral geometry (6 hour minicourse “Spectral geometry of the Steklov problem”), Independent University of Moscow, March-April 2017.
- Colloquium, Technion, Haifa, March 2017.
- Colloquium, Bar Ilan University, March 2017.
- Colloquium, Ben Gurion University of Negev, March 2017.
- Workshop on Shape Optimization and Isoperimetric and Functional Inequalities, CIRM, Luminy, November 2016.
- Colloquium, Tel Aviv University, February 2016.
- Oberseminar Geometrie, Ludwig-Maximilian-Universität München, February 2016.
- Workshop on Shape Optimisation and Spectral Geometry, ICMS, Edinburgh, June-July 2015.
- Conference on Geometric Spectral Theory, Lisbon and Porto, June 2015.
- Geometry seminar, Sapienza - Università di Roma, July 2014.
- Workshop on Spectral Theory and Geometry (4 hour minicourse), Université de Neuchâtel, June 2013.
- Colloquium, Hebrew University of Jerusalem, December 2012.
- Spring School on Nonlinear PDEs (4 hour minicourse), Université Libre de Bruxelles, June 2012.
- Brandeis-Harvard-MIT-Northeastern Joint Mathematical Colloquium, Northeastern University, Boston, March 2012.
- Coxeter-James lecture, CMS Winter Meeting, Toronto, December 2011.

### Publications:

- [1] S. Krymski, M. Levitin, L. Parnovski, I. Polterovich and D. Sher, *Inverse Steklov spectral problem for curvilinear polygons*, arXiv: arXiv:2004.03881 [math.SP], 1-23.
- [2] M. Karpukhin, N. Nadirashvili, A. Penskoi and I. Polterovich, *Conformally maximal metrics for Laplace eigenvalues on surfaces*, arXiv: 2003.02871 [math:DG], 1-52.
- [3] M. Levitin, L. Parnovski, I. Polterovich and D. Sher, *Sloshing, Steklov and corners: Asymptotics of Steklov eigenvalues for curvilinear polygons*, arXiv: 1908.06455 [math.SP], 1-106.
- [4] M. Levitin, L. Parnovski, I. Polterovich and D. Sher, *Sloshing, Steklov and corners: Asymptotics of sloshing eigenvalues*, to appear in J. Anal. Math., arXiv:1709.01891 [math.SP], 1-47.
- [5] M. Karpukhin, N. Nadirashvili, A. Penskoi and I. Polterovich, *An isoperimetric inequality for Laplace eigenvalues on the sphere*, to appear in J. Diff. Geometry, arXiv:1706.05713 [math:DG], 1-19.
- [6] I. Polterovich, L. Polterovich and V. Stojisavljević, *Persistence barcodes and Laplace eigenfunctions on surfaces*, Geom. Dedicata 201 (2019), no. 1, 111-138.
- [7] A. Girouard, J. Lagacé, I. Polterovich and A. Savo, *The Steklov spectrum of cuboids*, Mathematika 65 (2019), no. 2, 272-310.

- [8] I. Polterovich, D. Sher and J. Toth, *Nodal length of Steklov eigenfunctions on real-analytic Riemannian surfaces*, J. Reine Angew. Math. 754 (2019), 17-47.
- [9] Y. Wang, M. Ben-Chen, I. Polterovich and J. Solomon, *Steklov spectral geometry for extrinsic shape analysis*, ACM Transactions on Graphics, 38 (2018), no. 1, Article No. 7.
- [10] A. Girouard, D. Jakobson, M. Levitin, N. Nigam, I. Polterovich and F. Rochon (editors), *Geometric and Computational Spectral Theory*. Contemporary Mathematics, vol. 700, CRM Proceedings, Amer. Math. Soc. and CRM, 2017.
- [11] A. Girouard and I. Polterovich, *Spectral geometry of the Steklov problem*, J. Spectral Theory 7 (2017), no. 2, 321-359. Reprinted in: Antoine Henrot (Ed.), *Shape Optimization and Spectral Theory*, 120-148, De Gruyter Open, 2017.
- [12] S. Eswarathasan, I. Polterovich and J. Toth, *Smooth billiards with a large Weyl remainder*, Int. Math. Res. Not. (2016), no. 12, 3639-3677.
- [13] A. Hassannezhad, G. Kokarev and I. Polterovich, *Eigenvalue inequalities on Riemannian manifolds with a lower Ricci curvature bound*, J. Spectral Theory 6 (2016), no. 4, 807-835.
- [14] I. Polterovich and D. Sher, *Heat invariants of the Steklov problem*, J. Geom. Analysis, 25 (2015), no. 2, 924-950.
- [15] A. Girouard, L. Parnowski, I. Polterovich and D. Sher, *The Steklov spectrum of surfaces: asymptotics and invariants*, Math. Proc. Camb. Philos. Soc. 157 (2014), 379-389.
- [16] N. Kuznetsov, T. Kulczycki, M. Kwasnicki, A. Nazarov, S. Poborchi, I. Polterovich and B. Siudeja, *The Legacy of Vladimir Andreevich Steklov*, Notices of the AMS 61 (2014), no. 1, 9-22.
- [17] D. Elton, M. Levitin and I. Polterovich, *Eigenvalues of a one-dimensional Dirac operator pencil*, Ann. Henri Poincaré 15 (2014), no. 12, 2321-2377.
- [18] M. Karpukhin, G. Kokarev and I. Polterovich, *Multiplicity bounds for Steklov eigenvalues on Riemannian surfaces*, Ann. Inst. Fourier 64 (2014), no. 6, 2481-2502.
- [19] A. Artemev, L. Parnowski and I. Polterovich, *Inverse electrostatic and elasticity problems for checkered distributions*, Inverse Problems, 29 (2013), 075010.
- [20] A. Girouard and I. Polterovich, *Upper bounds for Steklov eigenvalues on surfaces*, Electron. Res. Announc. Math. Sc. 19 (2012), 77-85.
- [21] D. Jakobson, S. Nonnenmacher and I. Polterovich (editors), *Spectrum and Dynamics, Proceedings of the Workshop Held in Montréal, QC, April 7-11, 2008*, CRM Proceedings and Lecture Notes, Volume 52, Amer. Math. Soc., 2010.
- [22] R. Bañuelos, T. Kulczycki, I. Polterovich, B. Siudeja, *Eigenvalue estimates for mixed Steklov problems*, in "Operator theory and its applications", V.B. Lidskii Memorial Volume (D. Vassiliev et M. Levitin, editors), Amer. Math. Soc. Transl. Series 2, Vol. 231 (2010), 19-34.
- [23] A. Girouard and I. Polterovich, *On the Hersch-Payne-Schiffer inequalities for Steklov eigenvalues*, Func. Anal. Appl., 44:2 (2010), 106-117.
- [24] A. Girouard and I. Polterovich, *Shape optimization for low Neumann and Steklov eigenvalues*, Math. Meth. Appl. Sci. 33, no. 4 (2010), 501-516.
- [25] A. Girouard, N. Nadirashvili and I. Polterovich, *Maximization of the second positive Neumann eigenvalue for planar domains*, J. Diff. Geometry 83, no. 3 (2009), 637-662.

- [26] H. Lapointe, I. Polterovich and Y. Safarov, *Average growth of the spectral function on a Riemannian manifold*, Comm. Partial Differential Equations 34, no. 6 (2009), 581-615.
- [27] I. Polterovich, *Pleijel's nodal domain theorem for free membranes*, Proc. Amer. Math. Soc. 137 (2009), 1021-1024.
- [28] D. Jakobson, I. Polterovich and J. Toth, *A lower bound for the remainder in Weyl's law on negatively curved surfaces*, Int. Math. Res. Not. (2007), no. 2, ID rnm142, 38 pp.
- [29] D. Jakobson, I. Polterovich, *Estimates from below for the spectral function and for the remainder in local Weyl's law*, Geom. Func. Anal. 17, no. 3 (2007), 806-838.
- [30] M. Levitin, L. Parnowski, and I. Polterovich, *Isospectral domains with mixed boundary conditions*, J. Phys. A: Math. Gen. 39 (2006), 2073-2082.
- [31] D. Jakobson, N. Nadirashvili and I. Polterovich, *Extremal metric for the first eigenvalue on a Klein bottle*, Canadian J. Math. 58 no. 2 (2006), 381-400.
- [32] D. Jakobson, M. Levitin, N. Nadirashvili and I. Polterovich, *Spectral problems with mixed Dirichlet-Neumann boundary conditions: isospectrality and beyond*, J. Comput. Appl. Math., 194 no. 1 (2006), 141-155.
- [33] D. Jakobson, M. Levitin, N. Nadirashvili, N. Nigam and I. Polterovich, *How large can the first eigenvalue be on a surface of genus two?*, Int. Math. Res. Not. 2005: 63 (2005), 3967-3985.
- [34] D. Jakobson, I. Polterovich, *Lower bounds for the spectral function and for the remainder in local Weyl's law on manifolds*, Electron. Res. Announc. Amer. Math. Soc. 11 (2005), 71-77.
- [35] M. Hitrik, I. Polterovich, *Regularized traces and Taylor expansions for the heat semigroup*, J. London Math. Soc. (2) 68 (2003), no. 2, 402-418.
- [36] M. Hitrik, I. Polterovich, *Resolvent expansions and trace regularizations for Schrödinger operators*, in: Advances in Differential Equations and Mathematical Physics, Contemporary Mathematics, vol. 327 (2003), 161-173.
- [37] I. Polterovich, *Combinatorics of the heat trace on spheres*, Canadian J. Math. 54 no. 5 (2002), 1086-1099.
- [38] A. Dyubina, I. Polterovich, *Explicit constructions of universal R-trees and asymptotic geometry of hyperbolic spaces*, Bull. London Math. Soc. 33 (2001), no. 6, 727-734.
- [39] I. Polterovich, *Heat invariants of Riemannian manifolds*, Israel J. Math., 119 (2000), 239-252.
- [40] I. Polterovich, *A commutator method for computation of heat invariants*, Indag. Math., N.S., (2000) 11(1) 139-149.
- [41] I. Polterovich, *From Agmon-Kannai expansion to Korteweg-de Vries hierarchy*, Lett. Math. Phys. (1999) 49:71-77.
- [42] A. Dyubina, I. Polterovich, *Structures at infinity of hyperbolic spaces*, Uspekhi Mat. Nauk 53 (1998), no. 5, 239-240 (in Russian; translation in Russian Mathematical Surveys 53 (1998), no. 5, 1093-1094).
- [43] I. Polterovich, A. Shnirelman, *An asymptotic subcone of the Lobachevskii plane as a function space*, Uspekhi Mat. Nauk 52 (1997), no. 4, 209-210 (in Russian; translation in Russian Math. Surveys 52 (1997), no. 4, 842-843).
- [44] I. Polterovich, *On a characterization of flat metrics on 2-torus*, J. Dynam. Control Systems, vol. 2 (1996), No. 1, 89-101.