

Christopher Rasmussen

Curriculum Vitae

Mathematics & Computer Science
Wesleyan University

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Employment

- 2016– **Associate Professor of Mathematics**, Wesleyan University, Middletown, CT.
- 2008–2016 **Assistant Professor of Mathematics**, Wesleyan University, Middletown, CT.
- 2007–2008 **Guest Research Associate**, *Research Institute for Mathematical Sciences*, Japan Society for the Promotion of Science Postdoctoral Fellow, Kyoto, Japan.
- 2004–2007 **G. C. Evans Instructor**, *Rice University*, Houston, TX.

Visiting Appointments

- 2017 **Visiting Research Scholar/Visiting Associate Professor**, *Research Institute for Mathematical Sciences*, Kyoto University, Kyoto, Japan.

Education

- 2004 **Ph.D. in Mathematics**, *The University of Arizona*, Tucson, AZ.
Thesis: *Jacobians of étale covers of the projective line minus three points*
- 1998 **M.S. in Mathematics**, *The University of Virginia*, Charlottesville, VA.
- 1997 **B.A. in Mathematics**, *The University of Virginia*, Charlottesville, VA.

Grants & Funding

Research Grant

- 2007 **Grant-in-aid for JSPS Fellows**, *Japan Society for the Promotion of Science*, KAKEN-HI Grant #19 · 07028.
Grant-in-aid for JSPS Fellows (¥1.1M)

Fellowships

- 2000–2004 **VIGRE Graduate Fellowship**, *The University of Arizona*.
- 1997–1998 **Pratt-Bequest Mathematics Fellowship**, *The University of Virginia*.

Workshop Funding

- 2022 **Collaboration Workshop**, *ICERM*, *Brown University*.
Project: *Improvements to algorithms around S-unit equations* (joint with Alejandra Alvarado, Angelos Koutsianas, Beth Malmskog, Christelle Vincent, and McKenzie West)
- 2016 **Collaboration Workshop**, *ICERM*, *Brown University*.
Project: *Solving S-Unit equations in Sage* (joint with Beth Malmskog)

Other Funding

- 2022 **Park City Mathematics Institute**, *2022 Summer Research Program: Number Theory informed by computation*.

- 2016 **Wesleyan University**, *GISOS Faculty-student internship*, Oren Maximov ('17).
Project: *Nonlinear Recurrence in Noncommutative Rings*
- 2015 **Allbritton Center for the Study of Public Life**.
University Lecture by Catherine O'Neil (joint with Dave Constantine and Abigail Hornstein)
- 2012 **Area Cooperative Educational Services**, *Intel Math Program Instructor Training*,
Connecticut State Department of Education.
- 2008 **Southwest Center for Arithmetic Geometry**, *Arizona Winter School*, Project Assistant.
Project: *Arithmetic of values of E- and G-functions*

Publications

Refereed Manuscripts

12. **A robust implementation for solving the S -unit equation and several applications**, with A. Alvarado, A. Koutsianas, B. Malmskog, C. Vincent, and M. West, arXiv:1903.00977. Simons Symposia series, *Arithmetic Geometry, Number Theory, and Computation* (2022), 1–41.
11. **Cyclic covers and Ihara's question**, with A. Tamagawa, arXiv:1803.08524. *Res. Number Theory* **5**, Art. 33 (2019).
10. **Picard curves over \mathbb{Q} with good reduction away from 3**, with B. Malmskog, arXiv:1407.7892. *LMS J. Comput. Math.* **19** (2016), no. 2, 382–408.
9. **Abelian surfaces good away from 2**, with A. Tamagawa, arXiv:1504.03047. *Int. J. Number Theory* **13** (2017), no. 4, 991–1001.
8. **Arithmetic of abelian varieties with constrained torsion**, with A. Tamagawa, arXiv:1302.1477. *Trans. Amer. Math. Soc.* (2017) no. 4, 2395–2424.
7. **Character sums determined by low degree isogenies of elliptic curves**, with D. Moody, arXiv:1210.2743. *Rocky Mountain J. Math.*, **45** (2015), no. 2, 623–635.
6. **Class number formulas via 2-isogenies of elliptic curves**, with C. McLeman, arXiv:1008.4766. *Bull. Lond. Math. Soc.*, **44** (2012), no. 6, 1221–1236.
5. **An abelian surface with constrained 3-power torsion**. *Galois-Teichmüller theory and arithmetic geometry*, H. Nakamura, F. Pop, L. Schneps, A. Tamagawa, eds., Adv. Stud. Pure Math. **63**, *Math. Soc. Japan* (2012), 449–456.
4. **On elliptic curves of conductor 11^2 and an open question of Ihara**. *Algebraic number theory and related topics 2007*, RIMS Kôkyûroku Bessatsu, B12, *Res. Inst. Math. Sci.* (2009), 101–113.
3. **A finiteness conjecture on abelian varieties with constrained prime power torsion**, with A. Tamagawa. *Math. Res. Lett.* **15** (2008), no. 6, 1223–1231.
2. **On the torsion of Jacobians of principal modular curves of level 3^n** , with M. Papanikolas, arXiv:math/0510023. *Arch. Math. (Basel)* **88** (2007), no. 1, 19–28.
1. **On the fields of 2-power torsion of certain elliptic curves**. *Math. Res. Lett.* **11** (2004), no. 4, 529–538.

Accepted Software Submissions

Solving S -Unit equations over number fields, with A. Alvarado, A. Koutsianas, B. Malmskog, C. Vincent, M. West.

Accepted to the SageMath mathematics software project.

Popular Press

Using computers to crack open centuries-old mathematical puzzles.

The Conversation US, posted April 3, 2019.

Conferences & Sessions Organized

4. **Improvements to algorithms around S -unit equations**, with A. Alvarado, A. Koutsianas, B. Malmskog, C. Vincent, M. West, May 2022.
ICERM, Brown University, Providence RI.
3. **Special Session: Algorithms, Experimentation, and Applications in Number Theory**, with B. Malmskog, January 2020.
AMS Joint Meetings, Denver, CO.
2. **Solving S -Unit equations in Sage**, with B. Malmskog, January 2017.
ICERM, Brown University, Providence RI.
1. **Algebraic Geometry: a Conference for Undergraduate Mathematics Majors**, with B. Hardt and B. Hassett, February 2006.
Rice University, Houston, TX.

Invited Presentations

Conference and Seminar Talks

- 2022 **An open source implementation for solving S -unit equations.**
Number Theory Seminar
Number Theory Research Group, University of Debrecen, Debrecen, Hungary
Towards uniform bounds on heavenly elliptic curves.
PCMI Summer School 2022 Research Program
Park City Mathematics Institute, Park City, UT
- 2019 **Algorithms for solving S -unit equations.**
Number Theory/Arithmetic Geometry Seminar
Research Institute for Mathematical Sciences, Kyoto, Japan
Improvements on bounds for heavenly abelian varieties.
Number Theory/Arithmetic Geometry Seminar
Research Institute for Mathematical Sciences, Kyoto, Japan
- 2018 **Cyclic covers and Ihara's question.**
Connecticut Summer School in Number Theory
University of Connecticut, Storrs, CT
- 2017 **Solving S -unit equations.**
Michigan MAA Section Annual Meeting (Plenary Speaker)
Ferris State University, Big Rapids, MI
- 2016 **Abelian surfaces good away from 2.**
Number Theory/Algebraic Geometry Seminar
Research Institute for Mathematical Sciences, Kyoto, Japan

- Abelian surfaces good away from 2.**
Special Session on Elliptic Curves
 Southeastern Sectional Meeting of the AMS, Athens, GA
- 2014 **Constrained pro-2 torsion in low dimensions.**
Number Theory/Arithmetic Geometry Seminar
 Research Institute for Mathematical Sciences, Kyoto, Japan
- Picard curves with good reduction away from 3.**
Number Theory Joint Seminar
 Kyoto University, Kyoto, Japan
- Picard curves with good reduction away from 3.**
Special Session on Galois Theory and Interactions with Algebra and Number Theory
 Southeastern Sectional Meeting of the AMS, Greensboro, NC
- Picard curves over \mathbb{Q} with good reduction away from 3.**
Number Theory Seminar
 University of Rochester, Rochester, NY
- Picard curves with good reduction away from 3.**
Upstate New York Number Theory Conference
 State University of New York, Buffalo, NY
- 2013 **Finiteness results for abelian varieties with constrained arithmetic.**
Algebra Seminar
 University of Connecticut, Storrs, CT
- 2012 **Finiteness of constrained abelian varieties.**
Algebra Seminar
 The University of Virginia, Charlottesville, VA
- Class number formulas from isogenies.**
Five Colleges Number Theory Seminar
 Amherst College, Amherst, MA
- 2011 **2-Isogenies and weighted character sums.**
Number Theory Joint Seminar
 Kyoto University
- 2010 **Finiteness results on abelian varieties with constrained torsion.**
Number Theory Seminar
 University of Rochester, Rochester, NY
- Finiteness results on abelian varieties with constrained torsion.**
Galois-Theoretic Arithmetic Geometry Satellite Meeting
 Joint MSJ-RIMS Conference, Kyoto, Japan
- Finiteness results on abelian varieties with constrained torsion.**
Algebra/Number Theory Seminar
 Brown University, Providence, RI
- 2009 **Finiteness results on abelian varieties with constrained torsion.**
Algebraic Geometry Seminar
 SUNY-Stony Brook, Stony Brook, NY
- 2008 **Finiteness results for abelian varieties with constrained torsion.**
Five Colleges Number Theory Seminar
 Amherst College, Amherst, MA
- Finiteness results for abelian varieties with constrained torsion.**
Special Session on Number Theory
 Eastern Sectional Meeting of the AMS, Middletown, CT

- Finiteness results of abelian varieties with constrained torsion.**
Seventh Annual Number Theory Workshop
Hiroshima University, Hiroshima, Japan
- Finiteness results for abelian varieties with constrained torsion.**
Mathematics Seminar
Kagawa University, Takamatsu, Japan
- Abelian varieties with constrained torsion.**
Number Theory Workshop
Waseda University, Tokyo, Japan
- 2007 **A finiteness result for abelian varieties with constrained prime power torsion.**
Conference on Algebraic Number Theory and Related Topics
Research Institute for Mathematical Sciences, Kyoto, Japan
- Abelian varieties with constrained torsion.**
Number Theory Seminar
University of Tokyo, Tokyo, Japan
- The arithmetic of branched covers.**
Mathematics Colloquium
Wesleyan University, Middletown, CT
- The arithmetic of branched covers.**
Mathematics Colloquium
United States Naval Academy, Annapolis, MD
- 2006 **A finiteness conjecture for abelian varieties with constrained torsion.**
Algebra and Number Theory Seminar
The University of Arizona, Tucson, AZ
- On the arithmetic of Jacobians of modular curves.**
Front Range Number Theory Colloquium
Colorado State University, Fort Collins, CO
- Arithmetic from geometry on elliptic curves.**
Arithmetic Algebraic Geometry Seminar
Research Institute for Mathematical Sciences, Kyoto, Japan
- A finiteness conjecture for abelian varieties over number fields.**
Special Session on Galois Theory in Arithmetic and Geometry
Eastern Sectional Meeting of the AMS, Durham, NH
- A finiteness conjecture for abelian varieties over number fields.**
Special Session on Arithmetic Geometry and Modular Forms
AMS Joint Meetings, San Antonio, TX
- 2005 **On the torsion of Jacobian varieties of $X(p^n)$.**
Arithmetic Algebraic Geometry Seminar
Research Institute for Mathematical Sciences, Kyoto, Japan
- On the torsion of Jacobian varieties of $X(p^n)$, $p = 2, 3$.**
Okayama Workshop on Arithmetic and Geometry
Okayama University, Okayama, Japan
- On the torsion of Jacobian varieties of $X(p^n)$.**
ArithmeTexas
Texas A&M University, College Station, TX
- 2004 **Galois representations on fundamental groups.**
Number Theory Seminar
Texas A&M University, College Station, TX

- 2003 **Evidence of Ihara’s conjecture.**
Number Theory Seminar
 University of Texas, Austin, TX
- 2002 **Galois actions on fundamental groups.**
Number Theory Seminar
 Korea Institute for Advanced Study, Seoul, South Korea

Teaching

Recognition and Honors

- 2009 Honored by the creation of a scholarship by the Weinrott family to recognize “extraordinary teaching.”

Graduate Students

Suzanne O’Hara.

- 2022 **Zonia Menendez, Ph.D.**
 Thesis: *Images of sporadic points on the family of modular curves $X_0(n)$*
 Current Position: Assistant Professor of Mathematics, Southern Oregon University
- 2019 **Ryan Karpisz, M.A.**
 Thesis: *Conditional bounds on heavenly elliptic curves over quadratic number fields*
- 2015 **Nathaniel Josephs, M.A.**
 Thesis: *Finding rational points on a nonsingular cubic surface in \mathbb{P}^3*
- 2014 **Abbey Bourdon, Ph.D.**
 Thesis: *A uniform version of a finiteness conjecture for elliptic curves with complex multiplication*
 Current Position: Assistant Professor of Mathematics, Wake Forest University

Ph.D. Defense Committees

- 2023 Justin Bryant
- 2020 Freda Li
- 2019 Lisa Kaylor
- 2017 Alicia Marino
- 2016 Jingbo Liu
- 2015 Gabriel Valenzuela
- 2014 James Ricci, Bonita Graham
- 2013 Anna Haensch
- 2009 Becky Hall

Ph.D. Advanced Examination Committees

- 2023 Zachary Porat
- 2017 Freda Li
- 2016 Miriam Parmes
- 2014 Alicia Marino
- 2012 Jingbo Liu, Bonita Graham, James Ricci
- 2010 Anna Haensch
- 2008 Glenn Henshaw
- 2007 Shuijing Li, Bradley Duesler

M.A. Defense Committees

2019 Rocco Davino
2018 Avi-Balay Wilson
2017 Joshua Murphy
2015 John Bergan
2011 Juan Pablo Francisco
2009 Anna Radlowski

Honors Students Supervised

2016 Elizabeth Paquette
2013 Jeremy Fehr
2011 Qianqian Lin

Honors Students (Service as Reader)

2016 Yael Davidov, Olakumbi Kuti
2015 Sangsan Warakkagun
2013 Brenna Sansom, Randy Linder, Grace Collins-Hovey
2011 Bethany Berkowitz, Michael Chou, Jonas Mishara-Blomberger, David Puelz, Joel Specter

Graduate Courses

Affine Group Schemes, 2013.
Algebra, 2021, 2020, 2016, 2014, 2010, 2010.
Algebraic Geometry, 2016, 2009.
Elliptic Curves, 2011, 2006.
Local Fields, 2019.
Riemann Surfaces, 2021.
Topology, 2012.

Undergraduate Courses

† indicates a course taught in an Inquiry-Based Learning format

‡ indicates a course taught with Standards-Based grading

Abstract Algebra I, 2018, 2013, 2009.
Abstract Algebra II, 2018, 2015[†], 2013.
Algebraic Geometry, 2021, 2011.
Calculus I, 2022, 2020, 2011.
Complex Analysis, 2022, 2010, 2008.
Discrete Mathematics, 2022[‡], 2021[‡], 2018, 2016, 2014, 2013.
Elements of Calculus I, 2022[‡], 2019.
Elements of Calculus II, 2019, 2018.
Linear Algebra, 2020, 2015, 2014.
Multivariable Calculus, 2020, 2019, 2014, 2011, 2010, 2009, 2008.
Number Theory and Cryptography, 2016[†].

Tutorials

Abstract Algebra, 2018.
Algebraic Geometry, 2023, 2022, 2018, 2016, 2015, 2014, 2011.

Algebraic Topology, 2019.

Commutative Algebra, 2008.

Differential Geometry, 2009.

Elliptic Curves, 2022, 2013.

Professional Development Course

Intel Math Program, 2018, 2016, 2015, 2014, 2013, 2012.

Summer professional development course for K-8 public school teachers in CT for improving mathematics content knowledge

Service to the Profession

Referee Assignments

American Mathematical Monthly

Experimental Mathematics

International Journal of Number Theory

Journal of Number Theory

London Mathematical Society Lecture Note Series

Netherlands Organization for Scientific Research (NWO Domain Science)

Proceedings of the American Mathematical Society

Proceedings of the Japan Academy, Series A

Research in Number Theory

Quarterly Journal of Mathematics

Zentrablatt Math

Professional Memberships

American Association of University Professors

American Mathematical Society

Japan Society for the Promotion of Science Alumni Association

Mathematics Association of America

Outreach Presentations

2018 **Isogeny progeny: a character sum.**

Natural Sciences and Mathematics Seminar

Wesleyan University, Middletown, CT

2016 **Elimination and Implicitization – some flavors of algebraic geometry.**

Undergraduate Mathematics Colloquium

Duquesne University, Pittsburgh, PA

Ulam's Spiral.

Research Soirée on Patterns

College of Integrative Sciences Seminar, Wesleyan University, Middletown, CT

2015 **S-unit equations and Diophantine problems.**

Natural Sciences and Mathematics Seminar

Wesleyan University, Middletown, CT

2013 **Elimination Theory and Implicitization.**

Undergraduate Mathematics Seminar

Connecticut College, New London, CT

Elimination Theory and Implicitization.

Undergraduate Math Club

University of Connecticut, Storrs, CT

2012 **Symmetry in Arithmetic and Geometry.**

Gordon Keller Mathematics Major Dinner (Guest Speaker)

The University of Virginia, Charlottesville, VA

2011 **Algebraic geometry and figurate numbers.**

Undergraduate Math Club

Wesleyan University, Middletown, CT

2009 **Detecting rational points through Galois action.**

Natural Sciences and Mathematics Seminar

Wesleyan University, Middletown, CT

Shapely numbers.

Undergraduate Mathematics Seminar

University of Portland, Portland, OR

2008 **Shapely numbers.**

Science Dialogue (Invited Speaker)

Akashi Natural College of Technology, Akashi, Japan

2006 **Career advice for graduate students in mathematics.**

Graduate Student Colloquium

The University of Arizona, Tucson, AZ

The congruent number problem.

Undergraduate Mathematics Conference

Rice University, Houston, TX

University Service

Campus Service

2019–2021 Review and Appeals Board

2019–2021 Compensation and Benefits Committee

2019–2021 CBC Faculty Representative to the Investment Committee

2017 Meeting with University Assessment Task Force

2014–2019 University Major Committee (subcommittee of EPC)

Assistant Faculty Marshall, 182nd–187th, 190th Commencements, 2014–2019, 2021–2022

2010–2012 Tenure-track Representative to Academic Council

Departmental Service

2021–2023 **Mentoring**, *Tenure counselor for Alex Kruckman.*

2022–2023 **Mentoring**, *Postdoctoral supervisor for Jeffrey Yelton.*

2022 **Organizer**, *Department Colloquium.*

2022 **Hiring Committee**, *Research fellow.*

2008–2023 **Co-Organizer**, *Algebra Seminar.*

2021 **Organizer**, *Putnam Exam.*

2018–2019 **Hiring Committee**, *Tenure-track search in logic.*

2018–2020 **Director**, *Mathematics Workshop.*

Department Advisory Committee, 2020–2021, 2008–2010.

2014–2018 **Department Secretary/Recorder.**

2013–2014 **Graduate Education Committee.**

**Undergraduate Prizes/Examination Committee, 2021–2022, 2019–2020, 2018,
2015–2016, 2010–2013.**

2010–2012 **Web Site Committee.**