

CONTACT  
INFORMATION

203L Stark Hall  
Winona State University  
Winona, MN 55987

**Phone:** (507) 474-5775  
**E-mail:** eerrthum@winona.edu  
**URL:** <http://course1.winona.edu/eerrthum>

## EDUCATION

**University of Maryland**, College Park, Maryland

Ph.D., Mathematics, May 2007

- Dissertation Title: “Singular Moduli of Shimura Curves”
- Advisor: Stephen S. Kudla

**University of Iowa**, Iowa City, Iowa

B.S., Mathematics with Honors and Distinction, May 2002

B.S., Physics with Distinction, May 2002

TEACHING  
EXPERIENCE

**Winona State University**, Winona, Minnesota

*Assistant Professor*

**Fall 2007 - Present**

- Precalculus
- Applied Calculus
- Calculus I
- Number Theory
- Abstract Algebra

**University of Maryland**, College Park, Maryland

*Graduate Student Lecturer*

**Fall 2004 - Spring 2006**

- Elements of Geometry
- Elements of Numbers and Operations
- Introduction to Probability

*Graduate Student Discussion Section Leader*

**Spring 2003 - Fall 2003**

- Calculus I
- Calculus II

*Graduate Student Grader*

**Fall 2002, Spring 2004**

- Advanced Calculus I
- Abstract Algebra II

**University of Iowa**, Iowa City, Iowa

*Tutor for New Dimensions in Learning*

**Summer 2001 - Spring 2002**

- College Physics I
- Engineering Math III: Matrix Algebra
- Elementary Theory of Numbers

RESEARCH  
EXPERIENCE

**National Security Agency**, Fort George G. Meade, Maryland

*Mathematical Research Intern*

**Summer 2002 & Summer 2003**

Performed research for the Cryptology Office of the Information Assurance Research Group. Studied and gave presentations on public key cryptography and algebraic geometry. Obtained Top Secret and Sensitive Compartmented Information clearance.

**University of Iowa**, Iowa City, Iowa

*Laboratory Assistant – Physics Department*

**Fall 1999 - Fall 2001**

Assisted in the construction of a high-vacuum plasma chamber. Built various electronic components.

## PUBLICATIONS

*Singular Moduli of Shimura Curves.* In preparation.

*Addition of Points on an Elliptic Curve over the Reals*, Wolfram Demonstrations Project,  
<http://demonstrations.wolfram.com/AdditionOfPointsOnAnEllipticCurveOverTheReals/>

## TALKS GIVEN

*University of Wisconsin - Madison Number Theory Seminar* **March 2008**

*The Ohio State University Number Theory Seminar* **February 2008**

*AMS-MAA Joint Mathematics Meeting* **January 2008**

*Singular Moduli of Shimura Curves.* An explanation of my research into the explicit computation of the norms of singular moduli on “small” Shimura curves via Borcherds forms.

*Winona State University Job Talk* **Winter 2007**

*Finding Solutions on the Curve: Number Theory via Geometry.* An introduction to how geometry can be used to solve number theoretic problems including an example of elliptic curve cryptography.

*University of Maryland Spotlight on Graduate Research* **Fall 2006**

*Constructing Vector-Valued Modular Forms From Scalar Ones.* An introduction to vector-valued modular forms and a construction which vectorizes scalar-valued modular forms.

*University of Maryland VIGRE Modular Forms Research Interaction Team* **Spring 2006**

*The Divisor of an Automorphic Form.* An exposition on the relation between the space of cusp forms and the space of holomorphic differential forms on the corresponding Riemann surface.

*University of Maryland Oral Examination* **Spring 2005**

*“Heights and the Special Values of L-series,”* by Benedict H. Gross. An exposition and reinterpretation of Gross’s Montreal paper that introduced the relation between L-series and Shimura curves.

*University of Maryland VIGRE Number Theory Research Interaction Team* **Fall 2004**

*“Division Algebras - Beyond the Quaternions,”* by John C. McConnell. An overview of constructing generalized division algebras.

*University of Maryland VIGRE Cryptography Research Interaction Team* **Spring 2004**

*“A New Elliptic Curve Based Analogue of RSA,”* by N. Demytko. An explanation of an encryption scheme on elliptic curves that closely models the classical RSA method.

*University of Maryland VIGRE Cryptography Research Interaction Team* **Fall 2003**

*Bilinear Pairings in Cryptography.* An introduction of the various ways bilinear pairings on elliptic curves can be used in encryption and multi-party key agreement.

ACADEMIC  
ACTIVITIES

- AMS-MAA Joint Mathematics Meeting, San Diego, January 2008
  - MAA Mini-course: A Beginner’s Guide to the Scholarship of Teaching and Learning in Mathematics
  - MAA Mini-course: Directing Undergraduate Research
- North Central MAA Section Meeting, Bemidji, MN, October 2007
- North Central MAA Section NExT Member, August 2007
- AMS-MAA Joint Mathematics Meeting, New Orleans, January 2007
- Intersection of Arithmetic Cycles and Automorphic Forms Workshop, Montreal, December 2005
- University of Maryland VIGRE Research Interactive Team
  - Algebra & Number Theory, Spring 2003 - Spring 2005
  - Cryptography, Fall 2003 - Fall 2004
- International Mathematics Competition
  - Honorable Mention, Prague, July 2001
  - Participation, London, July 2000
- William Lowell Putnam Mathematical Competition
  - 194.5 place, 2000
  - Participation, 1998 - 2001

- Iowa Collegiate Mathematics Competition
  - 7th place, 2002
  - 1st place, 2001
  - Participation, 1999 - 2002

## HONORS AND AWARDS

- Departmental Fellowship (Univ. of Maryland Mathematics Department), Fall 2002 - Spring 2003
- University of Iowa Dean's List, Fall 1998 - Spring 2002
- William R. Savage Award in Physics, Spring 2001
- Phi Beta Kappa Honor Society, Inducted Spring 2001
- National Society of Collegiate Scholars, Inducted Spring 2000
- University of Iowa President's List, Fall 1999

## COMPUTER SKILLS

- Mathematical Software: Mathematica, Maple, Magma, Texas Instrument Calculators
- Languages: BASIC, Visual BASIC, Java, C++.
- Web Based: HTML, CSS, PHP

## SERVICE

**Winona State University**, Winona, Minnesota*Science Fair Judge***Fall 2004 - Present**

Judged junior and senior high school science projects at the 55th Annual Southeastern Minnesota and Western Wisconsin Regional Science Fair.

**University of Maryland**, College Park, Maryland*Honor Council Board Member***Fall 2004 - Present**

Served as a graduate student member on the board that investigates claims of academic dishonesty.

*Mentor for First-Year Graduate Students in Mathematics***Fall 2003, Fall 2004, Fall 2006**

Contacted and welcomed incoming graduate students in the department. Was available to offer advice on the department, university, and the local area.

**University of Iowa**, Iowa City, Iowa*Vice President of the Society of Physics Students***Fall 2001 - Spring 2002**

Helped organize events and meetings for students in the physics department.

*National Society of Collegiate Scholars Spring Break Service Program***Spring 2002**

Cleared portions of the Palmetto Trail in the Francis Marion National Forest in South Carolina.