

**Contact Information**

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**Research Interests**

Graph limits, descriptive set theory, real and functional analysis, topology, sigma-ideals of small sets

**Current Position**

05/2017 – present      Researcher, Institute of Mathematics of the Czech Academy of Sciences

**Previous Employments**

01/2014 – 04/2017      Postdoctoral Fellow, Institute of Mathematics of the Czech Academy of Sciences  
10/2016 – 03/2017      Postdoctoral Fellow, The University of Warsaw, Faculty of Mathematics, Informatics and Mechanics  
09/2013 – 12/2014      Assistant Professor, University of Economics, Prague, Faculty of Informatics and Statistics

**Fellowships**

2014 – 2015              Support Programme for the Perspective Human Resources, founded by the Czech Academy of Sciences

**Education and Degrees**

Ph.D. (2013)              Charles University in Prague, Faculty of Mathematics and Physics, PhD thesis *Applications of descriptive set theory in mathematical analysis*, supervisor Miroslav Zelený  
Mgr. (2009)              Charles University in Prague, Faculty of Mathematics and Physics, Diploma thesis *Infinite games and their applications*, supervisor Miroslav Zelený  
Bc. (2007)              Charles University in Prague, Faculty of Mathematics and Physics, Bachelor's thesis *Křivky Peanova typu* (in Czech), supervisor Jaroslav Lukeš

**Research Visits**

08/2016 – 09/2016      The University of Auckland, New Zealand

**Research Projects**

2020 – 2022              *Banach spaces of continuous and Lipschitz functions*, Grant number 20-22230L by the Austrian Science Foundation and the Czech Science Foundation, role: team member

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2018 – 2021	<i>Graph limits and inhomogeneous random graphs</i> , Grant number 18-01472Y by the Czech Science Foundation, role: team member
2017 – 2019	<i>Generic objects</i> , Grant number 17-27844S by the Czech Science Foundation, role: team member
2016 – 2018	<i>Nonlinear analysis in Banach spaces</i> , Grant number GA16-07378S by the Czech Science Foundation, role: team member
2012 – 2016	<i>Asymptotics of Operator Semigroups</i> , Marie Curie Action ‘International Research Staff Exchange Scheme’ awarded by the European Commission
2010 – 2012	<i>Applications of descriptive set theory in mathematical analysis</i> , Grant number 149410 by the Charles University Grant Agency, role: leader

### Awards

2017	Otto Wichterle Award for young researchers, awarded by the Czech Academy of Sciences
2009	First place in the competition SVOČ (competition of students from Czech and Slovak universities in scientific activity in mathematics)
2008 – 2009	Award of the Dean of the Faculty of Mathematics and Physics for the best diploma thesis

### Teaching

2016 – 2017	University of Warsaw, Faculty of Economic Sciences, problem solving sessions in a basic course in linear algebra
2013 – 2014	University of Economics, Prague, Faculty of Informatics and Statistics, problem solving sessions in a basic course in calculus and linear algebra
2008 – 2013	Charles University in Prague, Faculty of Mathematics and Physics, problem solving sessions in basic courses in calculus

### Publication Activity

WoS:	19 publications, 36 citations, H-index 3
Scopus:	19 publications, 44 citations, H-index 3

### Other Professional Activities

- Vice-head of the Abstract Analysis Department, Institute of Mathematics of the Czech Academy of Sciences
- Secretary of the Supervisory Board, Institute of Mathematics of the Czech Academy of Sciences
- Organizing: Seminar Set Theory and Analysis, Institute of Mathematics of the Czech Academy of Sciences
- Member of the HRS4R Advisory Committee, Institute of Mathematics CAS goes for HR Award
- Expert reviews for Ministry of Education, Youth and Sports, programm Mobility

- Preparing review reports for journals: Combinatorics, Probability and Computing; Topology and its Applications; Combinatorica; Journal of Mathematical Analysis and Applications; Real Analysis Exchange; Hacettepe Journal of Mathematics and Statistics
- Preparing reviews for MathSciNet

### Selected Talks

- *Descriptive complexity of Banach spaces*, 36th International Summer Conference on Real Functions Theory, Stará Lesná, Slovakia, 09/2022
- *Descriptive complexity of Banach spaces*, Banach spaces webinars, online, 05/2022
- *Descriptive complexity of Banach spaces*, 44th Summer Symposium in Real Analysis, Paris & Orsay, France, 06/2022
- *Measures as Graph Limits*, Inspirations in Real Analysis, Bedlewo, Poland, 04/2022
- *Measures as Graph Limits*, Winter School in Abstract Analysis, Svratka, Czech Republic, 01/2022
- *Measures as Graph Limits*, Seminar on Real and Abstract Analysis, Department of Mathematical Analysis, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic (online), 05/2021
- *A Turán-type theorem for large-distance graphs in Euclidean spaces*, Winter School in Abstract Analysis, Svratka, Czech Republic, 01/2020
- *A Turán-type theorem for large-distance graphs in Euclidean spaces*, The Alamo Symposium, San Antonio, Texas, USA, 06/2019
- *Strukturální uspořádání grafonů*, Současné trendy teoretické informatiky, Prague, Czech Republic, 06/2019
- *On graphs, graphons and the weak\* convergence*, Winter School in Abstract Analysis, Svratka, Czech Republic, 01/2019
- *Convergence of graphons and the weak\* topology*, Summer Symposium in Real Analysis XLII, Saint-Petersburg, Russian Federation, 06/2018
- *Convergence of graphons and structuredness order*, Workshop Graph limits in Bohemian Switzerland, Janov, Czech Republic, 03/2018
- *On a certain generalization of first-countable spaces*, External meeting of the Institute of Mathematics, Ostrava, Czech Republic, 09/2017
- *On a certain generalization of first-countable spaces*, Set Theoretic Methods in Topology and Analysis, Bedlewo, Poland, 09/2017
- *On a certain generalization of first-countable spaces*, Summer Symposium in Real Analysis XLI, Wooster, Ohio, USA, 06/2017
- *Haar meager sets*, Interactions between Algebra and Functional Analysis, Prague, Czech Republic, 09/2016
- *Infinite games and sigma-porosity*, Department of Mathematics Seminar, Department of Mathematics, University of Auckland, Auckland, New Zealand, 09/2016
- *Perfect cliques with respect to infinitely many relations*, Winter School in Abstract Analysis, Svratka, Czech Republic, 01/2016
- *Cliques in dense inhomogeneous random graphs*, Noon Seminar, Department of Applied Mathematics, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic, 11/2015
- *Classification of the spaces of continuous functions within the Borel-Wadge hierarchy*, Winter School in Abstract Analysis, Svratka, Czech Republic, 01/2015

- *Classification of the spaces  $C_p^*(X)$  within the Borel-Wadge hierarchy for a projective space  $X$* , Interactions between Algebra and Functional Analysis, Prague, Czech Republic, 12/2014
- *Classification of the spaces  $C_p^*(X)$  within the Borel-Wadge hierarchy for a projective space  $X$* , Joint Prague-Vienna Logic & Set Theory Meeting, Prague, Czech Republic, 12/2014
- *Infinite Games and  $\sigma$ -porosity*, Summer Symposium in Real Analysis XXXV, Budapest, Hungary, 06/2011
- *Infinite Games and  $\sigma$ -porosity*, Week of doctoral students, Prague, Czech Republic, 06/2010
- *$\sigma$ -pórovitost a nekonečné hry*, Soutěž studentů vysokých škol ve vědecké činnosti v matematice, Košice, Slovakia, 05/2009
- *$\sigma$ -porosity and Infinite Games*, Winter School in Abstract Analysis, Kácov, Czech Republic, 01/2009
- *A Note on the Three-Segment Problem*, Soutěž studentů vysokých škol ve vědecké činnosti v matematice, Brno, Czech Republic, 05/2008
- *Three-Segment Problem*, Winter School in Abstract Analysis, Lhota nad Rohanovem, Czech Republic, 01/2008

### Publications and Preprints

- [23] M. Cúth, M. Doležal, M. Doucha, O. Kurka: *Polish spaces of Banach spaces. Complexity of isometry and isomorphic classes*. Submitted.
- [22] M. Cúth, M. Doležal, M. Doucha, O. Kurka: *Polish spaces of Banach spaces*. Forum of Mathematics, Sigma, 10 (2022).
- [21] M. Doležal, J. Grebík, J. Hladký, I. Rocha, V. Rozhoň: *Cut distance identifying graphon parameters over weak\* limits*. J. Combin. Theory Ser. A 189 (2022), Paper No. 105615, 57 pp.
- [20] M. Doležal: *Graph limits: An alternative approach to  $s$ -graphons*. J. Graph Theory 99 (2022), no. 1, 90–106.
- [19] M. Doležal, J. Hladký, J. Kolář, T. Mitsis, C. Pelekis, V. Vlasák: *A Turán-type theorem for large-distance graphs in Euclidean spaces, and related isodiametric problems*. Discrete Comput. Geom. 66 (2021), no. 1, 281–300.
- [18] M. Doležal, J. Grebík, J. Hladký, I. Rocha, V. Rozhoň: *Relating the cut distance and the weak\* topology for graphons*. J. Combin. Theory Ser. B 147 (2021), 252–298.
- [17] M. Doležal, J. Hladký: *Matching polytopes*. Electron. J. Combin. 26 (2019), no. 4, Paper No. 4.38, 33 pp.
- [16] M. Doležal, T. Mitsis, C. Pelekis: *The de Bruijn–Erdős theorem from a Hausdorff measure point of view*. Acta Math. Hungar. 159 (2019), no. 2, 400–413.
- [15] M. Doležal, J. Hladký, J. Kolář, T. Mitsis, C. Pelekis, V. Vlasák: *A Turán-type theorem for large-distance graphs in Euclidean spaces, and related isodiametric problems*. Acta Math. Univ. Comenian. (N.S.) 88 (2019), no. 3, 625–629.
- [14] M. Doležal, J. Hladký: *Cut-norm and entropy minimization over weak\* limits*. J. Combin. Theory Ser. B 137 (2019), 232–263.

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- [13] M. Doležal, J. Hladký, P. Hu, D. Piguet: *First steps in combinatorial optimization on graphons: matchings*. Drmota, Michael (ed.) et al., Extended abstracts of the ninth European conference on combinatorics, graph theory and applications, EuroComb 2017, Vienna, Austria, August 28 – September 1, 2017. Amsterdam: Elsevier. Electronic Notes in Discrete Mathematics 61, 359–365 (2017).
- [12] M. Doležal, W. B. Moors: *On a certain generalization of  $W$ -spaces*. Topology Appl. 231 (2017), 1–9.
- [11] M. Doležal, J. Hladký, A. Máthé: *Cliques in dense inhomogeneous random graphs*. Random Structures Algorithms 51 (2017), no. 2, 275–314.
- [10] M. Doležal, V. Vlasák: *Haar meager sets, their hulls, and relationship to compact sets*. J. Math. Anal. Appl. 446 (2017), no. 1, 852–863.
- [9] M. Doležal, W. Kubiś: *Perfect independent sets with respect to infinitely many relations*. Arch. Math. Logic 55 (2016), no. 7–8, 847–856.
- [8] M. Doležal, D. Preiss, M. Zelený: *Infinite games and  $\sigma$ -porosity*. Israel J. Math. 215 (2016), no. 1, 441–457.
- [7] M. Doležal, M. Rmoutil, B. Vejnar, V. Vlasák: *Haar meager sets revisited*. J. Math. Anal. Appl. 440 (2016), no. 2, 922–939.
- [6] M. Doležal, B. Vejnar: *Classification of the spaces  $C_p^*(X)$  within the Borel-Wadge hierarchy for a projective space  $X$* . Topology Appl. 183 (2015), 11–17.
- [5] M. Doležal: *Unitary representations of finite abelian groups realizable by an action*. Topology Appl. 164 (2014), 87–94.
- [4] M. Doležal, P. Ludvík, P. Pošta, P. Pyrih, M. Rmoutil, B. Vejnar: *Arcwise connected continuum with a free arc and with the fixed set property for monotone onto maps*. Questions Answers Gen. Topology 30 (2012), no. 2, 135–137.
- [3] M. Doležal: *Characterization of  $\sigma$ -porosity via an infinite game*. Fund. Math. 216 (2012), no. 2, 109–118.
- [2] M. Doležal, P. Pošta, P. Pyrih, M. Rmoutil, B. Vejnar: *Chain of dendrites without monotone supremum*. Questions Answers Gen. Topology 29 (2011), no. 2, 131–133.
- [1] M. Doležal: *A note on the three-segment problem*. Math. Bohem. 134 (2009), no. 2, 211–215.