

Kostiantyn Drach

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Curriculum Vitae¹

Personal Information

Date of Birth	April 6, 1990
Citizenship	Ukraine
Sex	Male

Professional Experience

2012 – present	Senior Lecturer at the Department of Fundamental Mathematics (former Geometry Department), School of Mathematics and Informatics (former School of Mathematics and Mechanical Engineering), V. N. Karazin Kharkiv National University, Kharkiv, Ukraine
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Education

2012 – present (expected Spring 2016)	PhD in Mathematics , Department of Fundamental Mathematics (former Geometry Department), V. N. Karazin Kharkiv National University, Kharkiv, Ukraine and Department of Mathematical Analysis and Mathematical Optimization, Sumy State University, Sumy, Ukraine <i>Title:</i> “Extreme bounds for complete hypersurfaces in Riemannian spaces” <i>Advisor:</i> Alexander A. Borisenko
2011 – 2012	MSc in Mathematics (<i>with honors</i>), Geometry Department, School of Mathematics and Mechanical Engineering, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine
2007 – 2011	BSc in Mathematics (<i>with honors</i>), School of Mathematics and Mechanical Engineering, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine
2000 – 2007	High School Graduate (<i>with honors</i>), Kharkiv Physical and Mathematical Lyceum #27, Kharkiv, Ukraine

¹Last updated: January 15, 2016

Languages

Ukrainian (*native*), Russian (*native*), English (*fluent*).

Research Interests

Geometry of submanifolds; comparison techniques in geometry; geometric optimal control theory; geometric flows; isoperimetric inequalities; variational techniques in geometry; symmetries of abstract polytopes.

Publications

Published

- 2015 | A. Borisenko and K. Drach. Extreme properties of curves with bounded curvature on a sphere. *Journal of Dynamical and Control Systems*, 21(3):311–327, 2015
- 2015 | K. Drach. Some sharp estimates for convex hypersurfaces of pinched normal curvature. *Journal of Mathematical Physics, Analysis, Geometry*, 11(2):111–122, 2015
- 2015 | K. Drach and M. Mixer. Minimal covers of equivelar toroidal maps. *Ars Mathematica Contemporanea*, 9(2):77–91, 2015
- 2015 | A. Borisenko and K. Drach. Comparison theorem for the support functions of hypersurfaces. *Dopov. Nats. Akad. Nauk Ukr., Mat. Pryr. Tekh. Nauky 2015*, (3):11–16, 2015. (in Russian, English version available in CRM Preprint Series, No. 1186 (2014))
- 2014 | K. Drach. About the isoperimetric property of λ -convex lune on the Lobachevsky plane. *Dopov. Nats. Akad. Nauk Ukr., Mat. Pryr. Tekh. Nauky 2014*, (11):11–15, 2014. (in Russian, English version available in CRM Preprint Series, No. 1187 (2014))
- 2014 | A. Borisenko and K. Drach. Isoperimetric inequality for curves with curvature bounded below. *Matematicheskie Zametki*, 95(5):656–665, 2014. (English translation in *Mathematical Notes*, 95:5 (2014), 590-598)
- 2013 | A. Borisenko and K. Drach. Closeness to spheres of hypersurfaces with normal curvature bounded below. *Matematicheskii Sbornik*, 204(11):21–40, 2013. (English translation in *Sbornik: Mathematics*, 204:11 (2013), 1565-1583)
- 2011 | A. Borisenko and K. Drach. About an angle comparison theorem for closed curves. *Dopov. Nats. Akad. Nauk Ukr., Mat. Pryr. Tekh. Nauky 2011*, (6):7–11, 2011. (in Russian)

Accepted

- 2016 | K. Drach. On the solution of reverse Dido’s problem for convex surfaces of revolution. accepted in *Dopov. Nats. Akad. Nauk Ukr., Mat. Pryr. Tekh. Nauky 2016*

Preprints

- 2015 | K. Drach. Bolyai-Gerwien theorem for unbounded polygons
- 2014 | K. Drach. Conics associated with triangles, or how Poncelet meets Morley. arXiv:1410.4574 [math.MG]
- 2014 | K. Drach, Y. Eremenko, and A. Krymova. Uniquely constructed figures on a sphere. (in Ukrainian)

In preparation

- | K. Drach. Reverse isoperimetric inequality for strictly convex surfaces of revolution
- | K. Drach. On boundedness of the hyperbolic angle function of spacelike hypersurfaces
- | K. Drach and M. Skoryk. Archimedean toroids and their minimal almost regular covers

Selected Conference Proceedings

- 2014 | A. Borisenko and K. Drach. Geometry of hypersurfaces with bounded normal curvatures. In *Abstracts of the International Congress of Mathematicians 2014: Short Communications, Poster Sessions*, pages 116–117, Seoul, Aug. 2014. SEOUL ICM 2014
- 2013 | K. Drach. About global behavior of complete hypersurfaces with pinched normal curvature. In *Theses of the Reports to the 8th International Conference on Geometry, Topology and Teaching of Geometry*, pages 11–12, Cherkasy, 2013. ChDTU
- 2013 | A. Borisenko and K. Drach. Isoperimetric inequality for curves of bounded curvature on a sphere. In *Proceedings of the scientific-technical conference "Informatics, Mathematics, Automatics IMA::2013"*, pages 136–137, Symu, Apr. 2013. SumSU
- 2011 | A. Borisenko and K. Drach. On the refinement of the classical isoperimetric inequality. In *Proceedings of the international conference "Contemporary problems of mathematics and its application in natural sciences and information technologies" dedicated to the 50-th anniversary of the School of Mechanical Engineering and Mathematics*, pages 139–140, Kharkiv, Apr. 2011. Apostrof

Granted Program and Conference Participation

- August 2015 | 3rd Heidelberg Laureate Forum, Heidelberg, Germany
- August 2015 | Oberwolfach workshop "Applied Harmonic Analysis and Sparse Approximation", Oberwolfach, Germany
- May – June 2015 | Research Term in Analysis and Geometry in Metric Spaces, ICMAT, Madrid, Spain
- August 2014 | International Congress of Mathematicians, Seoul, Republic of Korea (NANUM travel grant)
- June 2014 | Fifth International Conference and School Geometry, Dynamics, Integrable Systems GDIS 2014: Bicentennial of The Great Poncelet Theorem and Billiard Dynamics, ICTP, Trieste, Italy
- August 2013 | The 12th Conference on Differential Geometry and its Applications DGA 2013, Brno, Czech Republic
- June – July 2013 | Conformal Geometry and Geometric PDE's Program, Centre de Recerca Matemàtica, Barcelona, Spain
- July – August 2011 | Fields – MITACS Undergraduate Summer Research Program, Fields Institute, Toronto, Canada

Talks and Posters

- November 2015 | Analysis Seminar (**invited talk**), University of Cincinnati, Cincinnati, USA
- August 2015 | 3rd Heidelberg Laureate Forum (**poster session**), Heidelberg, Germany
- May 2015 | Research Term in Analysis and Geometry in Metric Spaces (**talk at the Junior Seminar**), ICMAT, Spain
- August 2014 | International Congress of Mathematicians 2014 (**contributed short communication**), Seoul, Republic of Korea
- September 2013 | The 8th International Conference on Geometry, Topology and Teaching of Geometry (**invited talk**), Cherkasy, Ukraine
- June 2012 | Conference "Differential Geometry" (**contributed talk**), Bedlewo, Poland

Teaching Experience

Since 2012 taught the following courses at V.N. Karazin Kharkiv National University:

- *Elements of Mathematical Logic and Discrete Mathematics* (lectures and practical sessions for 1st year undergraduate students);
- *Analytical Geometry* (practical sessions for 1st year undergraduate students);
- *Mathematical Practicum* (practical sessions for 1st year undergraduate students);
- *Differential Geometry* (practical sessions for 2nd and 3rd year undergraduate students);
- *Classical Problems of Geometry "in Large"* (special course for 3rd year undergraduate students);
- *Computational Geometry and Computer Graphics* (practical sessions for 4th year undergraduate students specializing in applied mathematics);
- *Mean Curvature Flows* (special course for 5th year graduate students specializing in mathematics);
- *Mean Curvature Flows and Image Processing* (special course for 5th year graduate students specializing in applied mathematics);
- *Ricci Flows* (special course for 5th year graduate students specializing in mathematics).

Scholarships

2015, 2011	N. I. Akhiezer Foundation Scholarship of Kharkiv Mathematical Society
2011 – 2012	I. E. Tarapov Scholarship, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine
2009 – 2010, 2015 – 2016	Yu. Sapronov Kharkiv City Charitable Foundation Scholarship for talented students and young researchers

Scientific Competitions

March 2012	Second prize in the all-Ukrainian competition for student research projects in mathematics, Ivano-Frankivsk, Ukraine
March 2011	First prize in the all-Ukrainian competition for student research projects in mathematics, Vinnytsia, Ukraine
2009, 2010	Third Prizes in the all-Ukrainian Mathematical Olympiad for students, Lviv, Ukraine

Other Activities

2013 – present	Adviser for high school pupils' research projects in mathematics
2012 – 2015	Leader of mathematical circles for kids (5th – 7th grades) at "Fizmatik" outreach city school
2012 – 2014	Leader of a mathematical circle for high school pupils (10th – 11th grades) at Kharkiv Physical and Mathematical Lyceum #27
2007 – present	Member of the jury of the regional mathematical Olympiads and research projects contests