

Reza Akhtar

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Education

Ph.D. Mathematics, Brown University, 2000.
Dissertation title: *Milnor K-theory and zero-cycles on algebraic varieties*.
Dissertation advisor: Stephen Lichtenbaum

Sc.M. Mathematics, Brown University, 1997.

S.M. Applied Mathematics, Harvard University, 1995.

A.B. Mathematics *magna cum laude*, Harvard University, 1995.

Employment

Associate Professor (with tenure), Miami University, July 2006 - present.

Assistant Professor, Miami University, Sept. 2000 - June 2006.

Research Interests

My dissertation and most of my early papers are in the area of algebraic geometry, more specifically algebraic cycles and motives. The rest of my work is in combinatorics, particularly combinatorial questions connected to algebra.

Publications

1. R. Akhtar and A. Lachlan, "On Countable Homogeneous 3-graphs", *Archive for Mathematical Logic* **34** (1995), no. 5, 331-344.
2. R. Akhtar, "Zero-cycles on varieties over finite fields", *Communications in Algebra* **32** (2004), no. 1, 279-294.
3. R. Akhtar, "Torsion in mixed K -groups", *Communications in Algebra* **32** (2004), no. 1, 295-313.
4. R. Akhtar, "Milnor K-theory of smooth varieties", *K-theory* **32** (2004), no. 3, 269-291.
5. R. Akhtar, "Adequate equivalence relations and Pontryagin products", *Journal of Pure and Applied Algebra* **196** (2005), no. 1, 21-37.
6. R. Akhtar, "Cycles on curves over global fields of positive characteristic", *Transactions of the American Mathematical Society* **357** (2005), 2557-2569.
7. R. Akhtar and R. Joshua, "Künneth decompositions for quotient varieties", *Indagationes Mathematicae* **17** (2006), no. 3, 319-344.

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8. R. Akhtar and L. Lee, “Homology of zero-divisors”, *Rocky Mountain Journal of Mathematics*, **37** (2007), no. 4, 1105-1126.
9. R. Akhtar, “A mod- ℓ vanishing theorem of Beilinson-Soulé type”, *Journal of Pure and Applied Algebra* **208** (2007), no. 2, 555-560.
10. R. Akhtar, T. Jiang, and D. Pritikin, “Edge-bandwidth of the triangular grid”, *Electronic Journal of Combinatorics* **14** (2007), no. 1, Research Paper 67.
11. R. Akhtar, T. Jiang, and Z. Miller, “Edge-bandwidth of multidimensional grids and Hamming graphs”, *SIAM Journal on Discrete Mathematics* **22** (2008), no. 2, 425-449.
12. R. Akhtar and R. Joshua, “Lefschetz Decompositions for Quotient Varieties”, to appear in *Journal of K-theory*.
13. R. Akhtar and L. Lee, “Connectivity of the zero-divisor graph for finite rings”, to appear in *Journal of Commutative Algebra*.
14. R. Akhtar, M. Boggess, T. Jackson-Henderson, I. Jimenez, R. Karpman, A. Kinzel, and D. Pritikin, “On the unitary Cayley graph of a finite ring”, to appear in *Electronic Journal of Combinatorics*.
15. R. Akhtar and R. Joshua, “Toric Residue Codes: I”, submitted.
16. R. Akhtar and P. Larson, “Small-sum pairs in abelian groups”, submitted.
17. R. Akhtar, A. B. Evans, and D. Pritikin, “Representation numbers of complete multipartite graphs: I”, preprint.
18. R. Akhtar, A. B. Evans, and D. Pritikin, “Representation numbers of complete multipartite graphs: II”, preprint.
19. R. Akhtar and M. Forlini, “The linear chromatic number of Sperner families”, work in progress.
20. R. Akhtar, “Representation numbers for sparse graphs”, work in progress.

Research Presentations

1. “Zero-cycles on algebraic varieties”: Algebra Seminar, University of Pennsylvania, January 2000.
2. “Motivating Motives”: Invited Oration, Pi Mu Epsilon, Miami University, October 2000.
3. “Milnor K -theory and Intersection Theory”: Colloquium, University of Cincinnati, January 2001.
4. “Milnor K -theory of smooth schemes”: AMS Regional Meeting, Lawrence, KS. March 30 - April 1, 2001.

5. “Kato-Somekawa groups and higher Chow groups of zero-cycles”: AMS Regional Meeting, Columbus, OH. September 21 - 23, 2001.

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6. “Adequate equivalence relations and cycles on abelian varieties”: AMS Regional Meeting, Boston, MA. October 5-6, 2002.
7. “Cycles on Algebraic Varieties”: Colloquium, University of Dayton, October 2002.
8. “Algebraic Geometry”: Pi Mu Epsilon, December 2003.
9. “Cycle groups of curves over global fields of positive characteristic”: Joint Mathematics Meetings. Phoenix, AZ. January 7th, 2004.
10. “Elliptic Curves, Arithmetic and Geometry”: Colloquium, Wabash College, March 2004.
11. “Algebraic Cycles on Abelian Varieties”: Colloquium, Rose-Hulman Institute of Technology, November 2004.
12. “Algebraic cycles on curves over global fields”: Algebraic Geometry Seminar, The Ohio State University, April 2005.
13. “Cycles, cohomology, and motives”: Colloquium, Miami University, April 2005.
14. “A vanishing theorem of Beilinson-Soulé type”: K -theory Seminar, The Ohio State University, March 2006.
15. “Edge-bandwidth of the triangular grid”: MIGHTY Conference XLII: Marion, OH. April 29th, 2006.
16. “Beyond the zero-divisor graph: a homology theory for zero-divisors”: Colloquium, Wabash College, June 2006.
17. “Combinatorial methods for studying zero-divisors”: Colloquium, Trinity University, September 2006.
18. “The zero-divisor graph: at the intersection of algebra and combinatorics”: Undergraduate Seminar, Trinity University, September 2006.
19. “Elliptic Curves, Arithmetic, and Geometry”: Colloquium, Baldwin-Wallace College, November 2006.
20. “Chow-Künneth and Lefschetz Decompositions for Quotient Varieties”: CMS Winter Conference, Toronto, ON. December, 2006.
21. “Motivic decompositions for quotient varieties”: Algebraic Geometry Seminar, The Ohio State University, March 2007.
22. “The Beilinson-Soulé Conjecture with finite coefficients”: Algebraic Cycles Conference II, Columbus, OH. March 2008.

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Courses taught

At Brown University

MTH 9, Calculus I, Summer 1998.

MTH 17, A.P. Calculus II, Fall 1998.

At Miami University

MTH 151, Calculus I: Fall 2000, Fall 2001, Fall 2005.

MTH 153, Calculus I: Fall 2009.

MTH 222, Linear Algebra: Fall 2000, Fall 2007 (2 sec).

MTH 231, Discrete Mathematics: Spring 2003, Spring 2005 (2 sec).

MTH 249, A.P. Calculus II: Fall 2002, Fall 2003, Fall 2006.

MTH 249H Honors A.P. Calculus II: Fall 2007.

MTH 251, Calculus II: Spring 2001, Spring 2006, Fall 2008.

MTH 252, Calculus III: Fall 2004, Spring 2007.

MTH 347, Differential Equations: Fall 2006.

MTH 420, Topics in Algebra: Spring 2004.

MTH 421, Abstract Algebra I: Fall 2001, Spring 2003, Fall 2005, Spring 2007, Fall 2009.

MTH 422, Abstract Algebra II: Spring 2001.

MTH 425, Number Theory: Fall 2003, Fall 2004.

MTH 620, Topics in Algebra: Summer 2003.

MTH 621, Graduate Algebra I: Fall 2002, Fall 2008.

MTH 622, Graduate Algebra II: Spring 2002, Spring 2006.

Research Students

Master's thesis

M.A. Thesis advisor for Daniel Baczkowski, August 2003 - July 2004.

Thesis title: *Diophantine equations involving arithmetic functions of factorials.*

Master's final projects

Amy Herron (March - July 2002)

Deborah Puffer (January - May 2003)

Melody Brickel (January - May 2004)

Holly Attenborough (August 2005 - May 2006)

Benjamin Byer (August 2006 - May 2007, left Miami before finishing)

Joshua Wagner (August 2008 - June 2009)

Jeffrey Cooper (current)

Robert Seiver (current)

Carmen Weddell (current)

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Undergraduate Independent Studies

Todd Van Woerkom, Fall 2007.

Jonathon Hall, Spring 2008.

Undergraduate research students (individual)

Lucas Lee, Summer 2003.

Nathan St. John, Summer 2007.

Maxwell Forlini, Summer 2009.

SUMSRI research students

2004: Amanda Phillips, Julie Rogers, Kevin Tolliver, Frannie Worek.

2005: Camil Aponte, Natalia Cordova, Clyde Gholston, Helen Hauser, Patrice Johnson, Nathan Mims.

2006: Chantelle Bicket, Samantha Graffeo, Darragh Ross, Edward Washington.

2007: Katherine Benson, Louis Cruz, Yesenia Cruz, Melissa Tolley, Bryant Watkins.

2008: Megan Bernstein, Megan Boggess, Tiffany Jackson-Henderson, Isidora Jimenez, Rachel Karpman.

2009: Daniel Caproni, Joshua Edgerton, Margaret Rahmoeller, Mychael Sanchez, Anna Tracy.

Of the twenty one students above who have (as of yet) received their undergraduate degrees, at least eleven are known to be currently enrolled in graduate programs in the mathematical sciences.

Graduate Examinations

Algebra Comprehensive Examiner (30 students since 2000).

Master's Final Exam Committee (9 students since 2000).

Student Advising

I have served as academic advisor for roughly six undergraduate students per year (B.S. in Mathematics) for the past several years.

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Service

Departmental Service

Mathematics Steering Committee: Fall 2000 - Spring 2001.
Graduate Committee: Fall 2001 - Spring 2004 and Fall 2007 - present.
Minor work on department web page: Fall 2002 - present.
Maintainer of department web page: Fall 2009 - present.
Oxford Mathematics Search Committee: Fall 2002 - Spring 2003.
Hamilton Mathematics Search Committee: Fall 2009 - Spring 2010.
Colloquium Committee: Fall 2003 - Spring 2004.
Library Liaison: Fall 2004 - Spring 2007.
Chair of Committee for Peer Review of Teaching: Spring 2005.
Governance Committee: Fall 2006 - Spring 2007, Fall 2008 - Spring 2009.
Mathematics Committee Secretary: Spring 2002 - Spring 2006.
Mathematics Committee Chair: Fall 2006 - Spring 2008.

University Service

Honors and Scholars Program Advisory Committee: Fall 2007 - present.
Graduate Council Natural Sciences Subcommittee: Fall 2007 - Spring 2008.

Service to the Profession

Referee for Journal of Pure and Applied Algebra (2 articles), Communications in Algebra (3 articles), Hokkaido Journal of Mathematics (1 article), Clay Mathematics Institute Proceedings (1 article).
Reviewer for Math Reviews (2 reviews)
Judge for Undergraduate Research Poster Session, January 2002.

Conference Organization

Co-organizer (with Patrick Brosnan and Roy Joshua) of *Algebraic Cycles II: Progress and Prospects*: Columbus, OH; March 24-29, 2008.
Co-organizer (with Paul Larson and Dan Pritikin) of *Recreational Mathematics*: Oxford, OH; September 26-27, 2008.
Co-organizer (with Paul Larson and Bruce Magurn) of *Number Theory* (Miami University Fall Conference): Oxford, OH; September 28-29, 2007.
Co-organizer (with Roy Joshua and Bruce Magurn) of *Conference on Algebraic Cycles*: Oxford, OH; March 5-6, 2003.
Co-organizer (with Linda Eroh and Carmen Schabel) of Project NExT Special Session *Teaching Students to Write Proofs*, MAA MathFest: Burlington, VT; July 31st, 2002.

Student-Centered Service

Chapter Advisor to Pi Mu Epsilon, Fall 2005 - Spring 2008 and Fall 2009 - present.
Supervisor of undergraduate supplemental instructors for calculus courses (Fall 2000, Fall 2001, Fall 2005, Spring 2006, Fall 2006, Fall 2008).
Delivered invited oration to Pi Mu Epsilon, Fall 2000 and Fall 2004.

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Awards and Honors

John Harvard Scholarship, Harvard University, 1992-1995.
Phi Beta Kappa, Harvard University, 1995.
Brown University Fellowship, 1995-1996.
Brown University Teaching Assistantships, various semesters, 1995-2000.
NSERC (Government of Canada) Level A Graduate Fellowship, 1995-1997.
NSERC Level B Graduate Fellowship, 1997-1999.
Brown University Outstanding Graduate Teaching Award, 2000.
Sigma Xi, Brown University, 2000.
Sigma Xi Outstanding Research Award, 2000.
College of Arts and Sciences Summer Research Grant, Miami U., 2000.
Committee for Faculty Research Summer Grant, Miami U., 2000.
Exxon-Mobil Project NExT Fellow, 2001.
Recipient of funds (\$170) to attend Great Lakes K -theory conference, May 2004.
Recipient of funds (\$750) to attend Friedlander birthday conference, Sept. 2004.
Recipient of funds (\$500) to attend Lichtenbaum birthday conference, March 2005.
Recipient of USS (Undergraduate Summer Scholars) grants for **2003**, **2007**, **2009** to supervise student research in algebra and combinatorics.
Nominated for Alumni Distinguished Educator Award (Miami University), 2008.

Professional Memberships

American Mathematical Society