

CONTACT
INFORMATION

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RESEARCH
INTERESTS

Commutative algebra and homological algebra – especially the homological conjectures, computational algebra, coding theory.

EDUCATION

University of Illinois at Urbana-Champaign

Ph.D. Candidate, Mathematics (expected May 2009)

- Dissertation Topic: The Strong Direct Summand Conjecture
- Advisor: Sankar Dutta

M.S. in Teaching Mathematics, December 2008

Michigan State University

B.S. in Mathematics with High Honor, May 2003

B.S. in Computer Science with High Honor, May 2003

- 4.0/4.0 cumulative GPA.
- Honors College member.

PUBLICATIONS

J. McCullough, *A Note on the Strong Direct Summand Conjecture*, to appear in Proceedings of the AMS.

E. Torng and J. McCullough, *SRPT Optimally Uses Faster Machines to Minimize Flow Time*, ACM Transactions on Algorithms vol. 5 no. 1 (2008), 1-25.

- An outline of this paper was published in the conference proceedings of the 15th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA) (2004), 350-358.

B. Lundell and J. McCullough, *A Generalized Floor Bound on the Minimum Distance of Geometric Goppa Codes*, Journal of Pure and Applied Algebra 207 (2005), 155-164.

TEACHING AND
GRADING
EXPERIENCE

Calculus 3 w/Mathematica Math 241 Fall 2008
Full Instructor – Conducted computer-based class, led weekly classroom lectures, wrote and graded exams, written and Mathematica homework, supervised undergraduate class assistant.

Elementary Linear Algebra Math 125 Summer 2008
Full Instructor – Led lecture/discussion class, wrote and graded exams and homework, provided instruction for TI-83 matrix algebra use.

Calculus 3 w/Mathematica Math 241 Spring 2008
Full Instructor – Conducted computer-based class, conducted weekly classroom lectures, wrote and graded exams, written and Mathematica homework, supervised undergraduate class assistant.

Calculus 1 w/Mathematica Math 220 Spring 2007
Full Instructor – Conducted computer-based class, conducted weekly classroom lectures, wrote and graded exams, written and Mathematica homework, supervised undergraduate class assistant.

Calculus 1 Math 220 Fall 2006
Teaching Assistant – Led twice-weekly discussion section, graded homework and exams, led study sessions.

Abstract Algebra 1 Math 500 Fall 2006
Grader – Graded homework for graduate abstract algebra class.

Commutative Algebra Math 502 Fall 2006
Grader – Graded homework for graduate commutative algebra class.

HONORS AND
AWARDS**Graduate**

2009 Brahana TA Instructional Award Winner
2009 Irving Reiner Memorial Award in Algebra
2009 Trijtzensky Memorial Fellowship
2008 Nominated for the Department Teaching Award
2006–2008 Named to the List of Teachers Ranked as Excellent by their Students (top 30% of campus courses) – 4 semesters
2005–2006 University Fellowship
2003–2005 NSF VIGRE Fellowship

HONORS AND
AWARDS (CONT.)**Undergraduate**

2003	Board of Trustees GPA Award, Michigan State University
2002	College of Engineering Lawrence von Tersch Scholarship
2002	Golden Key Scholarship
2002	Math Dept. L.C. Plant Scholarship
2001	Widick Memorial Scholarship
2000, 2002	Herzog MSU Math Competition Prize Winner
1999–2001	Putnam Math Competition – top quartile
1999	Robert C. Byrd Scholarship winner
1999	Alumni Distinguished Scholarship
1999	Honors College State Scholarship
1998	National Merit Scholar

RESEARCH
EXPERIENCE

2006– present	Thesis research conducted under Prof. Sankar Dutta <ul style="list-style-type: none"> • Proved special cases of the Strong Direct Summand Conjecture and related Strong Monomial Conjecture. • Research Assistant funded by the University of Illinois Research Board – Summer 2007, Summer 2008 • Research Assistant funded by NSA grant number H98230-06-1-0026 awarded to Prof. Dutta – Fall 2007
Summer 2005	Reading Course <ul style="list-style-type: none"> • Studied syzygies and the Syzygy Problem with Prof. Phil Griffith (Math Dept. UIUC)
Summer 2004	Reading Course <ul style="list-style-type: none"> • Worked with Prof. Iwan Duursma on algebraic geometry codes (Math Dept. UIUC)
Summer 2002	Director’s Summer Program (DSP) at the National Security Agency (NSA). <ul style="list-style-type: none"> • Cryptologic Mathematics for Exceptional Undergraduate Mathematicians. • Worked on a current operational problem involving functional and algorithmic analysis, statistical modeling and classification techniques. • Obtained a Top Secret/Sensitive Compartmented Information (TS/SCI) security clearance. • Designed and wrote programs in C, Perl, and Matlab on a UNIX platform.

RESEARCH
EXPERIENCE
(CONT.)

- 2001–2003 Research Assistant to Prof. Eric Torng (CSE Dept. @ MSU)
- Continuation of scheduling theory research
- 1999–2001 Honors College Professorial Assistantship
- Researched open problems in scheduling theory with Prof. Eric Torng

INVITED
TALKS

The Strong Direct Summand Conjecture and Related Homological Problems, Graduate Student Commutative Algebra Seminar, Purdue University. (April 2009)

On the Strong Direct Summand Conjecture, AMS Sectional Meeting, Urbana. (March 2009)

Homological Conjectures and Invariant Theory, Department Colloquium, University of Louisville. (February 2009)

A Generalized Floor Bound on the Minimum Distance of Geometric Goppa Codes, MAA-AMS Joint Math Meeting, Atlanta. (January 2005)

OTHER TALKS

The Strong Direct Summand Conjecture, Commutative Ring Theory Seminar, UIUC. (October 2007)

Serre's Multiplicity Conjectures, Student Ring Theory Seminar, UIUC. (June 2007)

First Chern Class of Line Bundles on an Abelian Variety, Student Abelian Varieties Seminar, UIUC. (March 2007)

Big Cohen-Macaulay Algebras in Characteristic p , Commutative Ring Theory Seminar, UIUC. (February 2007)

Square-free Monomial Ideals and Stanley Reisner Rings, Student Ring Theory Seminar, UIUC. (June 2006)

Two Proofs of the New Intersection Theorem, Commutative Ring Theory Seminar, UIUC. (May 2006)

Green's Conjecture, Student Algebraic Geometry Seminar, UIUC. (November 2005)

Differentials, Smoothness and Regularity, Commutative Ring Theory Seminar, UIUC. (October 2005)

CONFERENCES

ATTENDED

March	2009	AMS Spring Sectional Meeting, Urbana, Illinois
March	2009	2nd Bluegrass Algebra Conference, Lexington, Kentucky
January	2009	AMS-MAA Joint Math Meetings, Washington, D.C.
August	2008	Commutative Algebra and its Interactions (in honor of Mel Hochster), Ann Arbor, Michigan
May	2008	Commutative Algebra: Connections with Algebraic Topology and Representation Theory (in honor of Luchezar Avramov), Lincoln, Nebraska
March	2008	A Macaulay 2 Conference, Ithaca, New York
May	2006	Conference on Homological Conjectures in Commutative Algebra (in honor of Paul C. Roberts), Snowbird, Utah
Sept.	2005	Conference in honor of Phillip Griffith, Urbana, Illinois
Jan.	2005	MAA-AMS Joint Math Meeting, Atlanta, Georgia

PROFESSIONAL

MEMBERSHIPS

AMS, MAA, NSCS, Phi Kappa Phi

PROFESSIONAL

ACTIVITIES

Fall 2008	Math 241 Course Captain
2007– present	Organizer Commutative Ring Theory Seminar
2006	Organizer Graduate Student Combinatorial Commutative Algebra Seminar
2005–2006	Member of Department Graduate Affairs Committee
Fall 2006	New Graduate Student Orientation

REFERENCES

Professor Sankar Dutta (Thesis advisor)
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University of Illinois at Urbana-Champaign
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Professor Emeritus Phillip Griffith
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1409 W. Green Street (MC-382)
Urbana, Illinois 61801
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Professor Henry Schenck
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University of Illinois at Urbana-Champaign
1409 W. Green Street (MC-382)
Urbana, Illinois 61801
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Debra Woods (concerns teaching)
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Professor Robert Muncaster (concerns teaching)
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