Edna Jones

Department of Mathematics
Hill Center
Rutgers, The State University of New Jersey
110 Frelinghuysen Road
Piscataway, NJ 08854-8019

Website: sites.math.rutgers.edu/~elj44
Email: elj44@math.rutgers.edu

Education

- **Ph.D. in Mathematics** (Expected in 2022)
  Rutgers, The State University of New Jersey, New Brunswick, New Jersey
  – Advisor: Alex Kontorovich
- **Bachelor of Science, Mathematics**; Minor: Computer Science (Nov. 2015)
  Rose-Hulman Institute of Technology, Terre Haute, Indiana
  – Summa Cum Laude

Research Interests

analytic number theory, the circle method, quadratic forms

Selected Honors & Awards

- Rutgers School of Arts and Sciences (SAS) Excellence Fellowship (2020–present)
- National Science Foundation (NSF) Graduate Research Fellowship (2017–2020)
- Rutgers Graduate School Fellowship for doctoral study in Mathematics (2016–2017)
- Clarence P. Sousley Award (2016)
  The Clarence P. Sousley Award is awarded by vote of the mathematics faculty at Rose-Hulman to a graduating senior mathematics major who has demonstrated exceptional performance in his or her field.
- Ranked 371.5 (out of 4320) on William Lowell Putnam Mathematical Competition with a score of 30 (2014)
- Henry Turner Eddy Award — Pure Math (2014)
  The Henry Turner Eddy Award is awarded by a vote of the faculty to a student completing the junior year at Rose-Hulman as a mathematics major or double major including mathematics. The student must have demonstrated the potential for the advancement of pure mathematics.
- U.S. Presidential Scholar (2011)
  Each year, up to 161 high school seniors are named U.S. Presidential Scholars, one of the United States' highest honors for high school students.

Publications

4. Edna Jones. "Local Densities of Diagonal Integral Ternary Quadratic Forms at Odd Primes." *Special Issue II: In Honor of Bruce Berndt's 80th Birthday*, special issue of *International Journal of Number Theory*, 17(3): 547–575, 2021, doi:10.1142/S1793042120400357.
3. Sheng Bau, Peter Johnson, Edna Jones, Khumbo Kumwenda, and Ryan Matzke. "Rainbow Connectivity in Some Cayley Graphs." *The Australasian Journal of Combinatorics*, 71(3): 381–393, 2018.

2. William Linz and Edna Jones. "r-Completeness of Sequences of Positive Integers." *INTEGERS: Electronic Journal of Combinatorial Number Theory*, 16, A59, 2016.
1. Edna Jones and John Ryan. "Theoretical Friends of Finite Proximity." *International Journal of Mathematics and Computer Science*, 10(2): 205–226, 2015.

Teaching Experience at the College Level

- **Instructor** for the Department of Mathematics at Rutgers University, New Brunswick, NJ
  - Math 250—Introductory Linear Algebra (Summer 2019)
    - Sole instructor for class of 15 students
    - Wrote syllabus, exams, quizzes, and homework problem sets on linear algebra
    - Incorporated active learning activities in lectures
    - Delegated some grading responsibilities to a grader
  - Math 477—Mathematical Theory of Probability (Summer 2018)
    - Sole instructor for class of 26 students
    - Wrote syllabus, exams, quizzes, and homework problem sets on probability
    - Incorporated active learning activities in lectures
    - Delegated some grading responsibilities to a grader
- **Course Assistant** for the Arizona Winter Semester 2021 for the course "A friendly introduction to the theory of modular forms" (Jan.–Mar. 2021)
  - Facilitated problem discussion meetings over Zoom
  - Collaborated with lecturer and other course assistants to create problem sets
- **Teaching Assistant** for the Department of Mathematics at Rutgers University, New Brunswick, NJ
  - Math 115—Precalculus College Mathematics (Fall 2019)
    - Ran flipped recitations sessions for a Precalculus College Mathematics course for engineering majors
    - Wrote and graded quizzes
  - Math 152—Calculus II for the Mathematical and Physical Sciences (Fall 2017)
    - Facilitated group discussions on workshop problems
- **Lab Assistant** for the Department of Computer Science and Software Engineering (CSSE) at Rose-Hulman Institute of Technology, Terre Haute, IN (Spring 2012)
  - Assisted students with coursework in the CSSE Department computer lab
- **Grader** at Rose-Hulman Institute of Technology, Terre Haute, IN
  - CSSE/MA 474—Theory of Computation (Winter 2015–2016)
  - MA 275—Discrete & Combinatorial Algebra I (Fall 2014)
  - CSSE 220—Object-Oriented Software Development (Winter 2011–2012)
  - CSSE 120—Introduction to Software Development (Fall 2011)

Invited Math Colloquium & Plenary Talks

- "Apollonian circle packings, integers, and higher-dimensional sphere packings"
  - Math/Stat Colloquium, Swarthmore College (Mar. 22, 2022)
  - Math/Stats Colloquium, Carleton College *(virtual)* (Sept. 22, 2020)
- "The Descartes circle theorem: How kissing circles give rise to a quadratic equation," Math/Stats Colloquium, Carleton College (Jan. 24, 2022)

- "An Asymptotic Local-Global Principle for Integral Kleinian Sphere Packings," Plenary Talk, Mid-Atlantic Seminar On Numbers V *(virtual)* (Mar. 28, 2021)

Other Invited Math Talks

- "A strong asymptotic local-global principle for integral Kleinian sphere packings," Algebra and Number Theory Seminar, Louisiana State University (Nov. 16, 2021)
- "Local-global I: Apollonian packings," Arbeitsgemeinschaft: Thin Groups and Super-approximation, Mathematisches Forschungsinstitut Oberwolfach *(virtual)* (Oct. 12, 2021)
- "A local-global principle for integral Kleinian sphere packings"
  - Number Theory Seminar, Duke University *(virtual)* (Oct. 6, 2021)
  - Number Theory Seminar, Rutgers University *(virtual)* (Oct. 5, 2021)
  - Purdue Analytic Number Theory and Harmonic Analysis (PANTHA) Seminar, Purdue University *(virtual)* (Sept. 29, 2021)
- "An Asymptotic Local-Global Principle for Integral Kleinian Sphere Packings"
  - Number Theory Seminar, University of Washington *(virtual)* (Mar. 30, 2021)
  - Number Theory Seminar, University of Illinois Urbana-Champaign *(virtual)* (Mar. 16, 2021)
  - Number Theory Seminar, University of Cambridge *(virtual)* (Mar. 9, 2021)
- "The Local-Global Principle for Integral Crystallographic Sphere Packings," AMS Special Session on Quadratic Forms and Theta Functions, Joint Mathematics Meetings *(virtual)* (Jan. 6, 2021)
- "Local Densities of Diagonal Integral Ternary Quadratic Forms at Odd Primes," Study Group in Number Theory Seminar, The Graduate Center, CUNY (Feb. 28, 2020)

Contributed Math Conference Talks

- "Representations by Ternary Quadratic Forms"
  - Analytic and Combinatorial Number Theory: The Legacy of Ramanujan (A conference in honor of Bruce C. Berndt's 80th birthday) (June 8, 2019)
  - Rose-Hulman Undergraduate Math Conference (Apr. 24, 2015)
  - Indiana MAA Section Spring Meeting, Taylor University (Mar. 14, 2015)
  - Pi Mu Epsilon Session #5, MAA MathFest, Portland, OR (Aug. 8, 2014)
- "Theoretical Friends of Finite Proximity"
  - Indiana MAA Section Spring Meeting, Franklin College (Mar. 18, 2016)
  - Southern Africa Mathematical Sciences Association (SAMSA) Annual Conference, Windhoek, Namibia (Nov. 25, 2015)
  - Young Mathematicians Conference (Aug. 23, 2015)

Poster Presentations

- "r-Completeness of Sequences of Positive Integers," presented with William Linz, Undergraduate Poster Session, Joint Mathematics Meetings, Seattle, WA (Jan. 8, 2016)
- "Representations by Ternary Quadratic Forms," Undergraduate Poster Session, Joint Mathematics Meetings, San Antonio, TX (Jan. 12, 2015)

Service to Department & Mathematics Community

- Co-organizer of the People Online In Number Theory (POINT) Tea-Time (Apr. 2021–present)
- Panelist on the Lunch in the Time of Covid panel "How to talk about racism and discrimination in your department" (Sept. 20, 2021)
- Panelist on the Pomona Research in Mathematics Experience (PRiME) Grad School Panel (July 23, 2021)
- Panelist on the Georgia Tech Math REU Grad School Panel (June 10, 2021)
- Co-organizer of the AMS Special Session on Quadratic Forms and Theta Functions at the Joint Mathematics Meetings (Jan. 6, 2021)
- An Our Stories speaker for the Online Undergraduate Resource Fair for the Advancement in Academia of Marginalized Mathematicians (OURFA^{2}M^2) (Dec. 19, 2020)
- Co-organizer of the Rutgers AMS Graduate Student Chapter Job Materials Workshop (Sept. 26–27, 2020)
- Organizer of the Rutgers AMS Graduate Student Chapter Research Bonanzas (May 8, 2019 & May 6, 2020)
- Panelist on a panel about graduate student life for woMAN UP!, a workshop on math advice and networking at the University of Pennsylvania (Sept. 28, 2019)
- Organizer of the Number Theory Learning Seminar at Rutgers (Jan.–May 2019)
- Organizer of the Rutgers Graduate Student Number Theory Seminar (Sept.–Dec. 2018)
- Organizer of the Rutgers AMS Graduate Student Chapter 3D printing workshop (Dec. 14, 2017)

Outreach & Teaching Students in K–12

- **Panelist** for the National Museum of Mathematics event "A Roundtable Discussion on Math Education in the U.S." (July 29, 2021)
- **Facilitator Trainer & Facilitator** for the Girls Math JAM Festival (June 2021)
  - Trained festival facilitators with Julia Robinson Mathematics Festival (JRMF) activities
  - Facilitated the JRMF activity Staircases at the festival with rising 5th–9th grade girls
- **Assistant Instructor** for the San Francisco Math Circle (SFMC) (Sept.–Dec. 2020)
  - Facilitate SFMC activities in 4 weekly classes on Zoom for 6th–8th grade students
- **Mathematician & Facilitator** at Julia Robinson Mathematics Festival (JRMF) (Apr.–Aug. 2020)
  - Assisted in the JRMF activity creation process by discussing the math & pedagogy behind activities and by editing the activity slides
  - Facilitated JRMF activities in weekly webinars on Zoom
  - Created some materials to help facilitators facilitate JRMF activities
- **Leader** of a Rutgers Math Teachers' Circle titled "Nimbers (Numbers and the Game of Nim)" (Feb. 11, 2020)
- **Facilitator** for the JRMF festival at the Joint Mathematics Meetings (Jan. 18, 2020)

- **Volunteer Teacher's Helper** with Math 6 and Math 6A at Highland Park Middle School, Highland Park, New Jersey (Feb.–June 2019)
  - Facilitated small-group mathematical discussions among sixth grade students
  - Helped teach essential math skills to a recently immigrated student with limited English skills
- **Co-organizer** of the "Mathematical Games and Puzzles from Around the World!" booth at Rutgers Day (Apr. 27, 2019)
- **Department of Mathematics Volunteer** at the "Women and Math" booth at Rutgers Day (Apr. 28, 2018)
- **Counselor** for Ross Mathematics Program (June–July 2016)
  - Directly supervised four high school students
  - Graded & gave feedback on students' mathematics problem sets

Professional Affiliations & Leadership

- American Mathematical Society (AMS) (2016–present)
  - Secretary of Rutgers Graduate Student Chapter (2017–present)
- Rutgers Math Department Teaching Group (2018–present)
- Association for Women in Mathematics (AWM) (2018–present)
- Mathematical Association of America (MAA) (2014–2016)
- Pi Mu Epsilon (PME) (2014–2015)
  - President of the Indiana Gamma Chapter (2014–2015)

Some Graduate Student Presentations

- "The Descartes circle theorem: How kissing circles give rise to a quadratic equation," Purdue Student Colloquium (Jan. 19, 2022)
- "A strong asymptotic local-global principle for integral Kleinian sphere packings," Purdue Graduate Student Research Day (Nov. 6, 2021)
- "On the local-global conjecture for integral Apollonian circle packings," Rutgers Graduate Number Theory Seminar *(virtual)* (Oct. 4, 2021)
- "Stationary Phase," Rutgers Graduate Number Theory Seminar *(virtual)* (July 13, 2021)
- "Apollonian Circle Packings, Integers, and Higher-Dimensional Sphere Packings," Rutgers Graduate Student Pizza Seminar *(virtual)* (Apr. 2, 2021)
- "An Asymptotic Local-Global Principle for Integral Kleinian Sphere Packings," Rutgers Graduate Number Theory Seminar *(virtual)* (Mar. 2, 2021)
- "Möbius Transformations and the Bends and Centers of Generalized Circles, Spheres, and Hyperspheres"
  - Rutgers Graduate Algebra and Representation Theory Seminar *(virtual)* (Nov. 11, 2020)
  - Rutgers Graduate Number Theory Seminar/Learning Seminar *(virtual)* (Oct. 7, 2020)
- "The Local-Global Principle for Integral Soddy Sphere Packings," Rutgers Graduate Number Theory Seminar/Learning Seminar *(virtual)* (Aug. 12, 2020)

- "Julia Robinson Mathematics Festival," Rutgers Math Department Teaching Group *(virtual)* (June 12, 2020)
- "Proving that primes congruent to 1 (mod 4) are the sum of two squares in expected and unexpected ways," Rutgers Graduate Student Pizza Seminar (Mar. 6, 2020)
- "Clifford algebras and Möbius transformations"
  - Rutgers Graduate Algebra and Representation Theory Seminar (Mar. 5, 2020)
  - Rutgers (Graduate Student) Number Theory Learning Seminar (Apr. 24, 2019)
- "Local Densities of Diagonal Integral Ternary Quadratic Forms at Odd Primes," Rutgers Graduate Number Theory Seminar (Feb. 19, 2020)
- "Siegel's [Mass] Formula," Rutgers Graduate Student Number Theory Seminar (Oct. 23, 2019)
- "K–12 Interaction (Part 1)," Rutgers Math Department Teaching Group (Apr. 5, 2019)
- "Modular Forms and Hecke Operators," Rutgers Graduate Algebra and Representation Theory Seminar (Mar. 27, 2019)
- "Inversive Coordinates and Descartes Circle Theorem," Rutgers (Graduate Student) Number Theory Learning Seminar (Jan. 30, 2019)
- "Continued Fractions and Ergodic Theory," Rutgers Graduate Student Number Theory Seminar (Dec. 6, 2018)
- "Finding Resources for Calculus Classes," Rutgers Math Department Teaching Group (Oct. 9, 2018)
- "r-Complete Sequences of Positive Integers," Rutgers Graduate Student Combinatorics Seminar (Mar. 28, 2018)
- "Representations by Ternary Quadratic Forms," Rutgers Graduate Student Number Theory Seminar (Oct. 23, 2017)

Some Additional Work Experience

- **Textbook Proofreader** for the structural engineering textbook *Structural Analysis: Skills for Practice* written by Dr. James Hanson (Aug. 2015–June 2016)
- **Software Engineering Intern** at Raytheon, Indianapolis, Indiana (May–Aug. 2013)
- **Civil Engineering Intern** at French-Reneker-Associates, Fairfield, Iowa (June–July 2011)