

# SHORT CURRICULUM VITAE

August 1, 2024

**Ján Mináč**

Western Fellow 2022-23, Inaugural Class of Fellows, Western Academy for Advanced Research  
Professor of Mathematics and Computer Science Department (cross-appointed)  
Fellow of the Canadian Mathematical Society, 2019 Second Inaugural Class of Fellows  
Faculty of Science Distinguished Research Professor 2020-2021  
Western University, Department of Mathematics, Middlesex College  
London, Ontario, Canada N6A 5B7

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**Academic Training:**      **Queen's University**, Kingston, Ontario, Canada -- Ph.D. in Mathematics, 1986  
**Comenius University**, Bratislava, Czechoslovakia – RNDr. in Mathematics  
(equivalent to M.Sc. in Mathematics), 1977; B.Sc. in Mathematics, 1976

**Past Employment – Western University:** Associate Professor, Department of Mathematics (1991 – 2003)  
Assistant Professor, Department of Mathematics (1989 – 1991)

**The University of California at Berkeley:** NSF Postdoctoral Fellow, Department of Mathematics  
(1987 - 1989)

**Mathematical Sciences Research Institute**, Berkeley: Researcher (1986 - 1987) --- Member (Fall 1999)

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## **Awards and Honours**

*Member of organizing committee (with L. Muller), **Fields Lab for Network Science**, The Fields Institute for Research in Mathematical Sciences, Toronto, June 2024 inception.*

***Workshop on Galois Cohomology and Massey Products: A Conference in Honour of Ján Mináč's 71<sup>st</sup> Birthday**, University of Ottawa, June 13-16, 2024.*

***Western Fellow 2022-23, Western Academy for Advanced Research**, Western University (2022 inaugural Fellow of this first inaugural year of the Western Academy for Advanced Research).*

***Fellow of the Canadian Mathematical Society, 2019 Second Inaugural Class of Fellows.**  
(One of eleven Canadian Mathematical Society Fellows elected nationwide.)*

***Distinguished Research Professor 2020-21 and 2004-05**, Faculty of Science, Western University.*

***NSF Postdoctoral Fellowship 1987-1989**, Department of Mathematics, University of California at Berkeley.*

***Teaching Awards of Excellence:** 2013 Canadian Mathematical Society Excellence in Teaching Award.  
*University Students' Council and Alumni Western Teaching Awards of Excellence 1996 - 1997 and 2009 - 2010*, Western University.*

## **Teaching Honour Roll Awards of Excellence:**

- *University Students' Council Teaching Honour Roll Awards of Excellence 2018-19, 2017-18, 2016-17, 2015-16, 2014-15, 2013-14, 2012-13, 2011-12, 2010-11, 2008-09, and 2007-08*, Western University.

## **Selected Scholarly and Professional Activities and Invited Lectures 2010 - 2024**

- Member of Editorial Boards: *Encyclopedia of Mathematics*.

- Member, *American Mathematical Society Committee on Human Rights of Mathematicians* (2012-15).
- **Invited colloquium lecture:** Department of Mathematics, Illinois State University, Fall 2024. (organizer: Sunil K. Chebolu).
- **Invited lecture:** Number Theory Seminar, Fields Institute for the Mathematical Sciences, Fall 2024.
- **Invited Algebra Seminar lecture:** Department of Mathematics, Michigan State University, Fall 2024. (organizer: Preston Wake).
- **Invited speaker,** online mini-workshop: *Algebra and Geometry of Homogeneous Spaces*, June 2-4, 2021. Org.: Nikita Karpenko (Alberta), Nicole Lemire (Western Ontario), and Kirill Zaynullin (Ottawa).
- **Co-organizer** (with L. Muller), 2022 *Western-Fields School in Networks and Neuroscience*, September 19-23, 2022.
- **Co-organizer** (with L. Muller), *Western Week in Graph Theory*, February 6-11, 2023. Lectures delivered by M. Chudnovsky (Princeton), S. Spirkl (Waterloo), and L. Crew (Waterloo).
- **Invited colloquium lecture:** “*The 13<sup>th</sup> mysterious room of a palace of absolute Galois groups*,” Pure Mathematics Colloquia, Department of Mathematics, University of Waterloo, April 1, 2019.
- **Co-organizer of Banff International Research Station workshop:** *Nilpotent Fundamental Groups*, June 18 – 23, 2017. Organizers: J. Mináč (Western University), F. Pop (University of Pennsylvania), A. Topaz (Oxford University) and K. Wickelgren (Georgia Institute of Technology).
- **Invited lecture,** “*A magical spell of Massey products on Galois  $p$ -extensions*,” Canadian Mathematical Society Winter Meeting, *Cohomological Methods in Quadratic Forms and Algebraic Groups Session*, Montreal, Quebec, December 6, 2015. (Session organizers: S. Gille and N. Karpenko, both U. Alberta.)
- **Invited lecture,** “*Why I am excited about the use of Massey products in Galois theory*” (joint work with N. D. Tân), American Mathematical Society 2015 Fall Eastern Sectional Meeting, *Advances in Valuation Theory IV Session* (Special Session organized by S. El Hitti, F.-V. Kuhlmann and H. Schoutens), Rutgers University, New Brunswick, NJ, November 15, 2015.
- **Invited professor/lecturer,** advanced mathematical summer school with Ch. Maire and G. Malle: “*Advanced International School on Galois Groups*,” University of the Basque Country, Bilbao, Spain, July 16 - 27, 2012.
- **Invited lecture,** *Department of Mathematics, Georgia Institute of Technology*, October 3, 2014. (Invited by Professor K. G. Wickelgren.)
- **Prize lecture,** *Canadian Mathematical Society Excellence in Teaching Award 2013*, CMS Summer Meeting, Halifax, Nova Scotia, June 5, 2013.
- **Invited plenary speaker,** *Workshop on Number Theory with a view Towards Transcendence and Diophantine Approximation*, University of Ottawa, June 8 – 10, 2013. (Invited by the organizers: Professors D. Roy and C. L. Stewart. Honouring Michel Waldschmidt with a doctorate from the University of Ottawa.)
- **Invited participant and lecturer,** Canadian Mathematical Society Winter Meeting, *Arithmetic Geometry Special Session*, Montreal, December 7 – 10, 2012. (Invited by H. Darmon, E. Goren and A. Iovita.)
- **Invited plenary speaker,** *70<sup>th</sup> Algebra Days*, Carleton University, Ottawa, October 20 – 21, 2012. (Invited by Professors L. Ribes and I. Bumagin.)
- **Invited participant,** American Institute of Mathematics, “*Deformation Theory, Patching, Quadratic Forms, and the Brauer Group*” workshop, Palo Alto, Jan. 17- 21, 2011 (org.: D. Krashen/M. Lieblich).
- **Invited participant and plenary speaker,** Tel Aviv University workshop on *Field Arithmetic* in honour of the retirement of Professor Moshe Jarden, June 13 – 17, 2010.

#### Further Banff International Research Station (BIRS) Workshop Co-organization Activity

- “*Nilpotent Fundamental Groups*” (with A. Topaz, F. Pop and K. Wickelgren), June 18 – 23, 2017.

- “*Linear Algebraic Groups and Related Structures*” (with V. Chernousov, A. Merkurjev and Z. Reichstein), September 13 – 18, 2009.
- “*Algebraic Groups, Quadratic Forms and Related Topics*” (with V. Chernousov, R. Elman, A. Merkurjev and Z. Reichstein), September 2 – 7, 2006.
- “*Quadratic Forms, Algebraic Groups, and Galois Cohomology*” (with R. Elman, A. Merkurjev, and C. Riehm), October 4 – 9, 2003.

### Membership on Scientific Program Committees

- **Member of the Scientific Program Committee**, *Conference on Public-Key Cryptography and Computational Number Theory*, Banach International Mathematical Center, Warsaw, 9/11-15, 2000.

**Membership in learned societies and organizations:** American Mathematical Society, Canadian Mathematical Society, Mathematical Association of America, American Association for the Advancement of Science, Scientific American.

**Oberwolfach Mathematical Institute workshops, AMS meetings, and various conferences and invited talks:** Since 1986 have carried out numerous visits to research workshops, conferences, and invited talks.

**Undergraduate research students, graduate students, and postdoctoral fellows – selected activities:** 22 graduate students have completed their advanced degrees under my supervision: 15 PhD students and 8 master’s students, with some joint supervision with other professors. Currently I am supervising and/or co-supervising four PhD students and one master’s student. I have also been working with several postdoctoral fellows, including: N. D. Tân, T. T. Nguyen, F. W. Pasini, R. C. Budzinski and M. Čížek. (In 2019 N. D. Tân received a prestigious award from the Vietnam Academy of Science and Technology for being “... a leading mathematician working in Vietnam under the age of 40.”) We have been working together intensively and productively. I have also been mentoring a number of wonderful undergraduate students. The last two summers I jointly co-supervised with L. Muller, seven outstanding undergraduate students in the NSERC USRA research program and four Fields Institute Undergraduate Summer Research Program students chosen internationally. One of my PhD students, Oussama Hamza, successfully defended his PhD thesis, June 28, 2024.

**NSERC Grant Funding Support:** Continuous NSERC research grant funding support since 1989. Recent research NSERC funding support 2017-2023: \$190,000. Current NSERC support 2023-2028: \$150,000.

### A Selection of Publications (from over 116 published and / or accepted papers)

- (1) J. Mináč and M. Spira. Formally real fields, C-fields and W-groups. *Math. Zeit.* **205** (1990), 519-530.
- (2) J. Mináč and R. Ware. Pro-2-Demushkin groups of rank  $\aleph_0$  as Galois groups of maximal 2-extensions of fields. *Math. Ann.* **292** (1992), 337-353.
- (3) J. Mináč. Poincaré polynomials; stability indices and number of orderings I. *Advances in Number Theory, Canadian Number Theory Association Proceedings*, Clarendon Press Oxford (1993), 515-528.
- (4) J. Mináč and M. Spira. Witt rings and Galois groups. *Ann. Math.* **144** (1996), 35-60.
- (5) A. Adem, D. Karagueuzian and J. Mináč. On the cohomology of Galois groups determined by Witt rings. *Adv. Math.* **148** (1999), no. 1, 105-160.
- (6) J. Mináč and J. Swallow. Galois module structure of  $p$ th-power classes of extensions of degree  $p$ . *Israel J. Math.* **138** (2003), 29-42.
- (7) W. Gao, D. Leep, J. Mináč and T. L. Smith. Galois groups over nonrigid fields. *Proceedings of the International Conference on Valuation Theory and its Applications, Vol. II (Saskatoon, 1999), Fields Institute Communications*, American Mathematical Society **33** (2003), 61-77.

- (8) J. Mináč and Z. Reichstein. Trace forms of Galois extensions in the presence of a fourth root of unity. *Int. Math. Res. Not.* (2004), no. 8, 389-410.
- (9) L. Mahé, J. Mináč and T. L. Smith. Additive structure of multiplicative subgroups of fields and Galois theory. *Doc. Math.* **9** (2004), 301-355.
- (10) J. Mináč, A. Schultz and J. Swallow. Galois module structure of  $p^{\text{th}}$ -power classes of cyclic extensions of degree  $p^n$ . *Proc. London Math. Soc.* (3) **92** (2006), no. 2, 307-341.
- (11) N. Lemire, J. Mináč and J. Swallow. Galois module structure of Galois cohomology and partial Euler-Poincaré characteristics. *J. Reine Angew. Math.* **613** (2007), 147-173.
- (12) D. Benson, N. Lemire, J. Mináč and J. Swallow. Detecting pro- $p$  groups that are not absolute Galois groups. *J. Reine Angew. Math.* **613** (2007), 175-191.
- (13) D. Benson, S. K. Chebolu, D. Christensen and J. Mináč. The generating hypothesis for the stable module category of a  $p$ -group. *J. Algebra.* **310** (2007), no. 1, 428-433.
- (14) S. K. Chebolu, D. Christensen and J. Mináč. Ghosts in modular representation theory. *Adv. Math.* **217** (2008), no. 6, 2782-2799.
- (15) J. F. Carlson, S. K. Chebolu and J. Mináč. Freyd's generating hypothesis with almost split sequences. *Proc. Amer. Math. Soc.* **137** (2009), no. 8, 2575-2580.
- (16) N. Lemire, J. Mináč, A. Schultz and J. Swallow. Galois module structure of Galois cohomology for embeddable cyclic extensions of degree  $p^n$ . *J. London Math. Soc.* (2) **81** (2010), no. 3, 525-543.
- (17) J. F. Carlson, S. K. Chebolu and J. Mináč. Finite generation of Tate cohomology. *AMS J. Representation Theory* **15** (2011), 244-257.
- (18) J. Labute and J. Mináč. Mild pro-2 groups and 2-extensions of  $\mathbb{Q}$  with restricted ramification. *J. Algebra* **332** (2011), 136-158.
- (19) I. Efrat and J. Mináč. On the descending central sequence of absolute Galois groups. *Amer. J. Math.* **133** (2011), no. 6, 1503-1532.
- (20) S. K. Chebolu, I. Efrat and J. Mináč. Quotients of absolute Galois groups which determine the entire Galois cohomology. *Math. Ann.* **352** (2012), no. 1, 205-221.
- (21) I. Efrat and J. Mináč. Small Galois groups that encode valuations. *Acta Arith.* **156** (2012), no. 1, 7-17.
- (22) J. Mináč, J. Swallow and A. Topaz. Galois module structure of  $(\ell^n)$ th classes of fields. *Bull. London Math. Soc.* **46** (2014), 143-154.
- (23) P. Guillot and J. Mináč. Milnor  $K$ -theory and the graded representation ring. *J. K-Theory* **13** (2014), 447-480.
- (24) J. Mináč and N. D. Tân (with an appendix written by I. Efrat, J. Mináč and N. D. Tân). The kernel unipotent conjecture and the vanishing of Massey products for odd rigid fields. *Adv. Math.* **273** (2015), 242-270.
- (25) J. Mináč and N. D. Tân. Triple Massey products over global fields. *Doc. Math.* **20** (2015), 1467-1480.
- (26) S. K. Chebolu, J. Mináč and C. Quadrelli. Detecting fast solvability of equations via small powerful Galois groups. *Trans. Amer. Math. Soc.* **367** (2015), no. 12, 8439-8464.
- (27) J. F. Carlson, S. K. Chebolu and J. Mináč. Ghosts and strong ghosts in the stable category. *Canad. Math. Bull.* **59** (2016), no. 4, 682-692.
- (28) J. Mináč, M. Rogelstad and N. D. Tân. Dimensions of Zassenhaus filtration subquotients of some pro- $p$ -groups. *Israel J. Math.* **212** (2016), no. 2, 825-855.
- (29) J. Mináč and N. D. Tân. Triple Massey products vanish over all fields. *J. London Math. Soc.* (2) **94** (2016), no. 3, 909-932.
- (30) M. Ataei, J. Mináč and N. D. Tân. Description of Galois unipotent extensions. *J. Algebra* **471** (2017), 193-219.
- (31) J. Mináč and N. D. Tân. Construction of unipotent Galois extensions and Massey products. *Adv. Math.* **304** (2017), 1021-1054.
- (32) I. Efrat and J. Mináč. Galois groups and cohomological functors. *Trans. Amer. Math. Soc.* **369** (2017), no. 4, 2697-2720.

- (33) J. Mináč and N. D. Tân. Triple Massey products and Galois theory. *J. Eur. Math. Soc. (JEMS)* **19** (2017), no. 1, 255-284.
- (34) J. Mináč and N. D. Tân. Counting Galois  $\mathbf{U}_4(\mathbf{F}_p)$ -extensions using Massey products. *J. Number Theory* **176** (2017), 76-112.
- (35) S. K. Chebolu, D. McQuillan and J. Mináč. Witt's cancellation theorem seen as a cancellation. *Expo. Math.* **35** (2017), no. 3, 300-314.
- (36) P. Guillot, J. Mináč and A. Topaz (with an Appendix by O. Wittenberg). Four-fold Massey products in Galois cohomology. *Compositio Math.* **154** (2018), no. 9, 1921-1959.
- (37) P. Guillot and J. Mináč. Extensions of unipotent groups, Massey products and Galois theory. *Adv. Math.* **354** (2019), 106748, 40 pp.
- (38) J. Mináč, M. Rogelstad and N. D. Tân. Relations in the maximal pro- $p$  quotients of absolute Galois groups. *Trans. Amer. Math. Soc.* **373** (2020), no. 4, 2499-2524.
- (39) J. Mináč, M. Palaisti, F. W. Pasini and N. D. Tân. Enhanced Koszul properties in Galois cohomology. *Res. Math. Sci.* **7** (2020), no. 2, Paper No. 10, 34 pp.
- (40) J. Mináč, F. W. Pasini, C. Quadrelli and N. D. Tân. Koszul algebras and quadratic duals in Galois cohomology. *Adv. Math.* **380** (2021), Paper No. 107569, 49 pp.
- (41) J. Mináč, L. Muller and T. T. Nguyen. Algebraic approach to the Kuramoto model. *Phys. Rev. E* **104** (2021), no. 2, Paper No. L022201, 5 pp.
- (42) J. Mináč, A. Schultz and J. Swallow. On the indecomposability of a remarkable new family of modules appearing in Galois theory. *J. Algebra* **598** (2022), 194-235.
- (43) Budzinski, R. C., Nguyễn, T. T., Doan, J., Mináč, J., Sejnowski, T. J., Muller, L. (2022). Geometry unites synchrony, chimeras, and waves in nonlinear oscillator networks. *Chaos* **32** (2022), no. 3, Paper No. 031104, 7 p.
- (44) J. Mináč, F. W. Pasini, C. Quadrelli and N. D. Tân. Mild pro- $p$  groups and the Koszulity conjectures. *Expo. Math.* **40** (2022), no. 3, 432-455.
- (45) Đoàn, J., Mináč, J., Muller, L., Nguyễn, T. T., Pasini, F. W. (2022). Joins of circulant matrices. *Linear Algebra Appl.* **650** (2022), 190-209.
- (46) J. Mináč, N. D. Tân and T. T. Nguyễn. Fekete polynomials, quadratic residues, and arithmetic. *J. Number Theory* **242** (2023), 532-575.
- (47) J. Mináč, A. Schultz and J. Swallow. Arithmetic properties encoded in the Galois module structure of  $K^x/K^{xp^m}$ . *J. Number Theory* **242** (2023), 669-708.
- (48) F. Chemotti, J. Mináč, A. Schultz and J. Swallow. Galois module structure of square power classes for biquadratic extensions. *Canad. J. Math.* **75** (2023), no. 3, 804-827.
- (49) T. T. Nguyễn, R. Budzinski, J. Đoàn, F. W. Pasini, J. Mináč and L. Muller. Equilibria in Kuramoto oscillator networks: an algebraic approach. *Siam J. Appl. Dyn. Syst.* **22** (2023), no. 2, 802-824.
- (50) L. Heller, J. Mináč, T. T. Nguyễn, A. Schultz and N. D. Tân. Galois module structure of some elementary  $p$ -abelian extensions. *Israel J. Math.* **257** (2023), no. 2, 389-408.
- (51) S. K. Chebolu, J. Merzel, J. Mináč, L. Muller, T. T. Nguyễn, F. W. Pasini and N. D. Tân. On the joins of group rings. *J. Pure Appl. Algebra* **227** (2023), no. 9, Paper No. 107377, 33 pp.
- (52) T. T. Nguyen, R. C. Budzinski, F. W. Pasini, R. Delabays, J. Mináč and L. Muller. Broadcasting solutions on networked systems of phase oscillators. *Chaos Solitons Fractals* **168** (2023), Paper No. 113166, 10 pp.
- (53) R. C. Budzinski, T. T. Nguyễn, G. B. Benigno, J. Đoàn, J. Mináč, T. J. Sejnowski and L. Muller. Analytical prediction of specific spatiotemporal patterns in nonlinear oscillator networks with distance-dependent time delays. *Physical Review Research* **5** (2023), Paper No. 013159.
- (54) M. Chudnovsky, M. Čížek, L. Crew, J. Mináč, T. T. Nguyen, S. Spirkel and N. D. Tân. On prime Cayley graphs. (Preprint 2024, arXiv: 2401.06062 [math.CO], 25 pages.)
- (55) F. Chemotti, J. Mináč, T. T. Nguyen, A. Schultz, J. Swallow and N. D. Tân. Quaternion algebras and square power classes over biquadratic extensions. *Israel J. Math.* **257** (2023), no. 1, 193-216.

- (56) J. Mináč, L. Muller, T. T. Nguyen and N. D. Tân. On the Paley graph of a quadratic character. *Math. Slovaca* **74** (2024), no. 3, 527-542.
- (57) Alexandra Busch, Megan Roussy, Rogelio Luna, Matthew L. Leavitt, Maryam H. Mofrad, Roberto A. Gulli, Benjamin Corrigan, Ján Mináč, Adam J. Sachs, Lena Palaniyappan, Lyle Muller and Julio C. Martinez-Trujillo. Neuronal activation sequences in lateral prefrontal cortex encode visuospatial working memory during virtual navigation. *Nature Communications* (2024)**15:4471**. (25 May 2024, published online: <https://doi.org/10.1038/s41467-024-48664-9>.)
- (58) Roberto Budzinski, Alexandra N. Busch, Samuel Mestern, Erwan Martin, Luisa H. B. Liboni, Federico W. Pasini, Ján Mináč, Todd Coleman, Wataru Inoue and Lyle E. Muller. An exact mathematical description of computation with transient spatiotemporal dynamics in a complex-valued neural network. *Communications Physics* (2024)**7:239**.