Matěj Doležálek

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EDUCATION

Ph.D. University of Konstanz (UKON) and University of Florence (UniFi)
(as part of the TENORS network)
Supervisors: Mateusz Michałek (UKON) and Giorgio Ottaviani (UniFi)
Thesis: *Cohomology of tensor varieties*
expected 2027

Mgr. Faculty of Mathematics and Physics (MFF UK)
(Mathematical structures)
Supervisor: Vítězslav Kala
Thesis: *Quaternion orders and quadratic forms*
2024

Bc. Faculty of Mathematics and Physics (MFF UK)
(General mathematics)
Supervisor: Vítězslav Kala
Thesis: *Subfields of number field extensions and quadratic forms*
2022

EMPLOYMENT

2024– University of Konstanz
Ph.D. student

INTERNSHIPS

2023 University of Konstanz
Research internship, supervisor: Mateusz Michałek
subject: *Equivariant Cohomology for Toric Varieties*

RESEARCH INTERESTS

Tensor geometry

Combinatorial applications of algebraic geometry

GRANTS

2022 Primus Research Programme
Team member of the project *Universal quadratic forms: geometry and analysis*
Principal investigator: Vítězslav Kala

2019–20 MFF UK
Principal investigator of the sudent faculty grant
Universal quadratic forms through quaternions and geometry of numbers

PUBLICATIONS

2026 *Extending bounds on minimal ranks of universal quadratic lattices to larger number fields*, to appear in Int. J. Number Theory, doi:10.1142/S1793042126500624.

2025 *Secant varieties of Segre-Veronese varieties* $\mathbb{P}^m \times \mathbb{P}^n$ *embedded by* $\mathcal{O}(1,2)$ *are non-defective for* $n \gg m^3$, $m \geq 3$ (with N. Ken), J. Symbolic Comput. 135, 102546, doi:10.1016/j.jsc.2025.102546.

2025 *Equivariant Tutte Polynomial* (with M. Bauer, M. Mišinová, S. Słobodianiuk and J. Weigert), Discrete Comput. Geom., doi:10.1007/s00454-025-00773-y.

2025 *Generalizing Hurwitz's quaternionic proof of Lagrange's and Jacobi's four-square theorems*, Expo. Math. 43, no. 6, 125715, doi:10.1016/j.exmath.2025.125715.

2024 *No proper generalized quadratic forms are universal over quadratic fields* (with O. Chwiedziuk, S. Fryšová, E. Pěchoučková, Z. Pezlar, O. Prakash, A. Růžičková and M. Zindulka), arXiv:2409.07941, submitted.

2024 *Representing rational integers by generalized quadratic forms over quadratic fields* (with O. Chwiedziuk, E. Pěchoučková, Z. Pezlar, O. Prakash, G. Romeo, A. Růžičková and M. Zindulka), arXiv:2403.07171, submitted.

2023 *The Six-Vertex Model with a Non-Standard Boundary Condition* (with M. Raška, E. Sgallová, E. N. Stucky and M. Zindulka), arXiv:2310.05281, preprint.

COMPETITIONS & AWARDS

Award of the The Learned Society of the Czech Republic (2022)

SVOČ competition: 1st place (2021), 3rd place (2023)

1st place in SOČ competition + *České hlavičky* award (2019)

International Mathematics Competition: 3× First prize (2021, 2022, 2023)

International Mathematical Olympiad: Bronze medal (2019), Honourable mention (2018)

TALKS

2025 *Induction on non-defective Segre-Veronese varieties embedded by* $\mathcal{O}(1,2)$
Applied Algebraic Geometry seminar, UniFi, Florence

2024 *Universal quadratic forms through quaternion orders*
Number theory seminar, MFF UK, Prague

2022 *Subfields of number field extensions and quadratic forms*
Number theory seminar, MFF UK, Prague

2020 *Quaternions, geoemetry of numbers and universal quadratic forms*
Number theory seminar, MFF UK, Prague

CONFERENCES & WORKSHOPS

2025 *Modern Algebraic Geometry in Algebraic Combinatorics and Tensors*
Mathematisches Forschungsinstitut Oberwolfach, Banach Center IMPAN

2025 *Arbeitsgemeinschaft 2542: Combinatorial Hodge Theory*
Mathematisches Forschungsinstitut Oberwolfach

2025 *Workshop on the Applications of Commutative Algebra* (Tensors group)
Fields Institute, Toronto

TEACHING

2024 Number Theory Proseminar
(practicals at MFF UK, summer semester)

2022–24 Introduction to Commutative Algebra
(practicals at MFF UK, winter semmester)

SERVICE & ORGANIZING EXPERIENCE

2019–25 Mathematical correspondence seminare (for high-schoolers) of MFF UK
(head organizer 2022–24)

2019– Czech Mathematical Olympiad
various grading and talks

2020 Middle European Mathematical Olympiad
deputy leader of the Czech team

2023 Middle European Mathematical Olympiad
coordinator for number theory

2024 Czech-Austrian-Polish-Slovak match
deputy leader of the Czech team

2025 Middle European Mathematical Olympiad
leader of the Czech team

LANGUAGES

English fluent

Czech native

German intermediate

Last updated 27th January, 2026