Mikhail V. Belolipetsky

IMPA - Instituto Nacional de Matemática Pura e Aplicada
Estrada Dona Castorina, 110
22460-320, Rio de Janeiro, RJ
Brazil

Tel: +55 21 2529 5207
Fax: +55 21 2512 4115
homepage: http://w3.impa.br/~mbel
email: mbel[at]impa.br

Personal

Born 9 May 1974 in Novosibirsk, Russia. Married, with two children.

Degrees

PhD 2000, Novosibirsk State University. Thesis title *Geometric properties of arithmetic groups in Lobachevsky spaces*. Adviser: A. D. Mednykh.

MSc 1997, with honors, Novosibirsk State University. Honors thesis: *Arithmetic properties of the groups of isometries generated by three involutions in $\mathscr{H}^3$*. Adviser: A. D. Mednykh.

BSc 1995, with honors, Novosibirsk State University. Honors thesis: *Estimates for the number of automorphisms of a Riemann surface*. Adviser: A. D. Mednykh.

Employment

IMPA (Rio de Janeiro, Brazil). S.S. Chern Chair in Geometry, since 2011.

Durham University (Durham, UK). Lecturer, 2005–11.

Institute of Mathematics, Hebrew University (Jerusalem, Israel). Postdoctoral fellow, 2003–05.

Max Planck Institut für Mathematik (Bonn, Germany). Research affiliate, 2002–03.

Sobolev Institute of Mathematics (Novosibirsk, Russia). Honorable senior research fellow, 2001–16.

Novosoft Inc. (http://www.novosoft.us). Lead software developer, 2000–01.

Visiting Positions

Max Planck Institut für Mathematik (Bonn, Germany), February 2020 – January 2021, sabbatical.

University of Chicago (USA), March 2014 and May 2015, visits hosted by Prof. S. Weinberger.

MSRI (Berkeley, USA), August 15 – December 16, 2011, Research Professor during the semester in Quantitative Geometry.

Hebrew University (Jerusalem, Israel), July 2010, visit hosted by Prof. A. Lubotzky.

Universidad Autónoma de Madrid (Spain), September – October 2009, visit hosted by Prof. A. Jaikin Zapirain.

University of Chicago (USA), September – October 2008, visit hosted by Prof. B. Farb.

Hebrew University (Jerusalem, Israel), June – July 2008, visit hosted by Prof. A. Lubotzky.

Erwin Schrödinger International Institute (Vienna, Austria), March 2007, visit hosted
by Prof. J. Schwermer.
Max Planck Institut für Mathematik (Bonn, Germany), July – August 2006, research visit.
IHES (Bures-Sur-Ivette, France), February – February 2003 and March 2004, research visits.

Grants, awards and honors:

Max Planck Society Fellowship, 01/02/2020–31/01/2021.
AmSud Project Brasil–França–América do Sul, *Geometry and Dynamics of Infinite Groups*,
2018–2019 (PI).
Bolsa de Produtividade em Pesquisa do CNPq (2012–2022), *Geometry and arithmetic of locally symmetric
spaces*.
FAPERJ, Cientista do Nosso Estado (2014, 2017, 2020), *Geometria e aritmética dos espaços localmente
simétricos*.
ICM Section Talk (2014).
CNPq Universal, *Geometria dos espaços aritméticos*, 01/02/2013–31/01/2016.
S.S. Chern Chair at IMPA (2011).
EPSRC First Grant, *Growth of lattices in semisimple Lie groups*, 23/01/2008–22/01/2011.
Golda - Meir Postdoctoral Fellowship, 01/10/2004–30/09/2005.
Max Planck Society Fellowship, 01/02/2002–30/09/2003.

Service

Editor of Journal of the Association for Mathematical Research (JAMR).
Editor of São Paulo Journal of Mathematical Sciences (SPJM).
Reviewer for Mathematical Reviews and Zentralblatt.
Refereed papers for Acta Mathematica, Acta Math. Sinica, Algebra & Number Theory, Annales Henri
Lebesgue, ARS Mathematica Contemporanea, Bull. of the Braz. Math. Society, Comm. in Algebra,
Comm. in Analysis and Geometry, Crelle's Journal, Doklady Mathematics, Exp. Math., GAFA,
Geom. Dedicata, Geometry & Topology, Internat. J. Algebra and Comput., IMRN, J. Algebra Its
Appl., J. Diff. Geom., J. Geom. Anal., J. of the Indian Math. Society, J. LMS, J. Number Th.,
J. Pure and Appl. Algebra, La Matematica, Math. Ann., Math. Comp., Math. Proc. Camb. Phil.
Soc., Math. Research Letters, Math. Sbornik, Mathematische Nachrichten, Michigan Math. J.,
New York J. of Math., Pacific J. of Math., Proc. AMS, Proc. Edinb. Math. Soc., Proc. LMS,
Publ. Matemàtiques, Publ. Math. Debrecen, Publ. Math. IHES, Selecta Math., Siberian Math. J.,
Topology and its Appl., Trans. AMS, Transformation Groups.
Grant applications reports for BSF, CNPq, EPSRC, ERC, FAPERJ, FAPESP, ISF, SNSF.
Member of the AMS (2005–2014).
Member of the GEAR Network.
Member of the Nature Reader Panel (2011).
Member of the Lie Theory and Generalizations sectional panel for ICM 2018.
ESF Expert Reviewer (since 2021).

Research Interests

Arithmetic groups and their geometric properties, representation theory, number theory, hyperbolic geometry.

Conferences Organising

LMS Durham Symposium "*Geometry and Arithmetic of Lattices*", July 2011, supported by an EPSRC grant (with M. Bridson, M. Lackenby and J. Parker).

"*Algebraic Geometry and Hyperbolic Geometry - New Connections*", Cabo Frio, Rio de Janeiro, 17/06/2013–21/06/2013 (with C. Araujo, M. Kapovich and J. Kollár).

"*Hyperbolic Geometry and Minimal Surfaces*", IMPA, Rio de Janeiro, 04/01/2015–10/01/2015 (with M. Bridgeman, J. Brock and H. Rosenberg).

"*Quantitative Geometry and Topology*" session at the MCA – Mathematical Congress of the Americas, Montreal, Canada, 24/07/2017–28/07/2017 (with A. Nabutovsky and S. Weinberger).

"*Group Theory – ICM 2018 Satellite Conference*", Cabo Frio, Rio de Janeiro, 23/07/2018 – 27/07/2018 (with N. Nikolov, D. Osin and I. Snopche).

"*Reflection Groups in Negative Curvature*", Oberwolfach Workshop, 07/04/2019 – 13/04/2019 (with V. Emery and R. Kellerhals).

"*Metric and hyperbolic geometry*" session at the 1st Joint meeting Brazil–France in Mathematics, IMPA, Rio de Janeiro, 15/07/2019–19/07/2019 (with S. Sabourau).

"*Arithmetic reflection groups and crystallographic packings* ", AIM Workshop, 14/12/2020 – 18/12/2020 online (with A. Kontorovich and A. Mark).

"*Group Theory*" session at the 33rd Brazilian Mathematical Colloquium, IMPA, Rio de Janeiro, 02/08/2021–06/08/21 online (with C. Acciarri).

"*AGRA IV*", Cabo Frio, Rio de Janeiro, 20/06/2022 – 25/06/2022 (with E. Carneiro, D. Dimitrov, H. Helfgott, M. Lalín, S. Lima, Y. Lima, R. Miatello, A. Pacetti, P. Pino, and F. Rodriguez-Villegas).

Invited and plenary conference talks (in chronological order)

2002 Third Days of Hyperbolic Geometry, September 9–12 (Gdańsk, Poland), *Cells and representations of right-angled Coxeter groups*.

2003 Arbeitstagung 2003, June 13–19 (Bonn, Germany), *Volumes of arithmetic hyperbolic n-manifolds*.
Workshop on Locally Symmetric Spaces, September 28 – October 4 (Oberwolfach, Germany), *On volumes of arithmetic locally symmetric spaces*.

2004 The 9th Amitsur Memorial Symposium, June 23–24 (Jerusalem, Israel), *Finite groups and hyperbolic manifolds*.
MPIM activity on Algebraic and Topological Dynamics (Bonn, Germany), *Finite groups and hyperbolic manifolds*.
Conference on Discrete Groups and Hyperbolic Manifolds, August 5–7 (Aberdeen, UK), *Volumes of arithmetic quotients of* $SO(1, n)$.

2005 The XXth Nevanlinna Colloquium, August 8–13 (Lausanne, Switzerland), *Counting manifolds and class field towers*.

2006 Workshop on Geometry and Group Theory, July 3–7 (Bonn, Germany), *Finiteness of arithmetic hyperbolic reflection groups*.

Geometric and Asymptotic Group Theory Conference with Applications, August 31 – September 4 (Barcelona, Spain), *Counting manifolds and class field towers*.

Conference on Geometry and Dynamics of Groups and Spaces in Memory of Alexander Reznikov, September 22–30 (Bonn, Germany), *Finiteness of arithmetic hyperbolic reflection groups*.

Prospects in Mathematics, December 14–17 (Durham, UK), *Hyperbolic reflection groups*.

2007 26° Colóquio Brasileiro de Matemática, August 2007 (Rio de Janeiro, Brazil), *Euler-Poincaré characteristic of arithmetic hyperbolic n-orbifolds*.

2008 Yorkshire and Durham Geometry Day, January 18th (Durham, UK), *Finiteness theorems for arithmetic reflection groups*.

Action Now Mini Conference, July 16th (Ben Gurion University, Israel), *Finiteness theorems for arithmetic reflection groups*.

2009 North British Geometric Group Theory, April 29th (University of Nottingham, UK), *Counting arithmetic Fuchsian and Kleinian groups*.

Arbeitstagung 2009, June 5–11 (Bonn, Germany), *Counting Lattices*.

Workshop on Algebra, Combinatorics and Dynamics, August 17–21 (Belfast, UK), *Cells in Weyl groups*.

The 5th William Rowan Hamilton Geometry and Topology Workshop, September 17–19 (Dublin, Ireland), *Some computational problems from geometry of lattices*.

Karlsruher Weihnachtsworkshop zur Geometrie und Zahlentheorie, December 14–16 (Karlsruhe, Germany), *Counting arithmetic surfaces and 3-manifolds*.

2010 BMC/BAMC (British Mathematics Colloquium and British Applied Mathematics Colloquium 2010), April 6–9 (Edinburgh, UK), invited talk at Geometric Group Theory Special Session, talk title "*On volumes of arithmetic quotients of the hyperbolic n-space*".

LMS workshop Geometry, Analysis and Logic of Groups, April 12–14 (Newcastle, UK), *On volumes of arithmetic hyperbolic orbifolds*.

Workshop on Low-Dimensional Topology and Number Theory, August 15 – 21 (Oberwolfach, Germany), *Geodesics, volumes and Lehmer's conjecture*.

2012 Workshop on Geometric Group Theory, Hyperbolic Dynamics and Symplectic Geometry, July 15 – 21 (Oberwolfach, Germany), *Free subgroups of arithmetic 3-manifold groups*.

The Fourth Latin American Congress of Mathematicians – IV CLAM, August 6 – 10 (Córdoba, Argentina), *Two-systoles of hyperbolic three-manifolds*.

2013 Semana da Álgebra, February 04 – 07 (Campinas, Brazil), *Arithmetic hyperbolic reflection groups*.

Cimpa School "Algebraic and Geometric Aspects of Representation Theory", February 25 – March 09 (Curitiba, Brazil), *Cells in Coxeter groups*.

III Workshop on Differential Geometry, March 04 – 08 (Maceió, Brazil), *Two-systoles of hyperbolic three-manifolds*.

BIRS Workshop "Arithmetic Groups", April 15 – 19 (Banff, Canada), *Arithmetic hyperbolic reflection groups*.

Growth and Mahler Measures in Geometry and Topology, July 1–5 (Institut Mittag-Leffler, Sweden), *Lehmer's question, hyperbolic volumes and Margulis numbers*.

MCA – Mathematical Congress of the Americas, August 5 – 9 (Guanajuato, Mexico), *Hyperbolic manifolds of small volume*.

Jornadas de Álgebra no Amazonas I, September 2 – 4 (Itacoatiara, Brazil), *Cells in Coxeter groups*.

Avanços e Perspectivas da Ciência no Brasil, América Latina e Caribe, October 28–30 (Academia Brasileira de Ciências, Rio de Janeiro, Brazil), *Hyperbolic crystallographic groups*.

2014 Systolic geometry, topology, and beyond, June 4–6 (Montpellier, France), *Growth of k-dimensional systoles in congruence coverings*.

ICM – International Congress of Mathematicians, August 13 – 21 (Seoul, Korea), Invited Talk in Geometry Section, *Hyperbolic orbifolds of small volume*.

2015 Hyperbolicity 2015, January 5 – 15 (Ilhabela, Brazil), *Arithmetic hyperbolic reflection groups*.

30° Colóquio Brasileiro de Matemática, July 26–31 (Rio de Janeiro, Brazil), *Growth of k-dimensional systoles in congruence coverings*.

COMCA – XXIV Congreso de Matemática Capricornio, August 5–7 (Iquique, Chile), *Arithmetic hyperbolic reflection groups*.

AGRA II: a two-week school on Arithmetic, Groups and Analysis, August 8–22 (Cusco, Peru), minicourse *Groups and Expanders* (joint with H. Helfgott).

The First Joint Meeting Brazil–Spain in Mathematics, December 7–10 (Fortaleza, Brazil), *Arithmetic hyperbolic reflection groups*.

2016 VI Workshop on Differential Geometry, March 14 – 19 (Maceió, Brazil), *Counting isospectral manifolds*.

Hyperbolic geometry and related topics, April 18–22 (KIAS, Seoul, Korea), *Computing covolumes of arithmetic lattices*.

The Fifth Latin American Congress of Mathematicians – V CLAM, July 11–15 (Barranquilla, Colombia), *Arithmetic hyperbolic reflection groups*.

XIX School on Differential Geometry, July 18 – 22 (Rio de Janeiro, Brazil), *Counting manifolds*.

The First Joint Meeting Brazil – Italy in Mathematics, August 29 – September 02 (Rio de Janeiro, Brazil), *Counting isospectral manifolds*.

Oktobermat XIV, October 20 – 21 (Rio de Janeiro, Brazil), *Geometric complexity of embeddings in $\mathbb{R}^n$*.

2017 MCA – Mathematical Congress of the Americas, July 24 – 28 (Montreal, Canada), Number Theory & Analysis Section, *Lehmer's problem and triangulations of arithmetic hyperbolic 3-orbifolds*.

CLA – XXII Coloquio Latinoamericano de Álgebra, August 7–11 (Quito, Ecuador), *Growth of lattices*.

"Mathematics in the Modern World" conference dedicated to the 60th anniversary of the Sobolev Institute of Mathematics, August 14–19 (Novosibirsk, Russia), *Growth of lattices in semisimple Lie groups*.

The first workshop of São Paulo Journal of Mathematical Sciences, October 19–20 (São Paulo, Brazil), *Counting isospectral lattices*.

2018 Thin groups in Number Theory, Geometry and Topology, May 14–18 (Houston, USA), *Free subgroups of 3-manifold groups*.

XXI Brazilian Topology Meeting – ICM 2018 Satellite Conference, August 13–17 (Niterói, Brazil), *Thickness of skeletons of hyperbolic orbifolds*.

2019 Hyperbolic Geometry, Spectral Geometry and related topics, April 15–19 (KIAS, Seoul, Korea), *Counting isospectral manifolds (minicourse)*.

Teichmüller Theory, Hyperbolicity and Dynamics, June 23–29 (IMPA, Rio de Janeiro, Brazil), *Arithmetic points in moduli spaces*.

The 1st Joint meeting Brazil–France in Mathematics, July 15–19 (IMPA, Rio de Janeiro, Brazil), *Free subgroups of 3-manifold groups*.

2020 Zariski-dense subgroups and number-theoretic techniques in Lie groups and geometry, July 30 (ICTS, India – Online), Gopal Prasad's Day Arithmetic in Geometry, *Prasad's volume formula and its applications*.

Arithmetic reflection groups and crystallographic packings, December 14–18 (AIM, San Jose, California – Online), *Spectral bounds for arithmetic reflection groups*.

2021 Lattices and Cohomology of Arithmetic Groups: Geometric and Computational Viewpoints, October 3–8 (BANFF, Canada – Online), *Subspace stabilisers in hyperbolic lattices*.

2022 Arithmetic Groups and 3-Manifolds, May 16–20 (Bonn, Germany), *Subspace stabilisers in hyperbolic lattices*.

2023 XXVI Brazilian Algebra Meeting, January 29 – February 3 (Curitiba, Brazil), Group Theory Session, *Effective bounds for Vinberg's algorithm*.

Durham Symposium 2023: Spectral gaps, August 7–11 (Durham, UK), *Geometric expanders*.

2024 Zariski dense subgroups, number theory and geometric applications, January 1–12 (ICTC, India), *Subspace stabilisers in hyperbolic lattices (Online)*.

Colloquia and seminar talks in 2005–23

04/11/05 Geometry and Groups Seminar (Newcastle, UK), Finite groups and hyperbolic manifolds.
08/11/05 Oxford Algebra Seminar (Oxford, UK), Growth of lattices in semisimple Lie groups.
06/11/05 Algebraic Geometry Seminar (Liverpool, UK), Mass formulas for the lattices in quadratic spaces.
09/11/05 Pure Maths Seminar (Durham, UK), Finite groups and hyperbolic manifolds.
02/02/06 Geometry Seminar (Durham, UK), Introduction to arithmetic groups I.
09/02/06 Geometry Seminar (Warwick, UK), Finite groups and hyperbolic manifolds.
23/02/06 Geometry Seminar (Durham, UK), Introduction to arithmetic groups II.
03/03/06 Pure Math Colloquium (Birmingham, UK), Finite groups and hyperbolic manifolds.
08/05/06 Topology Seminar (Oxford, UK), Finite groups and hyperbolic manifolds.
17/08/06 MPIM Oberseminar (Bonn, Germany), Counting maximal arithmetic subgroups.
07/12/06 Algebra Seminar (Aberdeen, UK), Finiteness theorems for arithmetic reflection groups.
21/12/06 Geometry Seminar (Novosibirsk, Russia), Finite groups and hyperbolic manifolds.
22/01/07 Pure Maths Colloquium (Durham, UK), Finiteness theorems for arithmetic reflection groups.
07/03/07 Heilbronn Seminar (Bristol, UK), Counting maximal arithmetic subgroups.
22/03/07 ESI Oberseminar (Vienna, Austria), Counting maximal arithmetic subgroups.
29/03/07 ESI Oberseminar (Vienna, Austria), Finiteness theorems for arithmetic reflection groups.
04/04/07 General Math Colloquium (Utrecht, Netherlands), Counting maximal arithmetic subgroups
08/06/07 Pure Math Colloquium (Southampton, UK), Finiteness theorems for arithmetic reflection groups.
18/10/07 Geometry Seminar (Durham, UK), Systoles of hyperbolic manifolds I.
25/10/07 Geometry Seminar (Durham, UK), Systoles of hyperbolic manifolds II.
31/10/07 Basic Notions Seminar (Durham, UK), Property T.

03/01/08 Amitsur Algebra Seminar (Jerusalem, Israel), Counting maximal arithmetic subgroups.

06/01/08 Bar-Ilan Math Colloquium (Bar-Ilan, Israel), Finiteness theorems for arithmetic reflection groups.

09/01/08 Geometry Seminar (Bar-Ilan, Israel), Some proofs of finiteness results for arithmetic reflection groups.

31/01/08 Geometry Seminar (Durham, UK), Systoles of hyperbolic manifolds III.

06/03/08 London Algebra Colloquium (Imperial College, UK), Finiteness theorems for arithmetic reflection groups.

13/03/08 Oberseminar Geometrie und Topologie (Fribourg, Switzerland), Finiteness theorems for arithmetic reflection groups.

13/06/08 Bar-Ilan Math Colloquium (Bar-Ilan, Israel), Class field towers, Pisot numbers and counting lattices.

18/09/08 Geometry Seminar (University of Chicago, USA), Class field towers, Pisot numbers and counting manifolds.

02/10/08 Differential Geometry Seminar (UIUC, USA), Finiteness theorems for arithmetic reflection groups.

06/10/08 Geometry Seminar (UIC, USA), Counting arithmetic surfaces and 3-manifolds.

30/10/08 Geometry Seminar (Durham, UK), Thick-thin decomposition and generators of lattices, part 1.

06/11/08 Geometry Seminar (Durham, UK), Thick-thin decomposition and generators of lattices, part 2.

20/11/08 Algebra Seminar (Krasnoyarsk, Russia), Growth of lattices in semisimple Lie groups.

14/10/09 Oberseminar Geometrie und Topologie (Fribourg, Switzerland), Counting arithmetic surfaces and 3-manifolds.

15/10/09 Séminaire Groupes et Géométrie (Genève, Switzerland), Counting lattices.

29/10/09 Geometry Seminar (Durham, UK), The surface subgroup conjecture.

03/11/09 Maths Colloquium (University of Kent, UK), Finiteness theorems for arithmetic reflection groups.

19/11/09 Algebra Seminar (Warwick, UK), Cells in Coxeter groups.

15/02/10 Pure Mathematics Seminar (Exeter, UK), On volumes of arithmetic hyperbolic n-orbifolds.

28/10/10 Number Theory Seminar (Oxford, UK), Distributions of lattices, class numbers and discriminants.

03/11/10 Pure Maths Colloquium (Sheffield, UK), On volumes of arithmetic quotients of the hyperbolic n-space.

23/02/11 Topology and Group Theory Seminar (Vanderbilt University, USA), Finiteness theorems for arithmetic hyperbolic reflection groups.

23/08/11 Geometry Seminar (IMPA, Brazil), Isometry groups of hyperbolic manifolds.

07/11/11 MSRI Seminar (Berkeley, USA), Finiteness theorems for arithmetic manifolds of bounded volume.

11/11/11 Special Talk (IMPA), Volumes of arithmetic quotients and counting lattices.

30/11/11 Topology, Geometry, and Operator Algebras Seminar (Berkeley, USA), Finite groups and hyperbolic manifolds.

14/02/12 Differential Geometry Seminar (IMPA), Surfaces in closed hyperbolic 3-manifolds.

07/05/12 Colóquio de Matemática (SMA-USP, São Carlos), Hyperbolic 3-manifolds after the virtual Haken.

23/08/12 Geometry Seminar (IMPA), Finiteness theorems for hyperbolic reflection groups.

21/09/12 Geometry Seminar (Belo Horizonte, Brazil), Two-systoles of hyperbolic three-manifolds.

21/11/12 Grupo de Trabalho — Subgrupos do grupo de Cremona (IMPA), Delta-hyperbolic spaces.

23/11/12 Number Theory Seminar (IMPA), Lehmer's question and the short geodesics conjecture.

28/11/12 Grupo de Trabalho — Subgrupos do grupo de Cremona (IMPA), Small cancellation theory.

18/01/13 UnB Algebra Seminar (Brasilia), Free subgroups of arithmetic 3-manifold groups.

11/04/13 Mathematics Colloquium (University of Virginia, USA), Free subgroups of arithmetic 3-manifold groups.

08/05/13 Algebra Seminar (IMPA), Green functions in Arakelov geometry.

22/08/13 Mathematics Colloquium (PUC, Rio de Janeiro), Hyperbolic manifolds of small volume.

15/09/13 Differential Geometry Seminar (IMPA), Isometry groups of hyperbolic manifolds.

12/03/14 Geometry Seminar (University of Chicago, USA), 2-systoles of arithmetic 3-manifolds.

13/03/14 Mathematics Colloquium (Vanderbilt University, USA), Free subgroups of three-manifold groups.

20/03/14 Geometry Seminar (University of Chicago, USA), 2-systoles and quantum codes.

20/05/14 Geometry & Topology Seminar (UFRJ, Rio de Janeiro), Growth of systoles of arithmetic manifolds.

31/10/14 Colóquio de Geometria e Aritmética (UFF, Rio de Janeiro), Arithmetic hyperbolic reflection groups.

25/11/15 Colóquio de Matemática (UFRGS, Porto Alegre), Grupos de reflexões hiperbólicas.

17/02/16 Geometry & Topology Seminar (UFRJ, Rio de Janeiro), Counting manifolds.

28/04/16 Geometry Seminar (Durham, UK), Two-systoles of hyperbolic three-manifolds.

03/11/16 Groups & Dynamics Seminar (Hebrew University, Jerusalem), Arithmetic Kleinian groups generated by elements of finite order.

10/02/17 Laboratory of algebraic geometry weekly seminar (HSE, Moscow), Systoles of hyperbolic manifolds.

21/02/17 Differential Geometry Seminar (IMPA), Triangulations of elliptic 3-manifolds.

23/02/17 Differential Geometry Seminar (IMPA), Triangulations of hyperbolic 3-orbifolds.

18/08/17 Geometry Seminar (Sobolev Institute, Novosibirsk), Geometric expanders.

07/03/18 Coloquio de Profesores (Cinvestav, Mexico), Thickness of skeletons of hyperbolic orbifolds.

05/10/18 Geometry and Dynamics Seminar (Lille, France), Free subgroups of 3-manifold groups.

23/10/18 Differential Geometry Seminar (IMPA), Free subgroups of 3-manifold groups.

25/10/19 Geometry and Dynamics Seminar (Lille, France), Thickness of skeletons of arithmetic hyperbolic orbifolds.

03/03/20 Arithmetic of Algebraic Groups Seminar (Bonn, Germany), Free subgroups of Kleinian groups.

18/03/21 Birmingham Warwick Algebra Seminar (Online), Growth of lattices in semisimple Lie groups.

22/04/21 LieJor Online Seminar: Algebras, Representations, and Applications, Growth of lattices.

13/07/21 Pangolin Seminar (Online), FC–subspaces.

20/01/22 Differential Geometry Seminar (IMPA), Subspace stabilisers in hyperbolic lattices.

06/10/22 Rice Mathematics Colloquium (Houston, USA), Arithmetic hyperbolic reflection groups.

06/06/23 Differential Geometry Seminar (IMPA), Subspace stabilisers in hyperbolic lattices (II).

20/06/23 Agol Lab Program (ICMAT, Madrid), Subspace stabilisers in hyperbolic lattices.

29/08/23 Differential Geometry Seminar (IMPA), Effective bounds for Vinberg's algorithm.

Publications

Journal Papers

[**1**] *Estimates for the number of automorphisms of a Riemann surface,* Sib. Math. J. **38** (1997), no. 5, 860–867.

[**2**] *On Wiman bound for arithmetic Riemann surfaces,* with Grzegorz Gromadzki, Glasgow Math. J. **45** (2003), 173–177.

[**3**] *Cells and representations of right-angled Coxeter groups,* Selecta Math., N. S. **10** (2004), 325–339.

[**4**] *On volumes of arithmetic quotients of* $SO(1,n)$, Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) **3** (2004), 749–770.

[5] *A bound for the number of automorphisms of an arithmetic Riemann surface,* with Gareth A. Jones, Math. Proc. Camb. Phil. Soc. **138** (2005), 289–299.

[6] *Automorphism groups of Riemann surfaces of genus $p+1$, where p is prime,* with Gareth A. Jones, Glasgow Math. J. **47** (2005), 379–393.

[7] *The mass of unimodular lattices,* with Wee Teck Gan, J. Number Theory **114** (2005), 221–237.

[8] *Finite groups and hyperbolic manifolds,* with Alex Lubotzky, Invent. Math. **162** (2005), 459–472.

[9] *Counting maximal arithmetic subgroups* (with an appendix by Jordan Ellenberg and Akshay Venkatesh), Duke Math. J. **140** (2007), no. 1, 1–33.

[10] *Addendum to: On volumes of arithmetic quotients of* SO$(1,n)$, Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) **6** (2007), 263–268.

[11] *Finiteness of arithmetic hyperbolic reflection groups,* with Ian Agol, Peter Storm and Kevin Whyte, Groups Geom. Dyn. **2** (2008), 481–498.

[12] *On fields of definition of arithmetic Kleinian reflection groups,* Proc. Amer. Math. Soc. **137** (2009), 1035–1038.

[13] *Counting arithmetic lattices and surfaces,* with Tsachik Gelander, Alex Lubotzky and Aner Shalev, Ann. of Math. (2) **172** (2010), 2197–2221.

[14] *Systoles of hyperbolic manifolds,* with Scott Thomson, Algebr. Geom. Topol. **11** (2011), 1455–1469.

[15] *Finiteness theorems for congruence reflection groups,* Transform. Groups **16** (2011), 939–954.

[16] *Manifolds counting and class field towers,* with Alex Lubotzky, Adv. Math. **229** (2012), 3123–3146.

[17] *On volumes of arithmetic quotients of* PO$(n,1)^\circ$, *n odd,* with Vincent Emery, Proc. Lond. Math. Soc. (3), **105** (2012), 541–570.

[18] *On* 2*-systoles of hyperbolic* 3*-manifolds,* Geom. Funct. Anal., **23** (2013), 813–827.

[19] *Cells in Coxeter groups, I,* with Paul Gunnells, J. Algebra, **385** (2013), 134–144.

[20] *Reflective and quasi-reflective Bianchi groups,* with John Mcleod, Transform. Groups, **18** (2013), 971–994.

[21] *On fields of definition of arithmetic Kleinian reflection groups. II,* with Ben Linowitz, Int. Math. Res. Notices (2014), Vol. 2014, 2559–2571.

[22] *Kazhdan–Lusztig cells in planar hyperbolic Coxeter groups and automata,* with Paul Gunnells and Richard Scott, Internat. J. Algebra Comput. **24** (2014), no. 5, 757–772.

[23] *Hyperbolic manifolds of small volume,* with Vincent Emery, Doc. Math., **19** (2014) 801–814.

[24] *Kazhdan–Lusztig cells in infinite Coxeter groups,* with Paul Gunnells, J. Gen. Lie Theory Appl., **9** (2015), no. S1, Art. ID S1-002, 4 pp.

[25] *Arithmetic hyperbolic reflection groups,* Bull. Amer. Math. Soc. (N.S.) **53** (2016), no. 3, 437–475.

[26] *Counting isospectral manifolds,* with Benjamin Linowitz, Adv. Math. **321** (2017), 69–79.

[27] *Counting non-uniform lattices,* with Alex Lubotzky, Israel J. Math. **232** (2019), 201–229.

[28] *Free subgroups of 3-manifold groups,* with Cayo Dória, Groups Geom. Dyn. **14** (2020), 243–254.

[29] *A bound for diameter of arithmetic hyperbolic orbifolds,* Geom. Dedicata **214** (2021), 295–302.

[30] *How to see the eight Thurston geometries,* with Tiago Novello, Vinícius da Silva and Luiz Velho, Ensaios Matemáticos, **37** (2021), 101–151.

[31] *Counting Salem numbers of arithmetic hyperbolic 3-orbifolds,* with Matilde Lalín, Plinio G. P. Murillo and Lola Thompson, Bull. Braz. Math. Soc., New Series, **53** (2022), 553–569 .

[32] *Thickness of skeletons of arithmetic hyperbolic orbifolds,* with Hannah Alpert, J. Topol. Anal., **14** (2022), 749–765.

[33] *Lower bounds for volumes and orthospectra of hyperbolic manifolds with geodesic boundary,* with Martin Bridgeman, Algebr. Geom. Topol., **22** (2022), 1255–1272.

[34] *Effective bounds for Vinberg's algorithm for arithmetic hyperbolic lattices,* with Michael Kapovich, São Paulo J. Math. Sci., online first (2023), 11 pp.

Conference Proceedings

[35] *Some estimates for the number of automorphisms of Riemann surfaces,* Proceedings of XXXIV International Scientific Students Conference, Novosibirsk 1996, p. 9.

[36] *Arbeitstagung 2003 – Volumes of arithmetic hyperbolic n-manifolds,* Publications of the MPIM in Bonn, report: MPIM2003–60n.

[37] *On volumes of arithmetic locally symmetric spaces,* from: "Locally Symmetric Spaces" (Organisers: Jürgen Rohlfs and Birgit Speh), Oberwolfach Reports, 2003.

[38] *Arbeitstagung 2009 – Counting lattices,* Publications of the MPIM in Bonn, report: MPIM2009–40o.

[39] *Kazhdan-Lusztig cells in infinite Coxeter groups,* with Paul Gunnells, 8 pp., Proceedings of the Workshop on Algebra, Combinatorics and Dynamics (Belfast, August 2009), J. Gen. Lie Theory Appl. **9** (2015), no. S1, Art. ID S1-002.

[40] *Geodesics, volumes and Lehmer's conjecture,* from: "Low-Dimensional Topology and Number Theory" (Organisers: Paul E. Gunnells, Walter Neumann, Adam S. Sikora, and Don Zagier), Oberwolfach Reports **7** (2010), 2136–2139.

[41] *Free subgroups of arithmetic 3-manifold groups,* from: "Geometric Group Theory, Hyperbolic Dynamics and Symplectic Geometry" (Organisers: Berhard Knieper, Leonid Polterovich, Leonid Potyagailo), Oberwolfach Reports, **35** (2012), 46–48.

[42] *Hyperbolic orbifolds of small volume,* Proceedings of the International Congress of Mathematicians (Seoul, 2014), Vol. II, 837–851.

[43] *Expansores geométricos* (in Spanish), Aritmética, grupos y análisis – Actas de la escuela AGRA II, Publicações Matemáticas, **42** (2020), 284–304.

Other Articles

[**44**] *Geometry of Larry Guth* (in Russian), Troitsky Variant Nauka, 6 (300), 2020, p. 7.

[**45**] *Ernest Borisovich Vinberg* (in Russian), with D. V. Alekseevsky, S. G. Gindikin, V. G. Kac, D. I. Panyushev, D. A. Timashev, O. V. Shvartsman, A. G. Eliashvili and O. S. Yakimova, Uspekhi Mat. Nauk, Volume 76, Issue 6 (462), pages 181–192 (2021). Translation in Russian Math. Surveys **76** (2021), 1123–1135.

Editorial

[**46**] *Mini-workshop: reflection groups in negative curvature,* with Vincent Emery and Ruth Kellerhals, Oberwolfach Rep. **16** (2019), no. 2, 1043–1070.

[**47**] *Aritmética, grupos y análisis – Actas de la escuela AGRA II,* with Harald Andrés Helfgott and Carlos Gustavo Moreira, Publicações Matemáticas, **42** (2020), 350 pp.

Submitted

[**48**] *Subspace stabilisers in hyperbolic lattices,* with Nikolay Bogachev, Alexander Kolpakov and Leone Slavich, `arXiv:2105.06897 [math.GT]`, 71 pp.

[**49**] *Growth of k-dimensional systoles in congruence coverings,* with Shmuel Weinberger, `arXiv:2302.03196 [math.GT]`, 22 pp.

[**50**] *Geometry and arithmetic of semi-arithmetic Fuchsian groups,* with Gregory Cosac, Cayo Dória and Gisele Teixeira Paula, `arXiv:2310.13151 [math.GR]`, 18 pp.

Preprints

[**51**] *On arithmetic Kleinian groups generated by three half-turns,* `arXiv:math.MG/9912071`, 13 pp.

[**52**] *Singular sets and parameters of generalized triangle orbifolds,* `arXiv:math.MG/0103015`, 21 pp.

[**53**] *Arithmetic Kleinian groups generated by elements of finite order,* `arXiv:1610.06147v2 [math.GT]`, 18 pp.

Teaching at Durham University

Undergraduate courses:

Algebra II (172 students), Differential Geometry III (94 students); Core A: Linear Algebra (350 students), Differential Geometry III (110 students); Geometry III/IV (46 students); Representation Theory and Modules III/IV (44 students); Algebra and Number Theory II (66 students), Geometry III/IV (39 students); Geometry III/IV (39 students), Algebra and Number Theory II (66 students), Representation Theory and Modules III/IV (29 students).

Tutorials and problem classes:

Core A Calculus, Core A Geometry, Core A Linear Algebra, Algebra and Number Theory II, Complex Analysis II, Geometric Topology II, Linear Algebra II.

Undergraduate projects supervised:

Project IV: *Pisot and Salem Numbers* (3 students); Communicating Mathematics III: *Pisot and Salem Numbers* (3 students); Communicating Mathematics III: *Fibonacci Numbers* (3 students); Project IV: *Cells in Coxeter Groups* (1 student).

Teaching at IMPA

March–June 2012, Aug.–Dec. 2013, 2014, 2015, 2016, 2017, 2018, 2021, 2023: Geometric Group Theory.
March–June 2021, 2022: Complex Analysis.
Summer 2013, 2015, 2016, 2017, 2019. 2023: Differential Topology.
March–June 2014: Algebra.
March–June 2018: Topology of Manifolds.

Current PhD students: Danielle da Cunha Nunes.

Current Master students: Aleksandr Grebennikov, Altan Erdnigor, Marcos Vinicius Strieder.

PhD students supervised:

Vincent Emery, joint supervision with Prof. Ruth Kellerhals (Fribourg, Switzerland), thesis title "*Du volume des quotients arithmétiques de l'espace hyperbolique*", 2009.

Scott A. Thomson, thesis "*Short geodesics in hyperbolic manifolds*", Durham University, 2012.

John A. McLeod, thesis "*Arithmetic hyperbolic reflection groups*", Durham University, 2013.

Plinio G. P. Murillo, thesis "*On arithmetic manifolds with large systole*", IMPA, 2017. **(Prêmio Carlos Gutierrez – 2018).**

Gisele Teixeira Paula, thesis "*On geometry of Siegel sets for lattices in SL_n*", IMPA, 2018.

Cayo Dória, thesis "*How systoles grow*", IMPA, 2018.

Marcos Cassorini, "*Discrete surfaces with length and area and minimal fillings of the circle*", IMPA, 2018.

Gregory Cosac Daher, "*On the geometry of semi-arithmetic Riemann surfaces*", IMPA, 2021.

Emanoel Freire, "*Kissing number of hyperbolic manifolds*", IMPA, 2023.

Postdocs supervised: Olivier Glorieux (12/2015–11/2016), Dali Shen (12/2015–11/2017).

Other Information

Spoken Languages: Russian, English, Spanish, Portuguese.
Programming Languages: C/C++, Java, JavaScript, Pascal, Fortran, Basic, x86 assembler, SQL, HTML.

From 1998 till 2001, I was doing part time jobs as *Game Designer* at Alawar Entertainment and *Graphics Designer* at CDS Inc., Novosibirsk.
I participated in Russian Informatics, Maths, and Physics Olympiads in 1990 and 1991; and was a winner of the 3rd Young Physicists' Tournament (1990, Moscow).
I studied at School N41, Krasnoyarsk, Russia.