

Courtney R. Gibbons

Curriculum Vitæ

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Clinton, NY 13323
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Employment

Assistant Professor, Department of Mathematics, Hamilton College JULY 2013–PRESENT
Paraprofessional, Department of Math and Computer Science, The Colorado College 2006–2007

Education

Ph.D. Mathematics, University of Nebraska–Lincoln AUG 2013
Thesis Advisors: Luchezar Avramov and Roger Wiegand
Thesis Title: Decompositions of Betti Diagrams

M.S. Mathematics, University of Nebraska–Lincoln MAY 2009

B.A. Mathematics, The Colorado College MAY 2006
Summa Cum Laude with Distinction in Mathematics

Research Interests

Commutative algebra; properties of infinite free resolutions and factorization in semigroups
Algebraic statistics; toric varieties of maximum likelihood equations for hierarchical log-linear models

Awards and Fellowships

The John R. Hatch Class of 1925 Excellence in Teaching Award, Hamilton College 2015

Project NExT Fellow, Mathematical Association of America 2013

Outstanding Graduate Teaching Assistant, UNL College of Arts and Sciences 2011

Emeritus Faculty Fellow, UNL Department of Mathematics 2010

Graduate Fellowship, UNL College of Arts and Sciences 2009

Outstanding Qualifying Exams, UNL Department of Mathematics 2008

Florian Cajori Prize in Mathematics, The Colorado College 2006

Grant-Supported Activity

Discovery-Based Algebra Activities, [Class of 1966 Career Development Award](#) SUMMER 2016

WMC REU Research Mentor, [NSF Grant #DMS-1460982](#) SUMMER 2015

KUMUNUjr Co-PI, [NSF Grant #DMS-1303248](#) S 2013

Graduate Researcher, [NSF Grant #DMS-1103176](#) S 2012

GAANN Trainee, [DOE Grant #200A90002](#) SUMMER–F 2010

NebraskaMATH Assistant, [NSF Grant #DUE-1035268](#) SUMMER 2011, 2012; F 2012

Project Fulcrum Resident Scientist, [NSF Grant #DGE-0086358](#) F 2009–S 2010

MCTP Trainee, [NSF Grant #DMS-0838463](#) SUMMER 2007–SUMMER 2008

Research

Published and Accepted Work

Article. *Rational combinations of Betti diagrams of complete intersections*, with M. Annunziata, C. Hawkins, and A. Sutherland. **To Appear**, *J. Algebra and its Applications*. Preprint: [arXiv:1507.08354](https://arxiv.org/abs/1507.08354)

Article. *Critical Pebbling Numbers of Graphs*, with J. D. Laison and E. J. Paul. *J. Combin. Math. Combin. Comput.* 99 (2016), 199224. [MR3585742](https://arxiv.org/abs/1507.08354)

Code. *BoijSoederberg.m2*, package reviser with B. Stone; incorporated in Macaulay2-v1.8.2, April 13, 2015

Article. *Grandma Makes Granola*, with R. Bedient. *College Mathematics Journal* 46 (2015), no. 1, pp. 58–60.

Article. *Non-simplicial decompositions of Betti diagrams of complete intersections*, with J. Jeffries, S. Mayes, C. Raicu, B. Stone, and B. White. *J. Commut. Algebra* 7 (2015), no. 2, 189206. [MR3370483](#)

Thesis. *Decompositions of Betti diagrams*. ProQuest LLC, Ann Arbor, MI, 2013. Thesis (Ph.D.)—University of Nebraska–Lincoln

Article. *The cone of Betti diagrams over a hypersurface ring of low embedding dimension*, with C. Berkesch, J. Burke, and D. Erman. *J. Pure Appl. Algebra* 216 (2012), no. 10, 22562268. [MR2925819](#)

Article. *Fixing numbers of graphs and groups*, with J. D. Laison. *Electron. J. Combin.* 16 (2009), no. 1, Research Paper 39, 13 pp. [MR2491641](#)

Unpublished Work

Article. *Maximum likelihood degree of toric varieties*, with Carlos Améndola, Nathan Bliss, Isaac Burke, Martin Helmer, Serkan Hoşten, Evan D. Nash, Jose Israel Rodriguez, Daniel Smolkin. **Submitted.** Preprint: [arXiv:1703.02251](#)

Work in Preparation

Article. *NCAAlgebra: a noncommutative algebra package for Macaulay2*, with A. Conner and W. F. Moore. **In preparation.**

Code. *NCAAlgebra.m2*, package author with A. Conner and W. F. Moore. **In preparation.**

Article. *Representation theory and Betti tables over short Gorenstein algebras*, with L. Avramov and R. Wiegand. **In preparation.**

Article. *A note on the decomposition of Betti diagrams of complete intersections*, with R. Huben and B. Stone. **In preparation.**

Article. *Decompositions of Betti diagrams of codimension 4 complete intersections*, with R. Huben, B. Stone, and F. Wyrick-Flax **In preparation.**

Conference Talks

SIAM Applied Algebraic Geometry Meeting: Maximum Likelihood Degree Minisymposium (invited)

Maximum Likelihood Degrees for Discrete Random Models

Georgia Institute of Technology, Atlanta, GA

* AUG 2017

Second International Workshop and Conference on Commutative Algebra (invited)

Preparatory Workshop Talk: *Graded Rings, Graded Modules, and Numerical Invariants*

Research Conference Talk: *Short Gorenstein Rings: Numerics and Consequences*

Tribhuvan University, Kathmandu, Nepal

OCT 2016

Joint Mathematics Meetings (JMM): Commutative Algebra Special Session (invited)

A ring without a Boij–Söderberg theory, Seattle, WA

JAN 2016

MathFest: Concrete Computations in Algebra and Algebraic Geometry Invited Paper Session (invited)

The search for indecomposable modules, Washington, DC

AUG 2015

1092nd AMS Meeting Special Session on Commutative Algebra (invited)

Non-simplicial decompositions of Betti diagrams of complete intersections

University of Louisville, Louisville, KY

OCT 2013

1085th AMS Meeting Special Session on Commutative Algebra (invited)

Modules over short Gorenstein rings

University of Arizona, Tucson, AZ

OCT 2012

JMM: AMS Contributed Papers Session

Modules over short Gorenstein rings

JAN 2013

1074th AMS Meeting: Special session on Commutative Algebra (invited)

New directions in Boij–Söderberg theory

University of Nebraska–Lincoln, Lincoln, NE

OCT 2011

Research Seminar Talks

University of Nebraska–Lincoln Commutative Algebra Seminar

FEB 2017

Williams College, Faculty Research Seminar

NOV 2016

Syracuse University, Algebra Seminar

MAR 2015

University of Utah, Algebra Seminar	MAR 2012
University of Texas at Arlington, Algebra Seminar	MAR 2012
University of Nebraska–Lincoln, Commutative Algebra Seminar	SEP 2010
University of Nebraska–Lincoln, Commutative Algebra Reading Seminar	2008–2013
University of Nebraska–Lincoln, Graduate Student Seminar	2008–2012

Posters

JMM: AWM Workshop poster session	JAN 2013
JMM: Undergraduate research poster session	JAN 2007

Workshops and Summer Schools Attended

Mathematical Sciences Research Institute

Macaulay2 Workshop	JAN 2014
Joint Introductory Workshop: Cluster Algebras and Commutative Algebra	AUG 2012
Summer Graduate School on Commutative Algebra	JUN 2011

American Mathematical Society: Mathematics Research Community

Algebraic Statistics	JULY 2016
Commutative Algebra	JULY 2010

Colorado College, Macaulay2 Workshop	AUG 2010
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The Abdus Salam International Center for Theoretic Physics, Trieste, Italy, School on Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics	SUMMER 2010
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Teaching

Professional Teaching Experience

Research Supervisor

Willamette University	WVMC Research Experience for Undergraduates	SUMMER 2015
Hamilton College	Physics, Mathematics, and Music [with K. Brown]	SUMMER 2016
	DEAN 500 Senior Fellowship	F 2014–S 2015

Instructor of Record

Hamilton College	MATH 113	Calculus I	F 2013; S 2016
	MATH 116	Calculus II	F 2015, 2017; S 2014
	MATH 224W	Linear Algebra	F 2013, 2014, 2017; S 2014, 2015
	MATH 325W	Modern Algebra	F 2015; S 2015, 2018
	MATH 327	Cryptography	S 2015
	MATH 361	Number Theory	S 2018
	MATH 450	Independent Study	S 2014

University of Nebraska–Lincoln	MATH 101	College Algebra	F 2009, 2010; S 2010
	MATH 203	Contemporary Mathematics	F 2010; S 2010, 2011
	MATH 300	Mathematics Matters [for future elementary educators]	F 2011

All Girls/All Math	Codes and Cryptology	SUMMER 2014
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Guest Lecturer

Hamilton College	COLLEGE 371 Common Seminar Adirondacks Program	F 2015
	HSPST 370	F 2013

Graduate Teaching Assistant

University of Nebraska–Lincoln	MATH 806T	Number Theory & Cryptology	SUMMER 2011
	MATH 811T	Functions for Precalculus Teachers (Online)	F 2012
	MATH 805T	Discrete Math & Combinatorics	SUMMER 2012
		Super-TA for all Calculus Courses	F 2011

Pedagogical Engagement

Curricular Development Math Department SSIH requirement	SUMMER 2016–PRESENT
Talking About Teaching Inclusive Pedagogies: Teaching a Diverse Student Body (speaker)	APR 2016
Consortium on High Achievement and Success (CHAS) Grant	
Alumna participant	S 2017
Faculty Development on Teaching Diverse First-Year Students	S 2016
Mathematical Association of America Minicourse	
Flipping the Classroom	JAN 2015
Hamilton College DOF Reading Discussions	
<i>What the Best College Teachers Do</i>	SUMMER 2014
<i>Teaching Naked</i>	SUMMER 2015

Undergraduate Seminar Talks

Sacramento State Math Club & ANTC Colloquium	MAR 2017
Williams College AWM Student Chapter Kick-Off Talk	FEB 2017
Utica College Math Colloquium	FEB 2017
Adelphi University Math and Comp Sci Seminar	
<i>From Statistics to Algebra and Back Again</i>	SEP 2016
<i>A Variety of Ways to Solve a Problem</i>	MAR 2015
Hampshire College HCiSSM “Prime Time”	AUG 2013
Williams College Mathematics Seminar	JAN 2013
Bard College Mathematics Seminar	NOV 2012
William Jewell College Pi Mu Epsilon Colloquium	NOV 2012
Colorado College Mathematics Seminar	APR 2010

Service

To the Profession

Session Organizer

JMM, Atlanta, GA	JAN 2017
Commutative Algebra: Research for Undergraduate and Early Graduate Students (Special Session #8)	
1115th AMS Meeting , Rutgers University, New Brunswick, NJ	NOV 2015
Special Session on Aspects of Resolutions and Syzygies in Commutative Algebra	

Panelist

Nebraska Conference for Undergraduate Women in Mathematics (NCUWM); Random Bits of Advice	FEB 2017
JMM: Joint Committee on Women in Mathematical Sciences; Success in Graduate School	JAN 2016
MathFest: Association for Women in Mathematics; Mentoring Matters	JUN 2014

Community Talks

The Other Side <i>The Mathematics of Climate Change</i>	F 2015
Emmerson Literary Society <i>Sudoku, Apes, and Algebra: An ELS “Tell Us What You Know” Lecture</i>	S 2015
Sigma Xi Colloquium <i>Syzygy: Understanding Relationships among Polynomials</i>	S 2014

Referee/Reviewer

<i>The Mathematical Monthly, Journal of Commutative Algebra, Journal of Algebra and its Applications, Mathematical Reviews, Minnesota Journal of Undergraduate Mathematics</i>	F 2014–PRESENT
KUMUNUjr Co-founder, Co-organizer, Co-PI	2012–2013
NCUWM Table Host	2010–2013
Pfizer–Novartis–LPS Science Fair judge	2010, 2012
Saturday Science volunteer	FEB 2010

To Hamilton College

Dean of Faculty Search Committee	F 2017–PRESENT
Writing Advisory Committee	F 2017–PRESENT
Phi Beta Kappa (Epsilon of New York)	
President	F 2017–PRESENT
Vice President	F 2014–S 2016
Committee on selection criteria	S 2014
Consulting Counseling Center usage statistics and projections for David Walden	F 2016
Ellucian Advising Tool faculty tester for Registrar's Office	S 2016
Honor Court Hamilton College	F 2014–S 2016
Crucial Conversations attendee	F 2015
Faculty Advisor Hamilton College Vegan Club	F 2014–S 2015
Mathletics Coach for the Putnam team with Prof. Andrew Dykstra	F 2013, F 2014
Junior Faculty Caucus participant	S 2014–PRESENT
Academic Advisor	

To University of Nebraska–Lincoln

UNL Workshop for Graduate TAs Orientation Leader, Panelist	2010, 2011, 2012
UNL Annual Math Day volunteer	2007–2012
UNL Math Graduate Student Advisory Board representative	2007–2009

Media Appearances

Interview for <i>Relatively Prime</i> math podcast Diegetic Plots: Chapter 2	FEB 2016
Interview for <i>Girls 20 Angle Bulletin</i> volume 8, numbers 3&4	FEB 2015, APR 2015
Guest Blogger mathbabe.org	FEB 2015
Actor for Mathematically Bent Theater at JMM	JAN 2014, 2015, 2017

Professional Memberships and Honor Societies

American Mathematical Society (AMS), Association for Women in Mathematics (AWM), Mathematics Association of America (MAA), Society for Industrial and Applied Mathematics (SIAM), National Association of Mathematicians (NAM), Phi Beta Kappa (Φ BK)