GENE S. KOPP

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EMPLOYMENT

Louisiana State University, Baton Rouge, LA, USA, Autumn 2022–present
  Assistant Professor (tenure-track)

Purdue University, West Lafayette, IN, USA, Autumn 2021–Summer 2022
  Golomb Visiting Assistant Professor

University of Bristol and **Heilbronn Institute for Mathematical Research**, Bristol, UK, Autumn 2017–Summer 2021
  Heilbronn Research Fellow

University of Michigan, Ann Arbor, MI, USA, Autumn 2011–Spring 2017
  Graduate Student Instructor (7 semesters)
  NSF RTG Graduate Student Fellow (2 semesters)
  Graduate Student Research Assistant (3 semesters)

EDUCATION

University of Michigan, Ann Arbor, MI
  Ph.D., Mathematics, 2017
  Advisor: Jeffrey C. Lagarias
  Ph.D. thesis: **Indefinite Theta Functions and Zeta Functions**

University of Chicago, Chicago, IL
  B.S., Mathematics, with honors, 2011

PRIZES

SIAM Student Paper Prize ($1000 cash, plus travel to SIAM annual conference), awarded annually to up to three "student author(s) of the most outstanding paper(s) accepted by SIAM journals within three years of the nomination deadline," 2018.

Third Prize, Outstanding Presentation Competition, Young Mathematicians Conference, The Ohio State University, 2010.

RESEARCH AND TRAVEL GRANTS

NSF research grant DMS #2302514 for "Modular Cocycles, Explicit Class Field Theory, and Quantum Designs" ($219,228), 2023–2026.

Heilbronn Referral Initiative for help with recruitment efforts (£1000), 2018–2019.

Heilbronn Focused Research Grant for number-theoretic methods in dispersive PDE (£2000), 2017–2018.

CONFERENCE AND WORKSHOP GRANTS

Grant from the Number Theory Foundation for "Bayou Arithmetic Research Days (BARDs)" ($1500, joint with Olivia Beckwith), Spring 2022.

Grant from the Number Theory Foundation for "Bayou Arithmetic Research Days (BARDs)" ($1620, joint with Olivia Beckwith), Autumn 2022.

Grant from the Journal of Number Theory (Elsevier) for "Bayou Arithmetic Research Days (BARDs)" ($1680, joint with Olivia Beckwith), Autumn 2022.

Heilbronn Grant for Focused Research Workshop on "Synthesizing approaches to the Stark conjectures" (£7500, joint with Owen Patashnick), Spring 2022.

Heilbronn Grant for Focused Research Workshop on "Zauner's Conjecture" (£2000), Spring 2019.

RESEARCH ARTICLES (PREPRINTS)

10. **On 2-superirreducible polynomials over finite fields**
    Joint w/ Jonathan Bober, Lara Du, Dan Fretwell, and Trevor Wooley
    arXiv:2309.15304. Posted Sept 2023. Submitted for publication.
    10 pages

9. **Class field theory for orders of number fields**
   Joint w/ Jeffrey C. Lagarias
   arXiv:2212.09177. Posted Dec 2022. Submitted for publication.
   47 pages

RESEARCH ARTICLES (PUBLICATIONS)

8. **A Kronecker limit formula for indefinite zeta functions**
   Research in the Mathematical Sciences, 2(20):1–22, 2023.
   22 pages

7. **Indefinite zeta functions**
   Research in the Mathematical Sciences, 8(17):1–34, 2021.
   34 pages

6. **SIC-POVMs and the Stark conjectures**
   International Mathematics Research Notices, 2021(18):13812–13838, 2021.
   27 pages

5. **Generating weights for the Weil representation of cyclic quadratic modules of even order**
   Joint w/ Luca Candelori and Cameron Franc
   Journal of Number Theory, 180:474–497, 2017.
   24 pages

4. **The arithmetic geometry of resonant Rossby wave triads**
   SIAM J. Appl. Algebra Geometry, 1(1):352–373, 2017.
   22 pages

3. **The limiting spectral measure for ensembles of symmetric block circulant matrices**
   Joint w/ Murat Koloğlu and Steven J. Miller; appendices w/ Frederick W. Strauch and Wentao Xiong.
   Journal of Theoretical Probability, 26(4):1020–1060, 2013.
   41 pages

2. **Robust coin flipping**
   Joint w/ John D. Wiltshire-Gordon
   In *Advances in Cryptology—EUROCRYPT 2012*, 172–194. Springer Berlin Heidelberg, 2012.
   23 pages

1. **On the number of summands in Zeckendorf decompositions**
   Joint w/ Murat Koloğlu, Steven J. Miller, and Yinghui Wang
   Fibonacci Quarterly 49(2):116–131, 2011.
   16 pages

SURVEY ARTICLES AND OTHER MATHEMATICAL PUBLICATIONS

Rubel's Problem: from Hayman's List to the Chabauty Method (with Edward Crane). Feature article in *LMS Newletter*, 492:24–29, Jan 2021.

PAPERS IN PREPARATION (TITLES MAY CHANGE)

The Shintani–Faddeev cocycle: Stark units from q-Pochhammer ratios.

A Brauer–Siegel theorem for orders in number fields (with Jeffrey C. Lagarias).

SIC-POVMs and orders in real quadratic number fields (with Jeffrey C. Lagarias).

Ghost SICs and Wigner functions (with Marcus Appleby and Steven Flammia).

A constructive approach to Zauner's conjecture via the Stark conjectures (with Marcus Appleby and Steven Flammia).

Gauss composition with level structure (with Olivia Beckwith).

Polyharmonic Maass forms and Hecke L-series (with Olivia Beckwith).

DISSERTATION

Indefinite Theta Functions and Zeta Functions. Ph.D. thesis (University of Michigan), 2017. Advisor: Jeffrey C. Lagarias.

PAPERS NOT INTENDED FOR PUBLICATION

Spherical matrix ensembles (with Steven J. Miller), arXiv:1501.01848. Posted Jan 2015.

Word-induced measures on compact groups (with John D. Wiltshire-Gordon). arXiv:1102.4353. Posted Feb 2011.

TEACHING

Algebraic Number Theory (graduate level), Louisiana State University, principal instructor, Autumn 2023.

Honors Calculus I, Louisiana State University, principal instructor, Autumn 2022.

Analytic Number Theory (graduate level), Louisiana State University, principal instructor, Autumn 2022.

Abstract Algebra, Purdue University, principal instructor, Spring 2022.

Linear Algebra (2 sections), Purdue University, principal instructor, Autumn 2021.

Topics in Modern Geometry, University of Bristol, co-instructor, Autumn 2018.

Calculus II, University of Michigan, principal instructor, Autumn 2015.

Calculus II, University of Michigan, principal instructor, Winter 2014.

Foundations of Computer Science, University of Michigan, teaching assistant, Autumn 2013.

Calculus I, University of Michigan, principal instructor, Winter 2013.

Differential Equations, University of Michigan, teaching assistant, Autumn 2012.

Calculus I, University of Michigan, principal instructor, Winter 2012.

Data, Functions & Graphs, University of Michigan, principal instructor, Autumn 2011.

MENTORSHIP

Ph.D. student advisees:

- Murtadha Aljanabi, current student, Louisiana State University
- Koustav Mondal, current student, Louisiana State University (jointly advised with Fang-Ting Tu)

Faculty mentor (pre-candidacy) for Ph.D. student Oluwaferanmi Agbolade, Louisiana State University, Autumn 2022–present.

Mentored undergraduate student Michael Ren in a project on "Arithmetic of optimal projective packings," University of Bristol and online, Summer 2021.

Co-mentored (with Cameron Franc) undergraduate students Aleyah Dawkins and Aaditya Sharma in a project on "Modular forms and hypergeometric differential equations," University of Michigan REU, Summer 2015.

RESEARCH TALKS (SORTED CHRONOLOGICALLY WITHIN TOPICS; TOPICS MAY COVER MULTIPLE PAPERS)

Talks on "The Shintani–Faddeev Cocycle"

35th **Automorphic Forms Workshop**, Louisiana State University, Spring 2023.

Number Theory Seminar, **University of Mississippi**, Spring 2023.

Number Theory Seminar, **Duke University**, Spring 2023.

Five College Number Theory Seminar (online), Spring 2022.

Focused Research Workshop on Synthesizing Approaches to the Stark Conjectures, University of Bristol, Spring 2022.

Southern Regional Number Theory Conference (plenary talk), Louisiana State University, Spring 2022.

Heilbronn Number Theory Seminar, **University of Bristol** (online), Winter 2022.

Paris–Montreal working seminar (online), Autumn 2021.

Tenth Annual **Upstate Number Theory Conference**, Union College, Autumn 2021.

Purdue Analytic Number Theory and Harmonic Analysis (PANTHA) Seminar, **Purdue University** (online), Autumn 2021.

Talks on "Class Field Theory for Orders"

Algebra and Combinatorics Seminar, **Tulane University**, Spring 2023.

Talks on "Gauss Composition with Level Structure" and "Polyharmonic Maass forms and Hecke L-functions"

Automorphic Forms and Representations Seminar, **Purdue University** (online), Spring 2022.

Number Theory Seminar, **Louisiana State University** (online), Spring 2021.

AMS Special Session on Quadratic Forms and Theta Functions, **Joint Mathematics Meetings** (online), Winter 2021.

Young Researchers in Algebraic Number Theory, Warwick, UK, Autumn 2019.

Talks on "Complex Equiangular Lines and the Stark Conjectures"

Codes and Expansions (CodEx) Seminar (online), Spring 2022.

SIAM Conference on Applied Algebraic Geometry (online), Summer 2021.

Summer of Frame Theory (SOFT) (online), Summer 2021.

Louisiana State University (online), Spring 2021.

Virtual Mathematics Seminar, **Royal Holloway University of London** (online), Autumn 2020.

Codes and Expansions (CodEx) Seminar (online), Summer 2020.

Number Theory Seminar, **Rutgers University**, Autumn 2019.

SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland, Summer 2019.

Algebra and Number Theory Seminar, **University of Kentucky**, Winter 2019.

Number Theory Seminar, **The Ohio State University**, Winter 2019.

Quebec-Vermont Number Theory Seminar, **McGill University**, Autumn 2018.

Quantum Physics Seminar, **University of Massachusetts Boston**, Autumn 2018.

Young Researchers in Algebraic Number Theory, Sheffield, UK, Autumn 2018.

Bristol-Oxbridge-Warwick-London (BOWL) 1-day meeting, Oxford, UK, Autumn 2018.

Talks on "Indefinite Theta Functions and Zeta Functions"

Number Theory Seminar, **Kansas State University** (online), Autumn 2020.

Number Theory Seminar, **Vanderbilt University** (online), Autumn 2020.

Linfoot Number Theory Seminar, **University of Bristol**, Autumn 2017.

Talks on "The Arithmetic Geometry of Resonant Rossby Wave Triads"

SIAM Annual Meeting (prize lecture), Portland, Oregon, Summer 2018.

Pure Institute Meeting, **University of Bristol**, Autumn 2017.

 University of Saskatchewan, Autumn 2017.

 PDE Seminar, **Georgia Institute of Technology**, Autumn 2016.

 Central AMS Sectional Meeting, Minneapolis, Minnesota, Autumn 2016.

 Chicago Number Theory Day, **University of Illinois Chicago**, Spring 2015.

Talks on "Generating Weights of Modules of Vector-Valued Modular Forms for the Weil Representation"

 Building Bridges: 4th EU/US Workshop on Automorphic Forms and Related Topics, Budapest, Hungary, Summer 2018.

 AMS Special Session on Representation Theory, Automorphic Forms and Related Topics, **Central AMS Sectional Meeting**, Minneapolis, Minnesota, Autumn 2016.

Talks on "Robust Coin Flipping"

 EECS Theory Seminar, **University of Michigan**, Winter 2012.

 CRYPTO rump session (with John D. Wiltshire-Gordon), University of California, Santa Barbara, Summer 2011.

Talks on "Eigenvalue Statistics for Toeplitz and Circulant Ensembles"

 Institute of Mathematical Statistics Asia Pacific Rim Meeting (with Murat Koloğlu, Steven J. Miller, and Karen Shen), Tsukuba, Japan, Summer 2012.

 Young Mathematicians Conference, Ohio State University, Autumn 2010.

OUTREACH

Facilitator for the Julia Robinson Mathematics Festival webinar series, Spring 2020–Summer 2020.

Activity leader for the Julia Robinson Mathematics Festival, Joint Mathematics Meeting, Denver, Colorado, Winter 2020.

Leader/facilitator for Michigan Math Circles for high school and middle school students, Autumn 2012–Winter 2015.

Course assistant for Knot Theory course for high school students at the Young Scholars Program, University of Chicago, Summer 2009.

Co-instructor of Number Theory Seminar for high school students at the Ross Mathematics Program, The Ohio State University, Summer 2008.

Counselor at the Ross Mathematics Program, The Ohio State University, Summers 2007 and 2008.

LEADERSHIP AND SERVICE

Seminar chair for the LSU Algebra and Number Theory Seminar, Autumn 2022–present.

Co-organizer of Bayou Arithmetic Research Day 2, Tulane University, Spring 2023.

Lead organizer of the Southern Regional Number Theory Conference, Louisiana State University (hybrid event), Spring 2023.

Co-organizer of the AMS Special Session on Quadratic Forms, Modular Forms, and Applications, Joint Mathematics Meetings, Boston, Massachusetts, Winter 2023.

Lead organizer of Bayou Arithmetic Research Day 1, Louisiana State University, Autumn 2022.

Lead organizer of the AMS Special Session on Quadratic Forms, Theta Function, and Modularity, Joint Mathematics Meetings, online, Spring 2022.

Co-organizer of the Focused Research Workshop on Synthesizing Approaches to the Stark Conjectures, University of Bristol (hybrid event), Spring 2022.

Co-organizer of the Southern Regional Number Theory Conference, Louisiana State University (hybrid event), Spring 2022.

Co-organizer of the Heilbronn number theory seminar, University of Bristol, Autumn 2017–Spring 2019 and Autumn 2020–Spring 2021.

Lead organizer of the AMS Special Session on Quadratic Forms and Theta Function, Joint Mathematics Meetings, online, Winter 2021.

Judge for the MAA Undergraduate Student Poster Session, Joint Mathematics Meeting, online, Winter 2021.

Judge for the MAA Undergraduate Student Poster Session, Joint Mathematics Meetings, Denver, Colorado, Winter 2020.

Referee for:

Communications in Nonlinear Science and Numerical Simulation (1 paper)

Finite Fields and Their Applications (1 paper)

IEEE Transactions on Information Theory (1 paper)

Journal of Mathematical Physics (3 papers)

Journal of Number Theory (2 papers)

Research in the Mathematical Sciences (1 paper)

COMPUTER SKILLS

Mathematica, Magma, Sage, PARI/GP, Macaulay2, GAP, C, Python, Scheme, LaTeX, HTML, WordPress, UNIX shell, Microsoft Teams, Zoom.