

# Karol Koziol

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Citizenship: Poland, USA

## Employment

- 9/2019 – **Postdoctoral Assistant Professor**, *University of Michigan*.  
Present Supervisor: Stephen DeBacker
- 8/2018 – **Postdoctoral Fellow**, *University of Alberta*.  
7/2019 Supervisor: Manish Patnaik
- 9/2014 – **NSF Postdoctoral Fellow**, *University of Toronto*.  
7/2018 Sponsoring Scientist: Florian Herzig
- 3/2016 – **EPDI Postdoctoral Fellow**, *Max Planck Institute for Mathematics*.  
8/2016 Supervisor: Geordie Williamson
- 9/2015 – **EPDI Postdoctoral Fellow**, *Institut des Hautes Etudes Scientifiques*.  
2/2016 Supervisor: Ahmed Abbes

## Education

- 9/2009 – **Ph.D. in Mathematics**, *Columbia University*.  
5/2014 Advisor: Rachel Ollivier
- 9/2005 – **B.A. in Mathematics (Honors), Minor in Music**, *New York University*.  
5/2009 Magna Cum Laude, Phi Beta Kappa

## Awards/Honors/Funding

- 2021 – 2024 NSF Standard Grant [DMS-2101836](#) (Sole PI), \$124,050
- 2019 AIM SQuaRE Workshop
- 2019 BIRS Research in Teams
- 2019 Funding to attend workshop “Hot Topics: Recent progress in Langlands Program” at MSRI
- 2017 Université Montpellier Travel Grant
- 2015 – 2016 EPDI Fellowship
- 2014 – 2018 NSF Mathematical Sciences Postdoctoral Research Fellowship, \$150,000
- 2013 Funding to attend summer school “New Geometric Techniques in Number Theory” at MSRI
- 2010 NSF Graduate Research Fellowship Honorable Mention
- 2009 – 2014 Faculty Fellow/Teaching Fellow in the Department of Mathematics, Columbia University
- 2009 – 2014 Funded by NSF RTG Grant DMS-0739400 in Number Theory, Columbia University
- 2009 Hollis Cooley Memorial Prize for Excellence in Mathematics, New York University

## Publications and preprints

- *Functorial properties of pro- $p$ -Iwahori cohomology*  
J. London Math. Soc. (2) **104** (2021) 1572–1614.
- *On the existence of admissible supersingular representations of  $p$ -adic reductive groups*  
(with Florian Herzig and Marie-France Vignéras, and an appendix by Sug Woo Shin)  
Forum of Mathematics, Sigma **8** (2020), e2.

- *Serre weight conjectures for  $p$ -adic unitary groups of rank 2*  
(with Stefano Morra)  
To appear in Algebra & Number Theory
- *The first pro- $p$ -Iwahori cohomology of mod- $p$  principal series for  $p$ -adic  $GL_n$*   
Trans. Amer. Math. Soc. **372** (2019), 1237–1288.
- *Hecke module structure on first and top pro- $p$ -Iwahori cohomology*  
Acta Arithmetica **186** (2018), 349–376.
- *Irreducible admissible mod- $p$  representations of metaplectic groups*  
(with Laura Peskin)  
Manuscripta Math. **155** (2018), no. 3-4, 539–577.
- *Homological dimension of simple pro- $p$ -Iwahori–Hecke modules*  
Math. Res. Lett. **26** (2019), no. 3, 769–804.
- *Pro- $p$ -Iwahori invariants for  $SL_2$  and  $L$ -packets of Hecke modules*  
International Mathematics Research Notices (2016), no. 4, 1090–1125.
- *A classification of the irreducible mod- $p$  representations of  $U(1, 1)(\mathbb{Q}_{p^2}/\mathbb{Q}_p)$*   
Annales de l’Institut Fourier **66** (2016), no. 4, 1545–1582.
- *Hecke modules and supersingular representations of  $U(2, 1)$*   
(with Peng Xu)  
Representation Theory **19**, (2015), 56–93.

## Seminar Talks

- 11/2021 **RTG Seminar**, University of Michigan
- 10/2021 **Joint Number Theory Seminar**, Columbia–CUNY–NYU
- 11/2020 **RTG Seminar**, University of Michigan
- 10/2020 **Number Theory Seminar**, Harvard
- 8/2020 **New Developments in Number Theory**, hosted by POINT, online
- 2/2020 **Topology, Analysis & Geometry Seminar**, Central Michigan University
- 11/2019 **Algebra, Combinatorics, and Geometry Seminar**, University of Pittsburgh
- 10/2019 **Algebra and Number Theory Seminar**, University of Arizona
- 4/2019 **Number Theory Seminar**, Northwestern
- 2/2019 **Research Presentation**, Trinity College Dublin
- 2/2019 **Number Theory Seminar**, University of British Columbia
- 1/2019 **Number Theory/Representation Theory Seminar**, University of Alberta
- 4/2018 **Number Theory Seminar**, UCLA
- 4/2018 **Number Theory Seminar**, UC San Diego
- 4/2018 **Number Theory Seminar**, Caltech
- 10/2017 **Séminaire de Géométrie Algébrique**, Université Montpellier 2
- 9/2016 **Number/Representation Theory Seminar**, University of Toronto
- 7/2016 **Séminaire de Théorie des Nombres**, Université Montpellier 2
- 6/2016 **Mittagsseminar zur Arithmetik**, Universität Münster
- 4/2016 **Oberseminar**, Max Planck Institute for Mathematics
- 11/2015 **Séminaire Groupes Réductifs et Formes Automorphes**, Institut de Mathématiques de Jussieu

- 11/2015 **Postdoc Seminar**, IHES
- 3/2015 **Number/Representation Theory Seminar**, University of Toronto
- 3/2015 **Arithmetic Geometry Seminar**, McMaster University
- 4/2014 **Princeton/IAS Junior Faculty Number Theory Seminar**, Princeton University
- 4/2014 **Group, Lie and Number Theory Seminar**, University of Michigan
- 2/2014 **Representation Theory Seminar**, CUNY Graduate Center
- 10/2013 **Number Theory Seminar**, University of British Columbia
- 6/2013 **Séminaire Groupes Réductifs et Formes Automorphes**, Institut de Mathématiques de Jussieu
- 6/2013 **Séminaire de Théorie des Nombres**, Université Montpellier 2

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## Conference Talks

- 11/2021 **Midwest Representation Theory Conference**, University of Michigan
- 7/2021 **Mathematical Congress of the Americas**, Buenos Aires, Argentina (online)
- 8/2019 **Nonassociative Algebras and Geometry**, Bonne Bay Marine Station
- 6/2019 **CMS Summer Meeting**, Regina (unable to attend)
- 5/2019 **Padova school on Serre conjectures and the  $p$ -adic Langlands program**, Padova
- 5/2019 **Alberta Number Theory Days XI**, BIRS
- 10/2018 **AMS Sectional Meetings**, University of Michigan
- 4/2018 **Upstate Number Theory Conference**, SUNY Buffalo
- 4/2017 **AMS Sectional Meetings**, University of Indiana, Bloomington
- 6/2016 **Geometric methods in the mod  $p$  local Langlands correspondence**, Centro di Ricerca Matematica Ennio De Giorgi
- 12/2015 **CMS Winter Meeting**, Montreal (unable to attend)
- 3/2014 **Conference on Modular Iwahori-Hecke Algebras**, Humboldt-Universität zu Berlin
- 12/2013 **Local Langlands Conjecture and Galois Representations**, Tata Institute
- 10/2013 **AMS Sectional Meetings**, Temple University
- 5/2013 **Hecke algebras in Number Theory and Categorification**, Columbia University
- 4/2013 **Modular Representation Theory of Finite and  $p$ -adic Groups**, IMS Singapore

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## Teaching

- **University of Michigan:**
  - Calculus I (F19)
  - Applied Modern Algebra (F19, F20)
  - Elementary Number Theory (W20, W21)
  - Number Theory Lab (W20)
  - Representation Theory of  $p$ -adic Groups (F20)
  - Linear Algebra – IBL (W21)
  - Linear Algebra (F21)
- **University of Alberta:**
  - Calculus I (F18)

- **University of Toronto:**
  - Linear Algebra I (F16)
  - Linear Algebra II (W17, Sum17)
- **Columbia University:**
  - Calculus III (Sum11)
  - Calculus IV (Sum12, Sum14)

## Outreach

- **University of Michigan:**
  - participated in Super Saturdays for the [Ypsilanti Math Corps](#)
  - gave talks at Michigan Math Circle, U(M) Undergraduate Math Club
- **University of Alberta:**
  - Science Fair Judge for middle school students at Aurora Academic Charter School
  - participated in weekly JAMES (Junior Alberta Math for Eager Students) Math Circle
- **University of Toronto:**
  - gave numerous presentations to high school students about algebraic topology, modular arithmetic, Arrow's theorem, the stable marriage problem, random walks, partial differential equations, and Fermat's theorem on two squares
  - mentored high school student Behshad Jahanpour's research project about  $p$ -adic numbers
- **Columbia University:**
  - gave presentations to Undergraduate Math Society about  $p$ -adic numbers and mathematical puzzles
- **New York University:**
  - gave presentations to high school students about modular arithmetic, algebraic topology, and elliptic curves at cSplash (one day mathematics outreach event at NYU)
  - co-organizer of cSplash, 2007 – 2009

## Service

Referee/quick opinion for: *Advances in Mathematics*, *Algebra and Number Theory*, *American Journal of Math*, *Bulletin of the LMS* ( $\times 2$ ), *Compositio Mathematica*, *International Journal of Number Theory*, *Israel Journal of Math*, *Journal of Number Theory*, *Journal de Théorie des Nombres de Bordeaux*, *Manuscripta Mathematica*, *Math Annalen*, *Math Research Letters*, *Representation Theory* ( $\times 4$ ), *Transactions of the AMS*

- 2021 – Co-organizer of RTG seminar on Representation Theory (with Charlotte Chan)
- 2021 Co-organizer of [Michigan Algebra and Number Theory Intercity Symposium \(MANTIS\)](#) (with Yuan Liu)
- 2021 Summer REU co-mentor for Drew Keisling and Dylan Pentland at the University of Michigan (with Tasho Kaletha)

- 2021 Co-organizer of special session on [Representations of  \$p\$ -adic groups and Langlands correspondences](#) (with Monica Nevins), 2021 CMS Summer Meeting, Ottawa.
- 2021 Panelist for session on applying to academic jobs for graduate students at University of Michigan
- 2020 – Co-organizer of [POINT: New Developments in Number Theory](#)
- 2020 Summer REU mentor for Alexander Wang at the University of Michigan
- 2020 Co-organizer of the [Cross Atlantic Representation Theory and Other topics ONline \(CARTOON\) conference](#) (with Jessica Fintzen) — online conference with over 400 registrants
- 2019 – 2020 Co-organizer for Group, Lie and Number Theory Seminar at the University of Michigan
- 2019 – Participant, Postdoc-Grad Student Mentorship Program, University of Michigan
- 2019 Co-organizer for Number Theory/Representation Theory Seminar at the University of Alberta
- 2016 – 2018 Co-organizer for Number Theory/Representation Theory Seminar at the University of Toronto
- 2013 Transcribed notes for Florian Herzig’s Mini-Course “ [\$p\$ -modular Representations of  \$p\$ -adic Groups](#)” at the summer school “Modular Representation Theory of Finite and  $p$ -adic Groups”
- 2012 – 2014 Departmental graduate student representative in Mathematics Department at Columbia University
- 2011 – 2014 Organized/co-organized student number theory seminars on Deligne–Lusztig theory, theta correspondence, deformation theory, and perfectoid spaces at Columbia University
- 2011 Co-organizer of Summer REU on Apollonian Circle Packings (with Tim Heath and Ian Whitehead)

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## Languages

English, Polish