
CONTACT INFORMATION	Vítězslav Kala Department of Algebra Charles University Sokolovská 83 18675 Praha Czech Republic	kala@karlin.mff.cuni.cz http://www1.karlin.mff.cuni.cz/~kala/web/
PERSONAL	Born August 8, 1985. Married, 1 daughter. Nationality Czech Republic.	
RESEARCH INTERESTS	Broadly interested in number theory (algebraic and analytic), algebra, and logic. Specifically: <ul style="list-style-type: none"> • Universal quadratic forms, arithmetic of number fields, asymptotics of class numbers, generalized continued fractions • Langlands program, Applications of model theory, Maass forms, simple semi-fields and semirings 	
EMPLOYMENT	<p>Charles University, Prague, Czech Republic Faculty of Mathematics and Physics, Department of Algebra</p> <p>Associate Professor (tenured) 01/2022 – present</p> <ul style="list-style-type: none"> • Habilitation ‘<i>docent</i>’ awarded 10/2021 <p>Assistant Professor 01/2017 – 12/2021</p> <p>Postdoc 09/2015 – 06/2016</p> <p>University of Göttingen, Germany Mathematical Institute</p> <p>Postdoc 01/2015 – 08/2017</p> <ul style="list-style-type: none"> • Mentor: Valentin Blomer • Partly supported by V.B.’s ERC Starting Grant <p>Max Planck Institute for Mathematics, Bonn, Germany</p> <p>Postdoc 09/2014 – 12/2014</p>	
EDUCATION	<p>Purdue University, West Lafayette, Indiana, USA Department of Mathematics</p> <p>PhD., Mathematics 2009 – 2014</p> <ul style="list-style-type: none"> • Advisor: Freydoon Shahidi • Thesis: Density of Self-Dual Automorphic Representations of $GL_n(\mathbb{A}_{\mathbb{Q}})$ <p>Charles University, Prague, Czech Republic Faculty of Mathematics and Physics</p> <p>PhD., Mathematics (in absentia) 2009 – 2013</p> <ul style="list-style-type: none"> • Advisor: Tomáš Kepka • Thesis: Algebraic Substructures in \mathbb{C}^m <p>Mgr. (Master’s), Mathematics 2007 – 2009</p> <ul style="list-style-type: none"> • Summa cum Laude <p>Bc. (Bachelor’s), Mathematics 2004 – 2007</p> <ul style="list-style-type: none"> • Summa cum Laude 	

GRANTS AND
AWARDS

Czech Science Foundation GAČR **2021 – 2025**

- Principal investigator of *UFOCLAN: Universal quadratic forms and class numbers* grant
- Highly selective Junior Star project (success rate 9%, total budget 1 000 000 USD)
- 5+ postdocs supported

Primus Research Programme **2020 – 2022**

- Principal investigator of research grant *Universal quadratic forms: geometry and analysis*
- 3 postdocs supported

Czech Science Foundation GAČR **2017 – 2019**

- Principal investigator of Junior Grant *Quadratic forms and numeration systems over number fields*
- 3 postdocs supported
- Outcomes of the grant evaluated by the grant agency as excellent (top 20%)

Neuron Impulse **2018 – 2019**

- Principal investigator of grant *Semifields in number theory and geometry*

Bolzano Award **2019**

- Annual award of the Bernard Bolzano Endowment Fund for the best scientific work in mathematics, for my work on *Universal quadratic forms and families of number fields*

University Center of Excellence **2018 – 2022**

- Team member on the grant *Methods of Algebra and Logic*
- Principal investigator: Jan Krajíček

International Fulbright Science and Technology Award **2009 – 2012**

- For international PhD students at prestigious universities in the USA
- Only 40 students worldwide selected each year

Mathematical Competitions

- 1st Prize – International Mathematical Competition 2006, 2008
- 1st Place – Vojtěch Jarník International Mathematical Competition 2009
- Bronze Medal – International Mathematical Olympiad 2004

ARTICLES

- [30] (with G. Cherubini, A. Fazzari, A. Granville, P. Yatsyna) *Consecutive real quadratic fields with large class numbers*, 7 pp., submitted
- [29] (with P. Yatsyna) *On Kitaoka's conjecture and lifting problem for universal quadratic forms*, 11 pp., submitted
- [28] *Number fields without universal quadratic forms of small rank exist in most degrees*, 6 pp., submitted
- [27] (with M. Tinková) *Universal quadratic forms, small norms and traces in families of number fields*, 21 pp., submitted
- [26] (with T. Hejda) *Ternary quadratic forms representing a given arithmetic progression*, J. Number Theory, to appear, 13 pp.
- [25] (with P. Yatsyna) *Lifting problem for universal quadratic forms*, Adv. Math. 377 (2021), 107497, 24 pp.
- [24] (with P. Yatsyna) *Sums of squares in S -integers*, New York J. Math. 26 (2020), 1145 – 1154
- [23] (with T. Hejda) *Additive structure of totally positive quadratic integers*, Manuscripta Math. 163 (2020), 263 – 278

- [22] (with J. Svoboda) *Universal quadratic forms over multiquadratic fields*, Ramanujan J. 48 (2019), 151 – 157
- [21] (with T. Vávra) *Periodic representations in algebraic bases*, Monatsh. Math. 188 (2019), 109 – 119
- [20] (with M. Korbelař) *Idempotence of finitely generated commutative semifields*, Forum Math. 30 (2018), 1461 – 1474
- [19] (with A. Dahl) *Distribution of class numbers in continued fraction families of real quadratic fields*, Proc. Edinb. Math. Soc. 61 (2018), 1193 – 1212
- [18] (with V. Blomer) *On the rank of universal quadratic forms over real quadratic fields*, Doc. Math. 23 (2018), 15 – 34
- [17] (with P. Glivický) *Fermat’s Last Theorem and Catalan Conjecture in weak exponential arithmetics*, Math. Log. Quart. 63 (2017), 162 – 174
- [16] *Semifields and a theorem of Abhyankar*, Comment. Math. Univ. Carolin. 58 (2017), 267 – 273
- [15] *Lattice-ordered abelian groups finitely generated as semirings*, J. Commut. Algebra 9 (2017), 387 – 412
- [14] *Norms of indecomposable integers in real quadratic fields*, J. Number Theory 166 (2016), 193 – 207
- [13] *Universal quadratic forms and elements of small norm in real quadratic fields*, Bull. Aust. Math. Soc. 94 (2016), 7 – 14
- [12] (with V. Blomer) *Number fields without universal n -ary quadratic forms*, Math. Proc. Cambridge Philos. Soc. 159 (2015), 239 – 252
- [11] (with J. Berg, A. Castillo, R. Grizzard, R. Moy, C. Wang) *Congruences for Ramanujan’s f and omega functions via generalized Borcherds products*, Ramanujan J. 35 (2014), 327 – 338
- [10] (with J. Jeřek, T. Kepka) *Finitely generated algebraic structures with various divisibility conditions*, Forum Math. 24 (2012), 379 – 397
- [9] (with M. Korbelař) *Congruence simple subsemirings of \mathbb{Q}^+* , Semigroup Forum 81 (2010), 286 – 296
- [8] (with A. Drápal, C. Hämläinen) *Latin bitrades, dissections of equilateral triangles, and abelian groups*, J. Comb. Des. 18 (2010), 1 – 24
- [7] (with T. Kepka, P. Nĕmec) *Norms on semirings I.*, Acta Univ. Carolin., Math. Et Phys. 51 (2010), 29 – 48
- [6] (with T. Kepka) *Commutative parasemifields finitely generated as semirings*, Acta Univ. Carolin., Math. Et Phys. 51 (2010), 49 – 56
- [5] (with T. Kepka, M. Korbelař) *Notes on commutative parasemifields*, Comment. Math. Univ. Carolin. 50 (2009), 521 – 533
- [4] (with A. D. Keedwell) *Addendum to The existence of Buchsteiner and conjugacy-closed quasigroups*, Europ. J. Combin. 30 (2009), 1386
- [3] (with T. Kepka, M. Korbelař, J. D. Phillips) *Various subsemirings of the field \mathbb{Q} of the rational numbers*, Acta Univ. Carolin., Math. Et Phys. 50 (2009), 29 – 59
- [2] (with T. Kepka) *A note on finitely generated ideal-simple commutative semirings*, Comment. Math. Univ. Carolin. 49 (2008), 1 – 9
- [1] (with V. Flařka, A. Janĉařík, T. Kepka) *Trees in commutative nil-semi-groups of index two*, Acta Univ. Carolin., Math. Et Phys. 48 (2007), 81 – 101

TEACHING

Charles University, Czech Republic

♡: *awarded Dean's teaching award (total 4 times)*

- Introduction to Group Theory (lecture), Fall 2021
- Commutative Rings (lecture), Fall 2017 ♡, 2018, 2019 ♡
- Quadratic Forms and Class Fields (lecture) Fall 2018 ♡, Spring 2019
- Algebra (lecture), Spring 2021
- Algebraic Number Theory (lecture), Spring 2018, 2019, 2021
- Modular Forms and L-Functions (lecture), Fall 2017, 2019, Spring 2018
- Number Theory and RSA (lecture), Spring 2009, 2018, 2019, 2020 ♡, 2022
- Quadratic Forms (lecture), Fall 2015
- Class Field Theory (lecture), Spring 2011, 2016
- 8 recitation classes (on number theory and algebra), 2006 – 2009

University of Göttingen, Germany

- Analytic Number Theory I (assistant), Winter 2016

Purdue University, USA

- Introductory Analysis I (business calculus course), Spring 2013, 2014

SERVICE

- Vice chair of the Evaluation Panel *Mathematics and Computer Science*, Czech Science Foundation, 2021 – 2023
- Member of the Discipline Committee *Physical Sciences*, Czech Science Foundation, 2021 – 2023
- Member of the *Cooperatio* advisory board for mathematics, Charles University, from 2022
- Member of the *Academic Senate* of the Faculty of Math. and Physics, Charles University, 2020 – 2023
- Editorial board member for *Commentationes Mathematicae Universitatis Carolinae*, from 2021
- Founder and Organizer of the *Number Theory Seminar* at Charles University, from 2015
- Referee for ~ 20 journals and conferences (including quick opinions), e.g., Intern. Math. Res. Not. IMRN, Comment. Math. Helvet., Bull. Sci. Math., Math. Nachr., Ramanujan J., Acta Arith., J. Number Theory, Intern. J. Number Theory, Canadian Math. Bull., J. Algebra Appl., Rocky Mountain J. Math., Bull. Aust. Math. Soc., Integers, Soft Comput., Math. Slovaca, Algor. Number Th. Symp. ANTS
- External Ph.D. thesis referee for University of Salerno (Italy) and Harish-Chandra Research Institute (India)
- Reviewer for *Mathematical Reviews*
- Editorial board member for *Pokroky matematiky, fyziky a astronomie* (Advances in mathematics, physics, and astronomy), Czech journal for popularization of math and physics, from 2019
- Graduate Representative in the Department of Mathematics at Purdue University, 2012 – 2013
- Founder and Organizer of the Student Colloquium seminar in the Department of Mathematics at Purdue University, 2011 – 2012
- Vice president and Mentor of the Purdue Fulbright Association, 2011, 2012
- Organizer of math competitions (correspondence seminars) and camps for middle- and high-school students, 2001 – 2009

POSTDOCS

- Matteo Bordignon, 01/2022 – 01/2023
- Giacomo Cherubini, 09/2020 – 12/2022

- Daniel Gil Munoz, 08/2021 – 06/2023
- Eric Stucky, 08/2021 – 06/2023
- Pavlo Yatsyna, 01/2020 – 12/2022
- Blazej Zmija, 10/2021 – 06/2023
- Alessandro Fazzari, 09/2021 – 12/2021
next job: postdoc at American Institute of Mathematics
- Tomáš Hejda, 01/2017 – 12/2019
next job: work for Overleaf
- Tomáš Vávra, 01/2017 – 12/2019, 05/2020 – 08/2020
next job: postdoc at University of Waterloo
- Ezra Waxman, 08/2018 – 07/2019
next job: postdoc at Dresden University with Minerva Fellowship

STUDENTS

Ph.D.

- Ester Sgallová, *n-universal quadratic forms over number fields* (from 2021)
- Mikuláš Zindulka, *Arithmetics of number fields: partitions, norms, and quadratic forms* (from 2021)
- Jakub Krásenský, *Universal quadratic forms over orders in number fields* (from 2018)
- Magdaléna Tinková, *Arithmetics of number fields and generalized continued fractions* (2017 – 2021)
next job: tenure-track faculty at Czech Technical University, Prague

Master's

- Martin Kuděj (from 2021)
- Martin Raška (from 2021)
- Bára Tížková (from 2021)
- Sára Vyhnalová, *Ideal lattices in cryptography* (co-advised by Pavlo Yatsyna, 2021)
- Kristína Mišlanová, *Quaternion algebras and units* (2021)
- Lucien Šíma, *Finitely generated semirings and semifields* (2021)
- Ester Sgallová, *Periodicity of Jacobi-Perron algorithm* (co-advised by Magda Tinková, 2021)
2nd place in SVOČ research competition
- Pavel Surý, *Local-global principle for quadratic forms* (2020)
- Martin Čech, *Pretentious approaches in analytic number theory* (2018)
- Kristýna Zemková, *Composition of quadratic forms over number fields* (2018)
Dean's prize for best thesis; 3rd place in SVOČ research competition
- Dominik Lachman, *Bruhat-Tits buildings* (2017)
Dean's prize for best thesis; 1st place in SVOČ research competition
- Jakub Hlavnička, *Products of primes in arithmetic sequences and prime number theorem*, Czech Technical University, Research Project (2015) and Master's Thesis (2016)
- Maroš Hrnčiar, *Solving diophantine equations by factorization in number fields* (2015)

Bachelor's

- František Couf (co-advised by Mikuláš Zindulka, from 2021)
- Matěj Doležálek (from 2021)
- Daniela Lněničková (from 2021)
- Martin Raška, *Sums of squares in number fields* (2021)
Dean's prize for best thesis
- Bára Tížková, *Universal quadratic forms and estimates of traces of algebraic*

integers (2021)

- Ondrej Bínovský, *Imaginary quadratic fields with class number 1* (2021)
- Matěj Doležálek, *Quaternions and universal quadratic forms over number fields* (2021, only SVOČ)
1st place in SVOČ research competition
- Alexandr Beneš, *Counting extensions of imaginary quadratic fields* (2020)
Dean's prize for best thesis
- Veronika Hájková, *Pythagoras numbers of orders in number fields* (2020)
- Martin Kuděj, *Continued fractions with prescribed period* (2020)
- Kateřina Bžatková, *Visibly irreducible polynomials* (2019)
- Kristína Mišlanová, *Matrix of Legendre symbols* (2019)
- Sára Vyhnalová, *Solovay-Strassen primality test* (2019)
- Anh Dung Le, *Bernoulli numbers and ideal class groups* (2017)
- Martin Čech, *Algebraic proofs of Dirichlet's theorem on arithmetic progressions* (2016)
- Josef Svoboda, *Universal quadratic forms over number fields* (2016)

TALKS

Invited conference and seminar talks

- *Universal quadratic forms over number fields*; International Conference on Class Groups of Number Fields and Related Topics, KSoM, India (online talk); October 24, 2021
- *Universal quadratic forms over number fields*; Number Theory Lunch Seminar, MPIM Bonn, Germany; March 3, 2020
- *Introduction to L-functions and Langlands program* (two plenary lectures); 57th SSAOS, Czechia; September 5 and 6, 2019
- *Universal quadratic forms over number fields*; Prague–Dresden Number Theory Meeting, Dresden, Germany; March 8, 2019
- *The rank of universal quadratic forms over number fields*; Conference on the Arithmetic Theory of Quadratic Forms, Seoul National University, Korea; January 7, 2019
- *Universal quadratic forms and class numbers of real quadratic fields*; Mathematical Colloquium, University of Göttingen; October 26, 2016
- *Universal quadratic forms over number fields*; Rényi Institute, Hungary; May 24, 2016
- *Universal quadratic forms and indecomposable integers in $\mathbb{Q}(\sqrt{D})$* ; Oberseminar Analytic Number Theory, University of Göttingen; April 11, 2016
- *Universal quadratic forms and continued fractions*; Mathematical Colloquium, Masaryk University, Brno, Czech Republic; November 6, 2015
- *Number fields without universal n -ary quadratic forms*; Göttingen-Hannover Number Theory Workshop; April 24, 2015
- *Provability of Fermat's Last Theorem in arithmetics with weak exponential*; Automorphic Forms and Representation Theory Seminar, Purdue University; December 9, 2014
- *Number of self-dual automorphic representations of $GL(N)$ and depth preservation*; Families of Automorphic Forms and the Trace Formula; BIRS, Canada; December 3, 2014
- *Number of self-dual automorphic representations of $GL(N)$ and depth preservation*; Oberseminar Analytic Number Theory, University of Göttingen; November 10, 2014
- *Counting (self-dual) automorphic representations*; Texas–Oklahoma Representations and Automorphic Forms VI; March 8, 2014

Contributed conference talks

- *Lifting problem for universal quadratic forms*; 31st Journées Arithmétiques, Turkey; July 4, 2019
- *Classifications of finitely generated semifields and lattice-ordered groups*; 98th AAA, Dresden, Germany; June 21, 2019
- *Classifications of finitely generated semifields and lattice-ordered groups*; 56th SSAOS, Czechia; September 6, 2018
- *Universal quadratic forms over number fields*; Combinatorics on Words, Janov nad Nisou, Czechia; June 22, 2018
- *Universal quadratic forms over number fields*; Quadratic forms in Chile, Talca; January 12, 2018
- *Universal quadratic forms over number fields*; 30th Journées Arithmétiques, France; July 7, 2017
- *Additively indecomposable integers in number fields*; ALaNT 4, Czech Republic; June 16, 2016
- *Universal quadratic forms over number fields*; 22nd Czech and Slovak International Conference on Number Theory; August 31, 2015
- *Langlands program: an area of pure mathematics* (poster); International Fulbright Science and Technology Conference, Washington, DC; June 12, 2012

Frequent local seminar talks are not listed.