

Caroline L. Turnage-Butterbaugh

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Research Interests:

Analytic number theory, especially the theory of the Riemann zeta-function and automorphic L -functions

Education:

Ph.D. in Mathematics, University of Mississippi, May 2014
Thesis: *Moments of products of L -functions*
Adviser: Micah B. Milinovich

M.A. in Mathematics, Wake Forest University, May 2008
Thesis: *Selected proofs of Fermat's Little Theorem and Wilson's Theorem*
Adviser: Fredric T. Howard

B.A. in Mathematics & French, *magna cum laude*, Wofford College, May 2006

Current position:

Postdoctoral Undergraduate Research Mentor, Williams College, Summer 2014
Supervisor: Steven J. Miller

Upcoming position:

Postdoctoral Fellow, North Dakota State University, start date: August 16, 2014
Mentor: Friedrich Littmann

Publications:

1. Moments of products of automorphic L -functions (with Micah B. Milinovich)
Journal of Number Theory **139** (2014), 175–204.
2. Gaps between zeros of Dedekind zeta-functions of quadratic number fields
Journal of Mathematical Analysis and Applications **418** (2014), no. 1, 100–107.
3. Consecutive primes in tuples (with William D. Banks and Tristan M. Freiberg)
under review, preprint available at <http://arxiv.org/abs/1311.7003>

Invited Research Visit: Department of Mathematics, University of Missouri, November 2013

Awards:

- *University of Mississippi Class Marshal* – May 2014
– One of two Ph.D. candidates chosen from the Graduate School to speak at the Doctoral Hooding Ceremony
- *Graduate Instructor Excellence in Teaching Award* – 2012–2013
– Sole recipient of “Golden Apple” teaching award given to the most outstanding graduate instructor from the entire graduate school at the University of Mississippi
- *Graduate Student Achievement Award in Mathematics* – Spring 2013
– One of two recipients chosen from the departments of Biology, Chemistry, Mathematics, Philosophy and Religion, and Physics and Astronomy
- *Graduate Assistance in Areas of National Need fellowship* – Fall 2009–present
– Funded by the US Department of Education
- *Honor Societies* – Phi Kappa Phi (University of Mississippi), Golden Key nominee (University of Mississippi), Gamma Beta Phi nominee (University of Mississippi), Pi Mu Epsilon (Wake Forest University)

Grants & Travel Awards:

- *Association for Women in Mathematics, mathematics travel grant* – May 2014
- *Graduate Assistance in Areas of National Need, summer research grants* – Summer 2010, Summer 2012, Summer 2013
- *Palmetto Number Theory Series, travel grants* – September 2012, September 2013
- *University of Mississippi Graduate School, travel grants* – September 2013, January 2013
- *University of North Carolina at Greensbor, travel grants* – May 2013, May 2012
- *Association for Women in Mathematics, travel grant* – January 2013
- *Midwest Number Theory Conference for Graduate Students and Recent PhDs, travel grants* – October 2012, June 2014
- *Canadian Number Theory Association XII, travel grant* – June 2012

Research Talks:*Moments of the Riemann zeta-function and L-functions*

- Department Colloquium, Williams College, July 2014

Moments of products of L-functions

- Exciting New Faces in Analytic Number Theory (ENFANT), Hausdorff Center for Mathematics, Bonn, July 2014
- Midwest Number Theory Conference for Graduate Students and Recent PhDs XX, University of Illinois at Urbana-Champaign, June 2014
- Southeast Regional Meeting on Numbers, Wofford College, April 2014
- Department Colloquium, University of Missouri, November 2013
- Palmetto Number Theory Series XX, Davidson College, September 2013
- Analysis and Number Theory Seminar, University of Mississippi, May 2013
- Graduate Student Seminar, University of Georgia, April 2013
- AMS Sectional Meeting, University of Mississippi, March 2013

Gaps between primes

- Department Colloquium, Wofford College, April 2014
- Pi Mu Epsilon, University of Mississippi, December 2013

The Distribution of the Primes and Moments of L-functions

- Department Colloquium, Lawrence College, February 2014
- Department Colloquium, Butler University, January 2014

Large gaps between zeros of Dedekind zeta-functions of quadratic number fields

- AWM Workshop at the Joint Meetings in Mathematics, San Diego, CA, January 2013
- Iowa Field of Dreams Mathematical Conference, Phoenix, AZ, November 2012 (poster)
- Midwest Number Theory Conference for Graduate Students and Recent PhDs IX, University of Illinois at Urbana-Champaign, October 2012
- Palmetto Number Theory Series XVIII, Wake Forest University, September 2012
- Graduate Student Seminar, University of Mississippi, September 2012

Workshops Attended:

- *Bounded Gaps Between Primes*, American Institute of Mathematics, Palo Alto, CA, November 2014 (upcoming)

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- *ENFANT (Exciting New Faces in Analytic Number Theory) & ELEFANT (Emerging Leaders and Evolving Frontiers in Analytic Number Theory) Workshop*, Hausdorff Center for Mathematics, Bonn, Germany, July 2014 (upcoming)
 - *University of North Carolina at Greensboro Summer School in Computational Number Theory 2013: Computational Algebraic Number Theory*, May 2013
 - *Association for Women in Mathematics Workshop at the Joint Mathematics Meetings*, San Diego, CA, January 2013
 - *University of North Carolina at Greensboro Summer School in Computational Number Theory 2012: A Computational Approach to L-functions*, May 2012
 - *Analytic Aspects of L-functions and Applications to Number Theory*, University of Calgary, Alberta, May/June 2011

Pedagogical Presentations:*Understanding X: Contextualizing Formulas*

- Faculty Development Workshop Series, Center for Excellence in Teaching and Learning, University of Mississippi, November 2013
- Graduate Student Seminar, Center for Excellence in Teaching and Learning, University of Mississippi, November 2013

Engaging Student Learners

- Graduate Instructor Workshop, Center for Excellence in Teaching and Learning, University of Mississippi, August 2013

Teaching Experience:

GRADUATE STUDENT INSTRUCTOR
University, MS USA

University of Mississippi
Fall 2009, Fall 2010 – Spring 2014

- Primary instructor for Math 123 (trigonometry), Math 125 (precalculus), Math 267 (business calculus), and Math 261 (calculus I)
- Co-instructor for Math 597 (introduction to analytic number theory)

UPPER SCHOOL MATHEMATICS TEACHER
Kansas City, MO USA
Instructor for geometry and algebra II accelerated

The Pembroke Hill School
Fall 2008–Summer 2009

GRADUATE TEACHING ASSISTANT
Winston-Salem, NC USA
GTA for Math 111 (freshman level calculus I) and Math 121 (linear algebra I)

Wake Forest University
Fall 2007–Spring 2008

Synergistic Activities - Mathematics Community:

- *American Mathematical Society – Member*, 2006–2008, 2009–present
- *MathSciNet – Reviewer*
- *Math Alliance – Pre-doctoral student mentor*, Spring 2012–present
– Available mentor to underrepresented or underserved American students interested in pursuing a PhD in mathematics
- *Nebraska Conference for Undergraduate Women in Mathematics – Invited graduate student panelist*, University of Nebraska-Lincoln, January 2012
– Participated as a panelist for discussion on “How to Choose a Graduate School” and co-leader of a break-out session on “Preparing for (applying to) Graduate School”

Synergistic Activities - University of Mississippi:

- *American Mathematical Society Graduate Student Chapter – Webmaster*, 2013 – 2014
– Build and maintain the webpage for the University of Mississippi Graduate Student Chapter of the American Mathematical Society, URL: <http://olemiss.edu/amsgsc>
- *Graduate Student Seminar – Founder and organizer*, Spring 2012 – Spring 2014
– Organize talks given by graduate students from the Department of Mathematics
- *Allies @ Ole Miss – Ally*, Fall 2012–Spring 2014
– Member of the university network of faculty and staff who are visibly supportive of students who identify themselves as gay, lesbian, bisexual, or transgender
- *Graduate Women’s Group – Committee member*, Fall 2012–Spring 2013
– Collaborated with graduate students from various departments to develop campus events promoting the discussion and understanding of women’s issues in academia
- *Pi Mu Epsilon – Play participant*, September 2012
– Participated in and coded the Beamer presentation for “Hilbert’s Hotel: A Play,” a skit for undergraduates that introduced the concepts and properties of countably infinite sets
- *Pi Mu Epsilon - Invited panelist*, March 2012, September 2012
– Answered questions from undergraduates about graduate school in mathematics
- *High School Mathematics Tournament – Volunteer*, Fall 2009, 2010, 2011
– Proctored exams and worked with other graduate students to set up testing spaces
- *Gear Up Mississippi Summer College – Guest lecturer*, July 2009, July 2010
– Taught a lesson to high school students entitled *Introduction to Fractals*, which included a talk on the subject followed by hands-on activities that demonstrated a connection between mathematics and art

References:

- Micah Milinovich, Assistant Professor of Mathematics, University of Mississippi
Email: mbmilino@olemiss.edu

- Steve Gonek, Professor of Mathematics, University of Rochester
Email: gonek@math.rochester.edu

- Gerard Buskes, Professor of Mathematics, University of Mississippi
Email: mmbuskes@olemiss.edu

- Susan Mossing (Reference for Teaching), Former Associate Director of the Center for Excellence in Teaching and Learning (CETL), University of Mississippi
 - Reference letter available via Sarah Hill, Senior Staff Assistant, CETL
Email: shill@olemiss.edu