

Courtney R. Gibbons

Curriculum Vitæ

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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 L. 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; *Summa Cum Laude* with Distinction in Mathematics MAY 2006

Research Interests

Commutative algebra: properties of infinite free resolutions and factorization in semigroups;
Algebraic statistics: toric varieties of maximum likelihood equations.

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, [Hamilton 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

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), Golden Key Honor Society, Phi Beta Kappa (ΦBK)

Research

(* indicates an undergraduate coauthor)

Published and Accepted Work

Article. *Maximum likelihood degree of toric varieties*, with C. Améndola, N. Bliss, I. Burke, M. Helmer, S. Hoşten, E. Nash, J. Rodriguez, D. Smolkin. (To Appear), J. Symbolic Comput. Preprint: [arXiv:1703.02251](https://arxiv.org/abs/1703.02251)

Article. *Rational combinations of Betti diagrams of complete intersections*, with M. Annunziata*, C. Hawkins*, and A. Sutherland*. J. Algebra Appl. 17 (2018), no. 5. 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://doi.org/10.1090/S0893-4063-2016-015742-0)

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 Math. J. 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](https://doi.org/10.1080/10726950.2015.1058883)

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](https://doi.org/10.1080/00207179.2012.718119)

Article. *Fixing numbers of graphs and groups*, with J. D. Laison. Electron. J. Combin. 16 (2009), no. 1, Research Paper 39, 13 pp. [MR2491641](https://doi.org/10.1080/10726950.2009.1058883)

Unpublished Work

Article. *Recursive strategy for decomposing Betti tables of complete intersections*, with R. Huben* and B. Stone. (Submitted). Preprint: [arxiv:1708.05440](https://arxiv.org/abs/1708.05440)

Work in Preparation

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

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

Article. *Realizable divisor sequences for atoms in Krull monoids*, with N. Baeth and J. Striuli.

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

Conference Talks

(† indicates an invited talk; * indicates an upcoming talk)

SIAM Applied Algebraic Geometry Meeting: Maximum Likelihood Degree Minisymposium † AUG 2017
Georgia Institute of Technology, Atlanta, GA
Maximum Likelihood Degrees for Discrete Random Models

Second International Workshop and Conference on Commutative Algebra † OCT 2016
Tribhuvan University, Kathmandu, Nepal
Preparatory Workshop Talk: *Graded Rings, Graded Modules, and Numerical Invariants*
Research Conference Talk: *Short Gorenstein Rings: Numerics and Consequences*

Joint Mathematics Meetings (JMM): Commutative Algebra Special Session † JAN 2016
Seattle, WA
A ring without a Boij-Söderberg theory

MathFest: Concrete Computations in Algebra and Algebraic Geometry Invited Paper Session † AUG 2015
Washington, DC
The search for indecomposable modules

1092nd AMS Meeting Special Session on Commutative Algebra † University of Louisville, Louisville, KY <i>Non-simplicial decompositions of Betti diagrams of complete intersections</i>	OCT 2013
1085th AMS Meeting Special Session on Commutative Algebra † University of Arizona, Tucson, AZ <i>Modules over short Gorenstein rings</i>	OCT 2012
JMM: AMS Contributed Papers Session San Diego, CA <i>Modules over short Gorenstein rings</i>	JAN 2013
1074th AMS Meeting: Special session on Commutative Algebra † University of Nebraska–Lincoln, Lincoln, NE <i>New directions in Boij–Söderberg theory</i>	OCT 2011

Research Seminar Talks

University of Nebraska–Lincoln, Commutative Algebra Seminar <i>A Ring without a Boij–Söderberg Theory</i>	FEB 2017
<i>Boij–Söderberg Theory I: Betti diagrams over polynomial rings</i>	SEP 2010
<i>Boij–Söderberg Theory II: Betti diagrams over $k[x, y]/(x^2)$</i>	SEP 2010
Williams College, Faculty Research Seminar <i>Representations of Kronecker Quivers</i>	NOV 2016
Syracuse University, Algebra Seminar <i>Parametrizing a family of indecomposable modules</i>	MAR 2015
University of Utah, Algebra Seminar <i>Decomposition of Betti diagrams over a quadric hypersurface</i>	MAR 2012
University of Texas at Arlington, Algebra Seminar <i>Betti diagrams over a small hypersurface</i>	MAR 2012
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

Selected Workshops, Conferences, and Summer Schools

Park City Mathematics Institute, Park City, UT Undergraduate Faculty Program	*JULY 2018
Banff International Research Station, Banff, Alberta, CA New Trends in Syzygies	*JUN 2018
Georgia Institute of Technology Applied Macaulay2 Tutorial	JULY 2017
American Mathematical Society: Mathematics Research Community Algebraic Statistics	JULY 2016
Commutative Algebra	JULY 2010
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
The Colorado College Macaulay2 Workshop	AUG 2010
The Abdus Salam International Center for Theoretic Physics, Trieste, Italy School on Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics	SUMMER 2010

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 Postmodern Spain: New Narratives and New Technologies	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
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Talking About Teaching

Inclusive Pedagogies: Teaching a Diverse Student Body (speaker)	APR 2016
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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
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Hamilton College DOF Reading Discussions

Book: <i>What the Best College Teachers Do</i>	SUMMER 2014
Book: <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	MAR 2015, SEP 2016
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
The Colorado College Mathematics Seminar	APR 2010

Service

To the Profession

Committee Member, AWM [Committee on Policy and Advocacy](#) S 2018–PRESENT

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 Undergrad. Women in Math (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

Speaker

The Arthur Levitt Public Affairs Center *Gerrymandering: The Math Behind the Madness** APR 2018

The Card Catalog Project *Googling It: How Google Ranks Search Results* F 2017

The Other Side *The Mathematics of Climate Change* F 2015

Emmerson Literary Society *Sudoku, Apes, and Algebra: An ELS “Tell Us What You Know” Lecture* S 2015

Sigma Xi Colloquium *Syzygy: Understanding Relationships among Polynomials* S 2014

Referee/Reviewer

Amer. Math. Monthly

J. Commut. Algebra

J. Algebra Appl.

Mathematical Reviews

Minnesota J. of Undergrad. Math.

Comm. Algebra

Co-Founder, Co-Organizer, Co-PI

KUMUNUjr Conference 2012–2013

Table Host

NCUWM 2010–2013

Outreach Volunteer

Pfizer–Novartis–LPS Science Fair Judge 2010, 2012

Saturday Science at UNL FEB 2010

To Hamilton College

Representative

Liberal Arts Consortium for Online Learning F 2017–PRESENT

Committee Member

Dean of Faculty Search Committee F 2017

Writing Advisory Committee F 2017–PRESENT

Honor Court F 2014–S 2016

Service to Phi Beta Kappa (Epsilon of New York)

President	F 2017–PRESENT
Vice President	F 2014–S 2016
Committee on selection criteria	S 2014

Calculus Czar

Hamilton Math Department	F 2017–PRESENT
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Consultant

Counseling Center usage statistics and projections for David Walden	F 2016
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Focus Group Member

Ellucian advising tool for Registrar's Office	S 2016
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Faculty Advisor

Hamilton College Student Chapter of the Association for Women in Mathematics	F 2017–PRESENT
Hamilton College Vegan Club	F 2014–S 2015, F 2017–PRESENT

Mathletics Coach (Putnam Team)

with Prof. Andrew Dykstra	F 2013, F 2014
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Caucus Participant

Junior Faculty Caucus	S 2014–PRESENT
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Academic Advisor

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To University of Nebraska–Lincoln

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

<i>Chronicle of Higher Ed</i> Teaching Newsletter , 10/5/17	OCT 2017
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<i>Relatively Prime</i> math podcast Diegetic Plots: Chapter 2	FEB 2016
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<i>Girls' Angle Bulletin</i> volume 8, numbers 3&4	FEB 2015, APR 2015
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Guest Columns

<i>Girls' Angle Bulletin</i> Girls' Angle	JUN 2017
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AMS <i>e-Mentoring Network Blog</i> The Four Parts of No	JUN 2017
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<i>Math Babe</i> mathbabe.org	FEB 2015
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Actor

Mathematically Bent Theater at JMM	JAN 2014, 2015, 2017
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