

Vítězslav Kala

CONTACT INFORMATION	Vítězslav Kala Katedra algebrý MFF UK Sokolovská 83 18675 Praha, Czech Republic	vita.kala@gmail.com sites.google.com/site/vitakala/
PERSONAL	Born August 8, 1985, Nationality Czech Republic	
RESEARCH INTERESTS	<ul style="list-style-type: none">• Universal quadratic forms, arithmetic of number fields, asymptotics of class numbers, continued fractions• Langlands program, self-dual representations, Weyl's law, depth• Applications of model theory, Maass forms, simple semirings	
EMPLOYMENT	Charles University , Prague, Czech Republic Faculty of Mathematics and Physics, Department of Algebra Assistant Professor (tenure track)	01/2017 – present
	University of Göttingen , Germany Mathematical Institute, Postdoc <ul style="list-style-type: none">• Mentor: Valentin Blomer• Partly supported by V.B.'s ERC Starting Grant	01/2015 – 08/2017
	Charles University , Prague, Czech Republic Faculty of Mathematics and Physics, Department of Algebra, Postdoc <ul style="list-style-type: none">• Supported by Charles University Mobility Fund	09/2015 – 06/2016
	Max Planck Institute for Mathematics , Bonn, Germany Postdoc	09/2014 – 12/2014
EDUCATION	Purdue University , West Lafayette, Indiana, USA Department of Mathematics PhD., Mathematics <ul style="list-style-type: none">• Advisor: Freydoon Shahidi• Thesis: Density of Self-Dual Automorphic Representations of $GL_n(\mathbb{A}_{\mathbb{Q}})$	2009 – 2014
	Charles University , Prague, Czech Republic Faculty of Mathematics and Physics PhD., Algebra (in absentia) <ul style="list-style-type: none">• Advisor: Tomáš Kepka• Thesis: Algebraic Substructures in \mathbb{C}^m	2009 – 2013
	Mgr. (Master's), Mathematical Structures <ul style="list-style-type: none">• Summa cum Laude• Advisor: Tomáš Kepka• Thesis: Simple Semirings	2007 – 2009
	Bc. (Bachelor's), General Mathematics <ul style="list-style-type: none">• Summa cum Laude	2004 – 2007

GRANTS AND
AWARDS

Czech Science Foundation GAČR

2017 – 2019

- Principal investigator of Junior Grant *Quadratic forms and numeration systems over number fields*
- Postdocs supported: Tomáš Hejda, Tomáš Vávra

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

Charles University

2004 – 2010

- Principal investigator of a research grant awarded by the Grant Agency of Charles University 2008, 2009
- Various scholarships (merit, teaching, research, propagation) 2004 – 2010

Mathematical Competitions

- 1st Prize – International Mathematical Competition 2006, 2008
- 1st Place – Vojtěch Jarník International Mathematical Competition 2009 (3rd best competitor overall in the history)
- Bronze Medal – International Mathematical Olympiad 2004

ARTICLES

- [24] *Periodic representations in algebraic bases* (with T. Vávra), 10 pp., submitted
- [23] *Additive structure of totally positive quadratic integers* (with T. Hejda), 12 pp., submitted
- [22] *Arity of universal quadratic forms over real quadratic fields* (with V. Blomer), 18 pp., submitted
- [21] *Idempotence of commutative semifields* (with M. Korbelař), 16 pp., submitted
- [20] *Weak Weyl's Law for self-dual automorphic representations of $GL_N(\mathbb{A}_{\mathbb{Q}})$* , 24 pp., submitted
- [19] *Universal quadratic forms over multiquadratic fields* (with J. Svoboda), 6 pp., submitted
- [18] *Distribution of class numbers in continued fraction families of real quadratic fields* (with A. Dahl), Proc. Edinb. Math. Soc., 18 pp., to appear
- [17] *Semifields and a theorem of Abhyankar*, Comment. Math. Univ. Carolin., 5 pp., to appear
- [16] *Fermat's Last Theorem and Catalan Conjecture in weak exponential arithmetics*, MLQ Math. Log. Q., 17 pp., to appear (with P. Glivický)
- [15] *Lattice-ordered abelian groups finitely generated as semirings*, J. Commut. Algebra 9 (2017), 387 – 412
- [14] *Universal quadratic forms and elements of small norm in real quadratic fields*, Bull. Aust. Math. Soc. 94 (2016), 7 – 14
- [13] *Norms of indecomposable integers in real quadratic fields*, J. Number Theory 166 (2016), 193 – 207
- [12] *Number fields without universal n -ary quadratic forms*, Math. Proc. Cambridge Philos. Soc. 159 (2015), 239 – 252 (with V. Blomer)
- [11] *Congruences for Ramanujan's f and omega functions via generalized Borcherds products*, Ramanujan J. 35 (2014), 327 – 338 (with J. Berg, A. Castillo, R. Grizzard, R. Moy, C. Wang)
- [10] *Finitely generated algebraic structures with various divisibility conditions*, Forum Math. 24 (2012), 379 – 397 (with J. Ježek, T. Kepka)

- [9] *Congruence simple subsemirings of \mathbb{Q}_+* , Semigroup Forum 81 (2010), 286 – 296 (with M. Korbelař)
- [8] *Latin bitrades, dissections of equilateral triangles, and abelian groups*, J. Comb. Des. 18 (2010), 1 – 24 (with A. Drápal, C. Hämmäläinen)
- [7] *Norms on semirings I.*, Acta Univ. Carolin., Math. Et Phys. 51 (2010), 29 – 48 (with T. Kepka, P. Nĕmec)
- [6] *Commutative parasemifields finitely generated as semirings*, Acta Univ. Carolin., Math. Et Phys. 51 (2010), 49 – 56 (with T. Kepka)
- [5] *Notes on commutative parasemifields*, Comment. Math. Univ. Carolin. 50 (2009), 521 – 533 (with T. Kepka, M. Korbelař)
- [4] *Addendum to The existence of Buchsteiner and conjugacy-closed quasigroups*, Europ. J. Combin. 30 (2009), 1386 (with A. D. Keedwell)
- [3] *Various subsemirings of the field \mathbb{Q} of the rational numbers*, Acta Univ. Carolin., Math. Et Phys. 50 (2009), 29 – 59 (with T. Kepka, M. Korbelař, J. D. Phillips)
- [2] *A note on finitely generated ideal-simple commutative semirings*, Comment. Math. Univ. Carolin. 49 (2008), 1 – 9 (with T. Kepka)
- [1] *Trees in commutative nil-semi-groups of index two*, Acta Univ. Carolin., Math. Et Phys. 48 (2007), 81 – 101 (with V. Flařka, A. Janĉařík, T. Kepka)

ARTICLES IN
PREPARATION

- [4] *Distance on Bruhat-Tits buildings* (with D. Lachman)
- [3] *On orthogonal matrices with prescribed Smith normal form* (with P. Maga)
- [2] *Markov constant and generalizations for algebraic numbers* (with ř. Starosta)
- [1] *Congruence-simple matrix semirings* (with T. Kepka, M. Korbelař)

TEACHING

Charles University, Czech Republic

- Commutative Rings (lecture), Fall 2017
- Modular Forms and L-Functions (lecture), Fall 2017, Spring 2018
- Number Theory and RSA (lecture), Spring 2009, 2018
- Quadratic Forms (lecture), Fall 2015
- Class Field Theory (lecture), Spring 2011, 2016
- Number Theory and RSA (recitation), Spring 2006, 2007, 2008, 2009
- Number Theory Proseminar (recitation), Spring 2007, 2008
- Abstract Algebra (recitation), Spring 2009
- Fundamentals of Abstract Algebra (recitation), Fall 2007

University of Göttingen, Germany

- Analytic Number Theory I (assistant), Winter 2016

Purdue University, USA

- MA22300 Introductory Analysis I (instructor for a business calculus course)
 - Spring 2014 (2 sections, evaluations 5.0 and 4.7 out of 5)
 - Spring 2013 (2 sections, evaluations 4.4 and 4.1 out of 5)

SERVICE

- Founder and Organizer of the Number Theory Seminar at Charles University, since 2015
- Reviewer for Mathematical Reviews and Zentralblatt Math
- Referee for 9 journals, including Acta Arith., Soft Comput., Comment. Math. Univ. Carolin.
- 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
- Chair of the Networking Committee of the Fulbright Science and Technology Fellows’ Association, 2012
- Vice president and Mentor of the Purdue Fulbright Association, 2011, 2012
- Member of the International Graduate Student Recruitment Advisory Board at Purdue University, 2011, 2012
- Organizer of math competitions (correspondence seminars) and camps for middle- and high-school students, 2001 – 2009

POSTDOCS

- Tomáš Hejda, 01/2017 – 12/2019
- Tomáš Vávra, 01/2017 – 12/2019

STUDENTS

Ph.D.

- Magdaléna Tinková, *Arithmetics of number fields and generalized continued fractions* (from 2017)

Master’s

- Martin Čech, *Pretentious approaches in analytic number theory* (expected 2018)
- Kristýna Zemková, *Bhargava composition of quadratic forms and classification of rings of small rank* (expected 2018)
- Dominik Lachman, *Bruhat-Tits buildings* (2017)
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

- 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)

RECENT TALKS

Invited conference and seminar talks

- *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*; Invited talk, 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*; 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*; Invited Graduate Student Speaker, Texas–Oklahoma Representations and Automorphic Forms VI; March 8, 2014

Contributed conference talks

- *Universal quadratic forms over number fields*; XXXth 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

Local seminar talks

- *Fermat's Last Theorem, modular forms, and L -functions*; Institute of Theoretical Physics Seminar, Charles University, Czech Republic; April 5, 2016
- *Additively indecomposable elements of number fields*; Number Theory Seminar, Charles University, Czech Republic; December 8, 2015
- *Finitely generated lattice-ordered groups*; Algebra Seminar, Charles University, Czech Republic; October 19, 2015
- *Universal quadratic forms and continued fractions*; Number Theory Seminar, Charles University, Czech Republic; October 6, 2015
- *Introduction to Langlands program*; Series of 3 talks, Junior Number Theory Seminar, University of Göttingen; May 2015
- *Weak Weyl's Law for self-dual automorphic representations of $GL_n(\mathbb{A}_\mathbb{Q})$* ; Number Theory Lunch Seminar, MPIM Bonn; October 1, 2014

RECENT CONFERENCES

- XXXth Journées Arithmétiques; Caen, France; July 3 – 7, 2017
- Higher Gross Zagier Formulas; MFO Oberwolfach, Germany; April 2 – 8, 2017
- Göttingen-Hannover Number Theory Workshops; February 6, 2015; April 24, 2015; November 2, 2016; January 27, 2017
- Geometric and Analytic Number Theory; ETH Zürich, Switzerland; September 12 – 15, 2016
- ALaNT 4 – Joint Conference on Algebra, Logic and Number Theory; Telč, Czech Republic; June 13 – 17, 2016
- Fall School of the Department of Algebra; Charles University, Czech Republic; November 18 – 22, 2015
- 22nd Czech and Slovak International Conference on Number Theory; Lip-tovský Ján, Slovakia; August 31 – September 4, 2015
- Families of Automorphic Forms and the Trace Formula; BIRS, Canada; December 1 – 5, 2014
- Gan-Gross-Prasad Summer School; Paris, France; June 18 – 27, 2014
- Arizona Winter School 2014: Arithmetic Statistics; March 15 – 19, 2014
- Texas–Oklahoma Representations and Automorphic Forms VI; University of Oklahoma; March 7 – 9, 2014

WORK EXPERIENCE **McKinsey & Company**
 • Internship as Business Analyst, April – June 2010

LANGUAGES **English** (fluent), **Czech** (native), **German** (advanced), **French** (reading)

OTHER INTERESTS Travelling, running (ran a marathon) and long-distance walking (walked 100 km in 24 hours), hiking (climbed Stok Kangri, 6153 meters), solving ciphers (won prestigious team cipher-solving competitions *Tmou* and *Bedna*), reading books, linguistics, volunteering (teaching in school and work in monastery in Ladakh, India, as part of a programme by Czech NGO Brontosaurus)