

# CURRICULUM VITAE

## Personal details and date of CV

**Surname:** Kulikov

**First name:** Vadim

**Orcid:** [0000-0001-5197-5017](https://orcid.org/0000-0001-5197-5017)

**Date of CV:** September 25, 2020

**Date of birth:** January 8, 1986

**Citizenship:** Finland

**Current residence:** Oulu, Finland.

## Degrees

**2016** (Second) Master's degree: [Middle European interdisciplinary master's degree in cognitive science](#), University of Vienna, Austria. Incl. a semester in Bratislava and a systems neuroscience summer school in Budapest. Graduation date: September 13th 2016. Supervisor: Prof. Ulrich Ansorge, Examiner: Prof. Matthew Ratcliffe. Title: *Lateralized Priming Effects and Categorical Perception*. Grade: 1 (best).

**2011** [PhD in mathematics](#), University of Helsinki, Finland. Graduation date: 19th November 2011. Supervisor: Tapani Hyttinen, title: *Playing Games on Sets and Models*. Grade: eximia cum laude appropatur.

**2009** (First) Master's degree in mathematical logic. University of Helsinki, Finland. Graduation date: Feb. 20, 2009. Supervisor: Tapani Hyttinen, title: *Weak Ehrenfeucht-Fraïssé Games*, University of Helsinki, Finland. Grade: laudatur.

## Current position

**Since July 1st 2020** Senior Research Fellow at the University of Oulu, UBICOMP laboratory.

**Since March 1. 2019** Adjunct Professor at the Department of Mathematics and Statistics of the University of Helsinki (docent agreement/dosenttisopimus).

## Previous work experience

**2019-2020** Artificial intelligence, mathematical modelling and data-analysis consultant at Bats and Seahorses and Tensoritulo OY. Major clients incl. WheelQ, Finland, Crawford Lake Capital Management, LLC; NJ, USA,

**2018-2019** University Teacher and Guest Researcher at Aalto University, Finland.

**2015 – 2018** Academy of Finland 3 year post-doctoral researcher (Grant number 285203, tot. **272 526 €**). Host institution: University of Helsinki, Department of Mathematics and Statistics.

**2012 – 2015** Post-doctoral fellow at the Kurt Gödel Research Center For Mathematical Logic, University of Vienna.

**2010 – 2012** Graduate student at University of Helsinki. Funded by the Finnish National Graduate School in Mathematics and its Applications, Graduate School of Mathematical Logic (MALJA), Emil Aaltonen Foundation, and Mittag-Leffler Institute.

**2009** *Mittag-Leffler Institute of the Royal Swedish Academy of Science.*, 4 months.

## Research funding and grants

**2015-2018** Academy of Finland 3 year post-doctoral researcher (tutkijatohtori), total **272 526 €**,

**2017** Oskar Öflunds stiftelse, **4000 €** for a psychological experiment and a research assistant,

**2009 – 2012** *The young researcher's grant* awarded by the University of Helsinki Research Foundation, 12 months, **18 400 €**,

**2009** Mittag-Leffler Institute Fellowship **10 000 €**.

**2009** Emil Aaltonen foundation: **1500 €** grant for travelling and other expenses.

## Research supervision and leadership experience

**2010-2018** I have supervised 12 Bachelor theses and 1 Master's thesis, in many different areas of mathematics incl. knot theory, logic, probability theory, neural networks and cognitive modelling.

## Teaching merits

**Pedagogical training and competence:** "A! Peda Intro", university pedagogy course at Aalto University, 5 ECTS (2019). Studies in developmental psychology and cognitive science of learning during cognitive science master's program, including the course "Learning on the move" of 5 ECTS (2015).

**Implementation of courses:** I designed and lectured two courses on **knot theory** (U. Helsinki 2009). I participated in tailoring, and contributed to the to-become-standard material, of the courses **Measure and Integral** and **Differential and Integral Calculus 2** (Aalto U. 2018), as well as **Topology I**, **Measure and Integral**, and **Algebra I** (U. Helsinki, 2011, 2012, 2017 resp.). I have designed and lectured a course on **mathematics of neural networks** (2014) which served as a basis to a larger course **computational cognitive neuroscience** which was implemented together with Aapo Hyvärinen and Hande Celikkanat (U. Helsinki 2016). I have designed and lectured several short courses on **deep learning**, some in collab. with Sam Hardwick (U. Helsinki & Alma Talent 2017-2018). I also have some experience teaching mathematics to pre-schoolers through an involvement in an educational start-up. Additionally, I have assisted close to a dozen courses in mathematics incl. **Finite Model Theory** (U. Helsinki 2006-2012). All teaching and teaching material was either in Finnish or in English (mostly English).

**Development of teaching methods:** I am an active advocate of interactive teaching. I believe that it should be enhanced by embodied activity, story-telling (narratives) and group activity. I have successfully applied these principles in my teaching experience. During times of pandemic, interaction, although virtual, should be emphasized, and interactive learning environments as well as interactive learning materials (i.e. animations and educational games) developed.

**Teaching awards:** "Best teaching assistant award". Awarded by student organisation Matrix ry (2007).

## Awards and honours

**2009** Lindelöf prize awarded by the Finnish Mathematical Society for the best master's thesis in mathematics in Finland in 2008.

**2009** A 500 euro award for a master's thesis of grade *laudatur* awarded by the Faculty of Sc. U. Helsinki.

## Other key academic merits

**Referee:** For Journal of Symbolic Logic (2017-2020).

**Aug 2017** Invited talk and a member of panel discussion at [Aboagora 2017](#), Symposium between Arts and Sciences, Turku, Finland.

**Jun 2017** Invited alumni talk at MEi:CogSci conference in Budapest.

**Sep 2016** Invited talk in the Workshop on "Set-theoretical aspects of the model theory of strong logics" at CRM, Barcelona.

**Mar 2016** Invited lecture at the Nordic Congress of Mathematicians in Stockholm, Sweden. On applications of descriptive set theory to classification problems in topology.

**Sep 2015** Invited tutorial at the conference on the generalized Baire Space, Hamburg, Germany.

**Jun 2012** Invited talk at the Russian-Finnish logic colloquium in St.-Petersburg. *Borel\* Sets and Game Semantics of Infinitary Languages*

## Scientific and societal impact

**Publications:** Total number of peer reviewed publications is 15.

**Aug 2019** Invited speaker at an architecture event ArchiMAD, "Art and mathematics".

- Jan 2019** Member of Panel Discussion at the [Science Forum \(Tieteenpäivät\)](#) on the topic “Courageous mind in the courageous brain”.
- Aug 2017** A popular article in a news blog of the University of Helsinki “Uutistamo”, [Can machines learn abstract thinking?](#) (in Finnish).
- Jun 2017** A popular talk in Finnish Parliament targeting a group of politicians on growth and possibilities of modern artificial intelligence and machine learning.
- Nov 2011** A mathematical contribution to a humoristic article in a leading Finnish newspaper, NYT-liite, on the subject *why the cord of the ear phones gets knotted in the pocket*.
- Jul 2009** Interviewed by the Finnish radio channel Yle Radio 1 for program “Matematiikan aika”.

## Other Merits

**Experience in cogsci:** During the master’s studies at U. Vienna I designed and conducted reaction time experiments of the Stroop-type. I had also written a number of (yet) unpublished essays on embodied mathematics education, philosophy of mind, phenomenology of psychopathology, and philosophy of mathematics.

**Erdős number: 3** via (at least) two different paths:

Kulikov-Hyttinen-Shelah-Erdős and  
Kulikov-S.-D. Friedman-Magidor-Erdős.

# LIST OF PUBLICATIONS

Organised according to the guidelines of the Academy of Finland

Vadim Kulikov

October 16, 2020

*Note: In mathematics it is customary to write the authors' names in lexicographical order based on surname.*

## A. Peer-reviewed scientific articles

- 2020 Hyttinen, T., Kulikov, V., Moreno, M. *On  $\Sigma_1^1$ -completeness of quasi-orders on  $\kappa^\kappa$* , *Fundamenta Mathematicae* 251 (2020), 245-268,
- 2019 Hannula, M., Hirvonen, Å., Kontinen, J., Kulikov, V. & Virtema, J., *Facets of Distribution Identities in Probabilistic Team Semantics* In *Logics in Artificial Intelligence : 16th European Conference, JELIA 2019, Rende, Italy, May 7-11, 2019, Proceedings.* Calimeri, F., Leone, N. & Manna, M. (edit.). Springer, pp. 304-320.
- 2018 D. Aspero, T. Hyttinen, V. Kulikov, M. Moreno: *Reducibility of equivalence relations arising from non-stationary ideals under large cardinal assumptions.* In *Notre Dame Journal of Formal Logic.*
- 2018 T. Hyttinen, V. Kulikov: *Borel\* Sets in the Generalised Baire Space* in *Jaakko Hintikka on Knowledge and Game Theoretical Semantics.* In “Jaakko Hintikka on Knowledge and Game-Theoretical Semantics”, Editors van Ditmarsch, Hans, Sandu, Gabriel. Series: Outstanding Contributions to Logic, pages 395-412. Springer.
- 2017 T. Hyttinen, V. Kulikov, M. Moreno: *A Borel Reducibility Counterpart of Shelah's Main Gap Theorem*, in *Archive for Mathematical Logic* Volume 56, Issue 3-4, pp 175-185.
- 2017 V. Kulikov: *A Non-classification Result for Wild Knots*, in the *Trans. Amer. Math. Soc.* 369(8) (2017), 5829-5853
- 2016 S.-D. Friedman, Y. Khomskii, V. Kulikov: *Regularity Properties on the Generalized Reals* *Annals of Pure and Applied Logic*, Volume 167, Issue 4, April 2016, Pages 408–430
- 2015 V. Kulikov: *Framework Theory: A theory of cognitive semantics*, *Proceedings of the workshop NCI@KI2015 (neuro-cognitive integration).*
- 2015 S.-D. Friedman, V. Kulikov: *Failures of the Silver Dichotomy in the Generalised Baire Space.* *Journal of Symbolic Logic.*
- 2015 S.-D. Friedman, T. Hyttinen, V. Kulikov *On Borel reducibility in generalized Baire space* 231 (2015), 285-298,
- 2015 T. Hyttinen, V. Kulikov: *On  $\Sigma_1^1$ -complete Equivalence Relations on the Generalised Baire Space.* *Mathematical Logic Quarterly, Math. Log. Q.* 61 (2015), no. 1-2, 66–81.
- 2014 V. Kulikov: *The Class of Purely Unrectifiable Sets in  $\ell_2$  is  $\Pi_1^1$ -complete* *Real Analysis Exchange.* Volume 39, Number 2 (2014), 323-334.
- 2014 (book) S.-D. Friedman, T. Hyttinen, V. Kulikov: *Generalised Descriptive Set Theory and Classification Theory.* Series: *Memoirs of the American Mathematical Society*, (2014).
- 2013 V. Kulikov: *Borel Equivalence Relations on the Generalised Cantor Space.* *J. Symbolic Logic* 78 (2013), no. 2, 439–458.
- 2011 T. Hyttinen, V. Kulikov: *Weak Ehrenfeucht-Fraïssé Games.* *Trans. Amer. Math. Soc.* 363 (2011), 3309-3334.

## C. Publications intended for the general public, linked to the applicant's research

- 2019 *Mathematics in Art (Matematiikkaa taiteessa)*, in the architecture journal ArchiMAD (in Finnish).
- 2017 [Can machines learn abstract thinking?](#) A popular article in a news blog of the University of Helsinki "Uutistamo", (in Finnish).
- 2017 *How five seconds a year can turn into a bottomless source of motivation: an interview with Prof. Olli Martio (Miten viisi sekuntia vuodessa muuttuu pohjattomaksi motivaation lähteeksi: Prof. Olli Martion haastattelu)*, in Dimensio (in Finnish).
- 2016-2017 (self-published) [Blog and podcast](#) on science and art.
- 2010 *Knots in Art and Mathematics* (Solmut taiteessa ja matematiikassa), Mathematics Journal Solmu (in Finnish).
- 2009 *Emmy Noether, life story* with Matti Lehtinen (Emmy Noether, elämäkerta) Mathematics Journal Solmu (in Finnish).
- 2008 *Sofia Kovalevskaia, life story*, (Sofia Kovalevskaia, elämäkerta), Mathematics Journal Solmu (in Finnish).

## G. Theses

- 2016 Master's thesis, cognitive science: [Semantics, Categorical Perception, Lateralized Priming and the Stroop Effect](#). Master's programme MEi:CogSci, University of Vienna; supervisor Prof. Ulrich Ansorge.
- 2011 Doctoral dissertation, mathematics (monograph): [Playing Games on Sets and Models](#) supervisor Tapani Hyttinen, partially in collaboration with Sy-David Friedman
- 2009 Master's thesis, mathematics: *Weak Ehrenfeucht-Fraïssé Games* supervisor Tapani Hyttinen
- 2008 Bachelor's thesis, mathematics: *Weak Ehrenfeucht-Fraïssé Games* supervisor Tapani Hyttinen