

SHORT CURRICULUM VITAE

Ján Mináč

Employment – Western University: Professor, Department of Mathematics (2003 – present)

Cross-Appointment – Western University: Professor, Department of Computer Science (2019-2024 and 2011-2016)

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)

Queen's University, Kingston, Ontario, Canada: Teaching Assistant, Department of Mathematics (1983 – 1986)

Mathematical Institute of the Academy of Sciences, Bratislava, Czechoslovakia: Researcher (1976 - 1982)

Awards and Honours

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

Distinguished Research Professorship 2004-2005, Faculty of Science, Western University.

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

Teaching Awards of Excellence: *Canadian Mathematical Society Excellence in Teaching Award 2013,*
presented at the CMS Summer Meeting, Halifax, NS, June 4 - 7, 2013.

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 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 - 2020

- Member of Editorial Boards: *Encyclopedia of Mathematics.*
- Member of the *American Mathematical Society Committee on Human Rights of Mathematicians* (2012-2015).

- Invited lecture: “*TBA*,” Number Theory Seminar, Department of Mathematics, Cornell University, Ithaca, New York, May 1, 2020.
- Invited colloquium lecture: “*The 13th 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. Lovita.)
- **Invited plenary speaker**, *70th 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, California, January 17 – 21, 2011. (Organized by Professors D. Krashen and 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.

Selected Scholarly Activities 2008 – 2009 and Special Scholarly Events 2004 – 2007

- **Invited two-hour lecture**, “*Group Theory, Number Theory and Representation Theory Seminar*,” Department of Mathematics, University of Michigan, Ann Arbor, November 16, 2009. (Invited by Professor G. Prasad.)
- **Invited lecture**, *Second Canada-France Congress*, University of Quebec, Montreal, Canada, June 1 – 5, 2008.
- **Co-organizer** (with J. Swallow), American Mathematical Society 2007 Spring Southeastern Section Meeting, “*Representation Theory and Galois Cohomology in Number Theory*,” Davidson College, Davidson, North Carolina, March 2 - 4, 2007.
- **Short-term visitor and invited lecture**, Research Institute for Mathematical Sciences (RIMS), Kyoto University, Kyoto, Japan, October 23 – 27, 2006.
- **Plenary speaker**, *ABC Algebra Workshop*, University of British Columbia, April 8 - 9, 2006. (Organized by A. Pianzola (U. Alberta) and Z. Reichstein (University of British Columbia).)
- **Visiting scholar and invited lecture**, Department of Mathematics, University of British Columbia, Vancouver, April 2006. (Invited by Professor Z. Reichstein.)
- **Organizer**, workshop on “*Galois Modules, Galois Cohomology, Pro-p-groups and Related Topics*,” The University of Western Ontario, December 10 – 12, 2004.

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**, *MoraviaCrypt Conference*, Brno, Czech Republic, June 15 – 22, 2005.
- **Member of the Scientific Program Committee**, *Conference on Public-Key Cryptography and Computational Number Theory*, Banach International Mathematical Center, Warsaw, Poland, September 11 - 15, 2000.

Membership in Learned Societies: American Mathematical Society, Canadian Mathematical Society, Mathematical Association of America.

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 Student Research Supervision: Since 2002 I have carried out regular research supervision of undergraduate students during the academic year and during the summer. I have had the privilege to mentor, encourage, and support a number of remarkable students during their subsequent development and pursuit of various careers.

Graduate Students and Postdoctoral Fellows – Activity: 18 graduate students have completed their advanced degrees under my supervision: 11 PhD students and 7 Master’s degree students, with some joint supervision with other professors. Currently I am supervising two PhD students. I have also been working with several postdoctoral fellows: N. D. Tân (currently based in Vietnam), and F. W. Pasini, who is my current postdoctoral fellow (from July 2017 and currently supervised together with M. Daley, Ch. Hall, T. Barron, and other faculty members from the Computer Science Department). (N. D. Tân recently received a prestigious award from the Vietnam Academy of Science and Technology for being the “... best mathematician working in Vietnam under the age of 40.”) We have been working together intensively and very successfully. We are planning to also supervise T. N. Xuan in the not too distant future, with co-supervisors, Ch. Hall and T. Barron, with M. Daley as a co-collaborator and advisor. It is amazing to be able to work with such a wonderful team.

NSERC Grant Funding Support: Continuous NSERC research grant funding support since 1989. Current research grant funding support (2018 - 2023) \$150,000.

A Selection of Publications (from among approximately 90 published 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^{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 (ℓ^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 $U_4(\mathbb{F}_p)$ -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. J. Mináč, M. Rogelstad and N. D. Tân. Relations in the maximal pro- p quotients of absolute Galois groups. *Trans. Amer. Math. Soc.* (2020 January).

A Comprehensive Picture: Different but strongly interrelated projects, some developed over many years and relying on my previously published work; are leading to a surprisingly coherent picture of the structure of maximal pro- p quotients of absolute Galois groups. These have been completed or are works-in-progress with a number of colleagues. The most recent work carried out during the last four years, but strongly relying both on my previous work as well as on new developments – on the development of the theory of Massey products in Galois cohomology and Koszul properties of Galois cohomology – is leading us to new theorems, strong conjectures, crucial new insights, and advances in classical problems related to absolute Galois groups.

A Short Personal Conclusion: When I was 12 years old, I discovered the mysterious and magical world of mathematics. That innocent first encounter turned into a lifelong passion. Therefore ever since my early mathematical dreams, I have been trying to find the time and freedom to think about mathematics and to share my enthusiasm for mathematics with students, with colleagues, and with my family. Although I went through many years of a difficult immigration process and considerable challenges, I am extremely grateful to my

mentors, colleagues, friends, and students; for being able to share with them ideas, passion, and enthusiasm for mathematics; and to continue to dream, to create, and to teach this wonderful subject.

Postscript. Very recently together with M. Daley, L. E. Muller, F. W. Pasini, and other collaborators, we have begun to pursue some fascinating new applications of mathematics to the study of the brain and mind and the study of large data. This research is not only bringing forth some exciting new connections between mathematics, medicine, and science; it is also leading us to rethink some fundamental concepts in mathematics from a different perspective.