

CURRICULUM VITAE

Ilia SMILGA
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Born on 25 March 1989 in Moscow, Russia
Nationality: French
Married, 2 children (born in 2019 and 2020)

Career path

2022– Postdoctoral Research Associate at the University of Oxford
2020–2022 Postdoc of the CNRS at the Institut des Hautes Études Scientifiques (near Paris)
2019–2020 Postdoc of the CNRS at the Aix-Marseille university
2018–2019 Research Fellow at Higher School of Economics (Moscow)
2015–2018 Gibbs Assistant Professor at university of Yale
2012–2015 Graduate student at Université de Paris-Sud
2008–2012 Student of the École Normale Supérieure, Paris
2006–2008 “Classes préparatoires” MPSI and MP* in lycée Louis-le-Grand, in Paris

Education

2011–2014 PhD with Yves Benoist at Université de Paris-Sud, on the subject “Tilings of affine space”. Defended on 12 November 2014.
2011 Master’s degree in mathematics
Sep–Dec ’10 Internship in the Independent University, in Moscow
2010 “Agrégation externe de mathématiques”: competitive examination for high school and university teaching positions; ranked 28th
2009 “Maîtrise” (one-year graduate degree) in mathematics
“Licence” (Bachelor’s degree) in mathematics
2006 “Baccalauréat S” (high school graduation) summa cum laude in lycée Clémenceau, in Nantes

Publications and preprints

Publications in peer-reviewed journals

- (2022) I. Smilga “Representations having vectors fixed by a Levi subgroup”, *Journal of Algebra* **597**, 75–115
- (2022) I. Smilga “Proper affine actions: a sufficient criterion”, *Mathematische Annalen* **382**, 513–605
- (2021) I. Smilga “New sequences of non-free rational points”, *Comptes Rendus Mathématique* **359** (8), 983–989
- (2020) I. Smilga “Construction of Milnorian representations”, *Geometriae Dedicata* **206**, 55–73
- (2018) B. Le Floch, I. Smilga “Action of Weyl group on zero-weight space”, *Comptes Rendus Mathématique* **356** (8), 852–858
- (2018) I. Smilga “Proper affine actions in non-swinging representations”, *Groups, Geometry and Dynamics* **12** (2), 449–528
- (2016) I. Smilga “Proper affine actions on semisimple Lie algebras”, *Annales de l’Institut Fourier* **66** (2), 785–831
- (2014) I. Smilga “Fundamental domains for properly discontinuous affine groups”, *Geometriae Dedicata* **171**, 203–229

Publications in proceedings and chapters of books

9. (2023) I. Smilga “Action of w_0 on V^L for orthogonal and exceptional groups”, in V. Dobrev, editor, *Proceedings of the XIV International Workshop “Lie Theory and Its Applications in Physics” (Sofia, Bulgaria, June 2021)*, volume 396 of *Springer Proceedings in Mathematics and Statistics*, pages 297–303. Springer Singapore, 2023.
10. (2022) J. Danciger, T. A. Drumm, W. M. Goldman, I. Smilga “Proper actions of discrete groups of affine transformations”, in D. Fisher, D. Kleinbock, G. Soifer, editors, *Dynamics, Geometry, Number Theory: the Impact of Margulis on Modern Mathematics*, pages 95–168. University of Chicago Press, 2022.
11. (2020) I. Smilga “Action of the restricted Weyl group on the L -invariant vectors of a representation”, in V. Dobrev, editor, *Proceedings of the XIII International Workshop “Lie Theory and Its Applications in Physics” (Varna, Bulgaria, June 2019)*, volume 335 of *Springer Proceedings in Mathematics and Statistics*, pages 365–372. Springer Singapore, 2020.

Preprints

12. (2023) I. Smilga “Action of w_0 on V^L : the special case of $\mathfrak{so}(1, n)$ ”, submitted; arXiv:2310.14956
13. (2023) J. Kahn, V. Marković, I. Smilga “Geometrically and topologically random surfaces in a closed hyperbolic three manifold”, submitted; arXiv:2309.02847
14. (2012) I. Smilga “Harmonic functions on the Sierpinski triangle”, arXiv:1205.4442

Invited talks and posters at conferences

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| Feb 2023 | <i>Distribution of minimal surfaces in compact hyperbolic 3-manifolds</i> (talk)
Winter Braids XIII
in Montpellier (France) |
| Jan 2022 | <i>Positivity and the Maslov index</i> (talk)
Young Researcher’s Workshop on Positivity in Lie Groups
in Heidelberg (Germany) |
| Jun 2021 | <i>Representations with vectors fixed by a Levi subgroup</i> (talk)
XIV International Workshop “Lie Theory and its Applications in Physics”
online, organised from Sofia (Bulgaria) |
| Jun 2019 | <i>Action of Weyl group on zero-weight space</i> (talk)
XIII International Workshop “Lie Theory and its Applications in Physics”
in Varna (Bulgaria) |
| Jan 2019 | <i>Milnorian and non-Milnorian representations</i> (talk)
Conference “Geometric Structures in Nice ” (France) |
| Nov 2018 | Poster at the “Real and Complex Dynamical Systems” conference
at the Independent University of Moscow |
| Mar 2016 | <i>Free affine groups acting properly discontinuously</i> (talk)
Special Session on Homogeneous Dynamics in AMS sectional meeting
in Stony Brook University (New York) |
| Feb 2015 | Poster at the “Zariski-Dense Subgroups” workshop
at the IPAM (Los Angeles) |
| Nov 2014 | <i>New counterexamples to a Milnor conjecture</i> (talk)
Conference “Parole aux jeunes chercheurs en géométrie et dynamique”
in Bordeaux (France) |

Seminar talks

(Numbers of articles quoted here refer to the publication list above. Some of the talks were done remotely, without visiting the city listed here.)

Around article 8: *Fundamental domains for affine Schottky groups in $SO(2n+2, 2n+1)$ or *Playing ping-pong with a tennis ball** Rennes (2013), Marseille, Yale (2015), Lille, HSE of Moscow (2018), Toulouse (2022)

Around article 7: *New counterexamples to Milnor’s conjecture and Affine tilings and Margulis invariants* Lille, Orsay (2 séminaires), Nantes (2014), Jussieu, Avignon, Einstein Institute in Jerusalem, Heidelberg (2015)

Around article 6: *Discrete free affine groups acting properly* Avignon, Heidelberg, Yale (2016), UT Austin, Lyon, Strasbourg, Lille, Rennes, Bordeaux (2017)

Around article 2: *Milnor and non-Milnor representations* Nice, Grenoble, Marseille, IHÉS, HSE of Moscow, Moscow State University (2018), Jussieu, Toulouse (2019), Nancy, Dijon, Amiens (2020), Avignon (2021), Orsay, Polytechnique, Montpellier (2022), Oxford (2023)

Around article 4: *Construction of Milnor representations* Marseille (2019), Grenoble (2021), Nancy, Nice (2022)

Around my work with Fanny Kassel (article in preparation): *Criteria for proper affine actions of Anosov groups* Marseille, Bordeaux, Rennes, Leipzig (2023)

Around article 5: *Action of the Weyl group on the zero-weight space* University of Maryland (2017), Moscow State University, HSE of Moscow (2018), Marseille (2019)

Around articles 5 and 1: *Action of the Weyl group on the space of L -invariant vectors* Marseille (2019), Lyon, Cologne, Marseille (2020), Poitiers, Caen (2022), Strasbourg, Nancy (2023)

Around article 13: *Distribution of minimal surfaces in hyperbolic 3-manifolds* Oxford, Rutgers (2023)

***Margulis spacetimes and crooked planes* (exposé court de type colloquium, présentation générale des espaces-temps de Margulis)** Journée francilienne d’accueil des postdoctorants à Orsay (2020), séminaire “North meets South” à Oxford (2022)

Visits abroad (≥ 1 month)

Jun–Aug ‘19 IHÉS, 2.5 months

May–Jul ‘18 IHÉS, 7 weeks

Aug–Sep ‘11 Program “Quantitative Geometry” at the MSRI, in Berkeley

Teaching and outreach activities

- 2023–2024** TA for Introduction to University Mathematics and Prelims–1 (Linear Algebra) at Exeter College in Oxford
- 2022–2023** Tutor + TA for C3.5 (Lie Groups) in Oxford
Tutor + TA for 3 groups of B1.1 (Logic) in Oxford
TA for A5 (Topology) at Exeter College in Oxford
TA for A3 (Rings and Modules) at Exeter College in Oxford
TA for A0 (Linear Algebra) at Exeter College in Oxford
- Jul 2021** Course “Playing ping-pong with a tennis ball: tilings of the affine space” at the summer school “Contemporary mathematics” (for high-school students and undergraduates in the first two years) in Dubna (Russia)
- Feb–Mar ’19** Running exercise sessions in Algebra at the Higher School of Economics
- 2017–2018** Math 360 (Introduction to Lie Theory) at Yale
Math 830 (Differential Geometry) at Yale
Math 354 (Number Theory) at Yale
- 2016–2017** Math 380 (Modern Algebra) at Yale
Topics course “Proper actions by discrete groups” at Yale
Math 830 (Differential Geometry) at Yale
- 2015–2016** Math 360 (Introduction to Lie Theory) at Yale
Math 354 (Number Theory) at Yale
Math 830 (Differential Geometry) at Yale
- 2013–2014** “Maths en Jeans” workshop (initiation to mathematical research for high-school students)
- 2012–2015** Teaching assistant (running exercise sessions) in the University of Paris-Sud
- Mar–Jun ’12** Oral interrogations in mathematics in MPSI (first year of “Classes préparatoires”) in lycée Louis-le-Grand
- 2008–2009** Tutoring for high-school students in the “TalENS” association
- 2007, 2010** IMO training camp in Grésillon (France)
- I am the coauthor, with Bruno Le Floch, of exercise 5 given at the 2008 International Mathematics Olympiad (in Madrid).

In 2007, I prepared a talk about regular polytopes in dimension 4 and above, for the Students’ Mathematical Seminar in Louis-le-Grand. I repeated in on several occasions since (IMO training camp in Grésillon, Berkeley...)

Grants, awards and distinctions

- 2017** NSF Research Grant: “Properly Discontinuous Actions on Homogeneous Spaces”, DMS-1709952, 2017–2019.
- 2009** Ranked 35th in the Prologin contest (a French coding contest)
- 2007** Silver medal at the International Physics Olympiad in Isfahan (Iran)
- 2006** Gold medal at the International Mathematics Olympiad in Ljubljana (Slovenia)
Third prize at the “Concours Général” in physics
Second “accessit” (runner-up) at the “Concours Général” in mathematics
- 2005** Bronze medal at the International Mathematics Olympiad in Mérida (Mexico)

Community service

Refereeing for *Algebraic and Geometric Topology*, *Geometriae Dedicata*, *Journal of Lie Theory and Journal of Topology*.

I was a member of the organizing committee for the conference “Dynamics of Group Actions” in the honor of Yves Benoist, in particular responsible for its webpage: <http://dynamicsgroupactions.imj-prg.fr/>.

I translated into English the articles “Actions propres sur les espaces homogènes réductifs”

and “Propriétés asymptotiques des groupes linéaires” by Yves Benoist; the translations can be consulted at [arXiv:1802.07302](https://arxiv.org/abs/1802.07302) and [arXiv:1811.06009](https://arxiv.org/abs/1811.06009).

Various skills

Language French and Russian: mother tongues
 English: fluent
 Italian, German and Spanish: intermediate
 Polish: basic

Computers CamL, LaTeX, Mathematica, Sage
 Some experience with Linux
 Some knowledge of C and Lisp