

# David Jensen

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## EMPLOYMENT **University of Kentucky**, Kentucky, USA

Wimberly Royster Research Professor  
Associate Professor  
Assistant Professor

July 2020 - July 2023  
June 2019 - present  
August 2013 - June 2019

## **Stony Brook University**, New York, USA

Simons Postdoc

August 2010 - 2013

## EDUCATION **University of Texas**, Texas, USA

Ph.D., Mathematics

May 2010

- Thesis Topic: Birational geometry of  $\overline{M}_{g,1}$
- Advisor: Sean Keel

## **Williams College**, Massachusetts, USA

B.A., Highest Honors in Mathematics and Philosophy

June 2004

- Thesis Topic: Completions of UFDs with Semi-Local Formal Fibers
- Advisor: Susan Loepp

## VISITING **Yale University**, Connecticut, USA

POSITIONS

August 2013 - August 2014  
January - May 2016  
June - December 2017

## PUBLICATIONS

AND

PREPRINTS

- 41 *Fibonacci Sumsets and the Gonality of Strip Graphs*  
with D. Rivera Laboy (submitted).
- 40 *On the Gonality of Ferrers Diagrams*  
with M. Morvai, W. Welch, and S. Yeomans (submitted).
- 39 *Group Theory via Quilts*  
with K. Ponto  
Mitteilungen der Deutschen Mathematiker-Vereinigung, 31, no. 4 (2023) 218–219.
- 38 *On the Semigroup of Graph Gonality Sequences*  
with A. Fessler, E. Kelsey, and N. Owen  
Australasian Journal of Combinatorics, 88 (2024), no. 3, 343–361.
- 37 *The Embedding Theorem in Hurwitz-Brill-Noether Theory*  
with K. Cook-Powell, E. Larson, H. Larson, and I. Vogt (submitted).
- 36 *Sliding Block Puzzles with a Twist: On Segerman’s  $15 + 4$  Puzzle*  
with P. Garcia, A. Hanson, and N. Owen, (submitted).
- 35 *Tropical Linear Series and Tropical Independence*  
with S. Payne, (submitted).
- 34 *Chip Firing and Algebraic Curves*  
Notices of the AMS, 68 (2021), no. 11, 1875–1881.

- 33 *What to Expect at a Large Public Research University*  
Notices of the AMS, 67 (2020), no. 6, 813–814.
- 32 *Recent Developments in Brill-Noether Theory*  
with S. Payne  
EMS Volume for the BMS Einstein Semester on Algebraic Geometry (to appear.)
- 31 *The Nonabelian Brill-Noether Divisor on  $\overline{M}_{13}$  and the Kodaira Dimension of  $\overline{R}_{13}$*   
with G. Farkas and S. Payne  
Geometry and Topology, 28 (2024), no. 2, 803–866.
- 30 *Tropical Methods in Hurwitz-Brill-Noether Theory*  
with K. Cook-Powell  
Advances in Mathematics, 398 (2022), paper no. 108199, 42 pp.
- 29 *The Kodaira Dimensions of  $\overline{M}_{22}$  and  $\overline{M}_{23}$*   
with G. Farkas and S. Payne, (submitted).
- 28 *A New Lower Bound on Graph Gonality*  
with M. Harp, E. Jackson and N. Speeter  
Discrete Applied Mathematics, 309 (2022), 172–179.
- 27 *Scrollar Invariants of Tropical Curves*  
with K. Sawyer, (submitted).
- 26 *The Motivic Zeta Functions of a Matroid*  
with M. Kutler and J. Usatine  
J. London Math. Soc. 103 (2021), no. 2, 604–632.
- 25 *Components of Brill-Noether Loci for Curves with Fixed Gonality*  
with K. Cook-Powell  
Michigan Math Journal, 71 (2022), no. 1, 19–45.
- 24 *Brill-Noether Theory for Curves of a Fixed Gonality*  
with D. Ranganathan  
Forum of Math Pi, 9 (2021), paper no. e1, 33 pp.
- 23 *Brill-Noether Theory of Curves on  $\mathbb{P}^1 \times \mathbb{P}^1$ : Tropical and Classical Approach*  
with F. Cools, M. D’Adderio and M. Panizzut  
Alg. Combin. 2 (2019), no. 3, 323–341.
- 22 *Combinatorial and Inductive Methods for the Tropical Maximal Rank Conjecture*  
with S. Payne  
Journal of Combinatorial Theory, Series A, 152 (2017), 138–158.
- 21 *Gonality of Expander Graphs*  
with N. Dutta  
Discrete Mathematics, 341 (2018), no. 9, 2535–2543.
- 20 *Tropicalization of Theta Characteristics, Double Covers, and Prym Varieties*  
with Y. Len  
Selecta Mathematica 24 (2018), no. 2, 1391–1410.
- 19 *Tropical Independence II: The Maximal Rank Conjecture for Quadrics*  
with S. Payne  
Algebra and Number Theory, 10 (2015), no. 8, 1601–1640.
- 18 *Degeneration of Linear Series From the Tropical Point of View and Applications*  
with M. Baker  
Proceedings of Simons Symposium on Nonarchimedean Geometry, (2016), 365–433.

- 17 *Toric Graph Associahedra and Compactifications of  $M_{0,n}$*   
with R. Feirrer da Rosa and D. Ranganathan  
Journal of Algebraic Combinatorics, 43 (2015), no. 1, 139–151.
- 16 *Realization of Groups with Pairing as Jacobians of Finite Graphs*  
with L. Gaudet, D. Ranganathan, N. Wawrykow and T. Weisman  
Annals of Combinatorics, 22 (2018), no. 4, 781–801.
- 15 *Gonality of Random Graphs*  
with A. Deveau, J. Kainic and D. Mitropolsky  
Involve, a Journal of Mathematics, 9 (2016), no. 4, 715–620.
- 14 *The Locus of Brill-Noether General Graphs is Not Dense*  
Portugalia Mathematica, 73 (2016), no. 3, 177–182.
- 13 *Lifting Divisors on a Generic Chain of Loops*  
with D. Cartwright and S. Payne  
Canadian Mathematical Bulletin, 58 (2015), no. 2, 250–262.
- 12 *Tropical Independence I: Shapes of Divisors and a Proof of the Gieseker-Petri Theorem*  
with S. Payne  
Algebra and Number Theory, 8 (2014), no. 9, 2043–2066.
- 11 *A Simplicial Approach to the Effective Cone of  $\overline{M}_{0,n}$*   
with B. Doran and N. Giansiracusa  
International Mathematics Research Notices, (2017), no. 2, 529–565.
- 10 *Veronese Quotient Models of  $\overline{M}_{0,n}$  and Conformal Blocks*  
with A. Gibney, H. Moon and D. Swinarski  
Michigan Mathematical Journal 62 (2013), no. 4, 721–751.
- 9 *Towards a Tropical Proof of the Gieseker-Petri Theorem*  
with V. Baratham, C. Mata, D. Nguyen and S. Parekh  
Collectanea Mathematica 65 (2014), no.1, 17–27.
- 8 *Log Canonical Models and Variation of GIT for Genus 4 Canonical Curves*  
with S. Casalaina-Martin and R. Laza  
Journal of Algebraic Geometry, 23 (2014), no.4, 727–764.
- 7 *GIT Compactifications of  $M_{0,n}$  and Flips*  
with N. Giansiracusa and H. Moon  
Advances in Mathematics 248 (2013), 242–278.
- 6 *Stability of Second Hilbert Points of Canonical Curves*  
with M. Fedorchuk  
International Mathematics Research Notices, (2013), no.22, 5270–5287.
- 5 *Geometry of the Ball Quotient Model of the Moduli Space of Genus 4 Curves*  
with S. Casalaina-Martin and R. Laza  
Compact Moduli Spaces and Vector Bundles, Contemp. Math. 564 (2012), 107–136.
- 4 *Rational Fibrations of  $\overline{M}_{5,1}$  and  $\overline{M}_{6,1}$*   
Journal of Pure and Applied Algebra, 216 (2012), no.3, 633–642.
- 3 *Birational Contractions of  $\overline{M}_{3,1}$  and  $\overline{M}_{4,1}$*   
Transactions of the American Mathematical Society, 365 (2013), no.6, 2863–2879.
- 2 *Completions of UFDs with Semi-Local Formal Fibers*  
Communications in Algebra, 34 (2006), no.1, 347–360.

- 1 *Controlling Formal Fibers of Principal Prime Ideals*  
 with A. Dundon, S. Loepp, J. Provine, and J. Rodu  
 Rocky Mountain Journal of Mathematics, 37 (2007), no.6, 1871–1891.

HONORS AND AWARDS	NSF Standard Grant DMS-2054135 (\$292,882)	Summer 2021 - Summer 2025
	NSF Standard Grant DMS-1601896 (\$136,307)	Fall 2016 - Fall 2020
	AMS Simons Travel Grant	Summer 2013 - Summer 2016
	NSF Research Training Grant Fellowship	Spring 2008
	Frank Gerth III Graduate Excellence Award	Fall 2005
	Rosenberg Prize for Excellence in Mathematics	Spring 2004
PROFESSIONAL SERVICE	Three NSF Panels	
	Co-Organizer of the Workshop of the Kentucky-Ohio Algebra Alliance	Summer 2024
	Organizer of Eaves Lecture	Fall 2022
	Co-Organizer of Hayden-Howard Lecture	Spring 2019
	Organizer for AIM Workshop on Foundations for Tropical Schemes	Spring 2017
	Organizer for MSRI Summer School on Chip-Firing and Tropical Curves	Summer 2016
	Organizer for Conference on Tropical and Nonarchimedean Analytic Geometry of Moduli Spaces at Casa Matematica Oaxaca	Spring 2016
	US Based Organizer for Géométrie Algébrique en Liberté	Spring 2013
	Referee for: Advances in Geometry, Advances, Algebra and Number Theory, Annali di Matematica Pura ed Applicata, Arkiv for Matematik, Australasian Journal of Combina- torics, Bulletin of the Belgian Mathematical Society, Canadian Journal of Mathematics, CEJM, Collectanea, Communications in Algebra, Compositio, Contemp. Math., Crelle, Discrete Applied Math., Discrete Mathematics, Documenta, Duke, European Journal of Combinatorics, European Journal of Mathematics, Experimental Mathematics, Forum of Math Pi, Forum of Mathematics Sigma, Glasgow Mathematical Journal, IMRN, JEMS, Journal of Algebraic Combinatorics, Journal of the London Math Society, La Matematica, Math Annalen, Mathematical Proceedings of the Cambridge Philosophical Society, Mathe- matische Nachrichten, Manuscripta, Michigan Math Journal, MRL, Portugalia, Proceedings of the AMS, Proceedings of the AMS Summer Institute, Proceedings of Combinatorial Al- gebraic Geometry Thematic Program, Proceedings of the London Math Society, Selecta, Transactions of the AMS	
UNIVERSITY OF KENTUCKY SERVICE	Project Leader and Director of Communciations for UK Math Lab	Spring 2018 - present
	A&S DOE Taskforce for Instruction, Service, and Development	Fall 2024 and Spring 2025
	Graduate Council Representative	Fall 2024
	Royster Professorship Nominating Committee	Spring 2023
	Chair Search Committee	Spring 2021
	Speaker at A Night of Mathematical Musings	Spring 2020
	Graduate Recruiting Committee	Spring 2020

	Algebra Prelim Committee	Spring 2017 - Fall 2019, Spring and Fall 2021, Spring 2023, Spring 2024
	Tenure-Stream Hiring Committee	Fall 2016, Spring 2017, Fall 2018, Spring 2019, Fall 2024, Spring 2025
	Organizer of Algebra and Geometry Seminar	Spring 2015 - Spring 2017, Fall 2023-present
	Graduate Program Committee	Fall 2016, Spring 2017, Fall 2021 and Spring 2022
	Undergraduate Committee	Fall 2015 and Spring 2016
	Faculty Student Mentoring Program	Fall 2015
	AWM Job Search Panel	Spring 2015
	Volunteer for University of Kentucky High School Math Day for Women	Fall 2014
	Speaker for Central Kentucky Math Circle	Spring 2015 and Fall 2016
PHD		
STUDENTS	Kalila Sawyer	PhD 2020
SUPERVISED	Kaelin Cook-Powell	PhD 2021
	Noah Speeter	PhD 2023
	Angela Hanson	PhD 2023
	Eric Burkholder (pre-qualified)	PhD expected 2027
	Doel Rivera Laboy (pre-qualified)	PhD expected 2027
	Emma Pickard (pre-qualified)	PhD expected 2028
POSTDOCTORAL		
FELLOWS	Max Kutler	2018 – 2021
UNDERGRADUATE		
RESEARCH	UK Math Lab project with Haruku Aono, Owen Craig, Samuel Dalton, Kitsele Dikobe, and Ella Norris	
SUPERVISED	UK Math Lab project with Samuel Dalton, Cameron Egbert, and Ayham Yousef	
	UK Math Lab project with Marissa Morvai, Ben Welch, and Sydney Yeomans	
	UK Math Lab project with Marissa Morvai, Noah Owen, and Sydney Yeomans	
	UK Math Lab project with Austin Fessler, Kate Kelsey, and Noah Owen	
	UK Math Lab project with Patrick Garcia and Noah Owen	
	UK Math Lab project with Michael Harp and Elijah Jackson	
	UK Math Lab project with Alex Blose, Ben Cortas, Madison Howard, Elijah Jackson and Jackson Morris	
	Independent Study project with Mae Cotton	
	UK Math Lab project with Madison Howard and Elijah Jackson	
	UK Math Lab project with Jessica Appel, Jackson Morris, and Kristopher Andrew	
	Independent research project with Neelav Dutta at University of Kentucky	
	SUMRY project with Louis Gaudet, Nick Wawrykow, and Teddy Weisman at Yale	
	SUMRY project with Andrew Deveau, Jenna Kainic, and Dan Mitropolsky at Yale	
	SUMRY project with Rodrigo Ferreira da Rosa at Yale	
	Independent research project with Vyassa Baratham, Cristina Mata, Dat Nguyen, and Shalin Parekh at SUNY Stony Brook	

SERVICE AT PRIOR INSTITUTIONS	Mentor for Summer Undergraduate Math Research at Yale	Summer 2014
	Department Liaison to the Yale Undergraduate Math Society	Fall 2013 and Spring 2014
	Speaker for Brookhaven National Labs Gifted Math Program	Spring and Fall 2012
	Coordinator of Undergraduate Research Group on Tropical Geometry	Spring 2012
	Faculty Sponsor of the Stony Brook Slack-Line Club	Fall 2011 and Spring 2012
	Organizer of Academic Job Search Panel	Spring 2010
	Organizer of Saturday Morning Math Group/Austin Math Circle	Spring and Fall 2009
	Observer for Inquiry-Based Learning Mathematics Project	Fall 2008 and Spring 2009
	Volunteer for Explore UT Day (college-wide open house)	Spring 2008 and Spring 2009
	Developer and Organizer of Introduction to Algebraic Geometry Seminar	Fall 2007
	Inaugural Speaker for UT Math Club	Fall 2007
	Mentor (with tenure) at Canada/USA Mathcamp	Summer 2007
	Mentor for Intellectual Entrepreneurship Pre-Grad Internship	Spring 2007 and Fall 2008
	Organizer of Sophomore Exploratory Seminar	Spring and Fall 2006

INVITED LECTURE SERIES	• <i>A Tropical Approach to the Strong Maximal Rank Conjecture</i>	
	Brill-Noether Conference, Humboldt Universitat, Berlin, Germany	November 2019
	• <i>Tropical Brill-Noether Theory</i>	
	Roma Tre University	May 2017
	• <i>Moduli Spaces of Curves and Their Birational Geometry</i>	
	Summer School on Algebraic Geometry, Yangyang, South Korea	June 2012

INVITED TALKS	• <i>Sliding Block Puzzles with a Twist</i>	
	The Ohio State University, Columbus, OH	October 2022
	• <i>Nonabelian Brill-Noether Theory of Genus 13 Curves</i>	
	VBAC, Tufts University, MA (remote)	January 2022
	• <i>The Kodaira Dimensions of Moduli Spaces of Curves</i>	
	LMS-Bath Symposium, Bath, UK	August 2022
	Brown University, Providence, RI	March 2022
	ICM Satellite Conference, Cabo Frio, Brazil	August 2018
	Tufts University	March 2018
	AMS Sectional, The Ohio State University	March 2018
	Georgia Algebraic Geometry Symposium, Georgia Tech University	February 2018
	• <i>Linear Systems on General Curves of Fixed Gonality</i>	
	University of Arizona (remote)	September 2020
	Purdue University (remote)	September 2020
	BATMOBYLE, Brown University	November 2019
	I-70 Conference, WUSTL	November 2019
	Amherst College	April 2019
	The Ohio State University	February 2019
	Stanford University	November 2018
	Central Michigan University	October 2018
	University of Tennessee	September 2018
	University of Texas	November 2017

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| Harvard University   | October 2017   |
| Rutgers University   | October 2017   |
| Roma Tre University  | May 2017       |
| Combinatorial Moduli Spaces, Fields Institute  | December 2016  |
| • <i>A Nonarchimedean Analytic Approach to the Geometry of General Curves</i>              |                |
| Geometry at the ANU, Canberra, Australia   | August 2016    |
| New Methods in Birational Geometry, University of Toulouse, France                         | June 2016      |
| • <i>Tropicalization of Theta Characteristics</i>  |                |
| Rice University  | October 2016   |
| BATMOBYLE, Yale University   | April 2016     |
| University of Virginia   | April 2016     |
| • <i>Tropical Independence and the Maximal Rank Conjecture for Quadrics</i>                |                |
| AMS Sectional, University of Georgia   | March 2016     |
| AGNES, Brown University  | October 2015   |
| University of Illinois, Chicago  | September 2015 |
| Workshop on Degenerations in Algebraic Geometry, AIM, San Diego                            | August 2015    |
| AMS Summer Institute in Algebraic Geometry, University of Utah                             | July 2015      |
| • <i>Gonality of Random Graphs</i>   |                |
| Williams College   | September 2017 |
| Waterloo University, Canada  | November 2015  |
| University of Tennessee  | September 2014 |
| Fordham University   | July 2014      |
| • <i>Tropical Brill-Noether Theory and the Gieseker-Petri Theorem</i>                      |                |
| Simons Symposium on Nonarchimedean Geometry, Puerto Rico                                   | February 2015  |
| University of Georgia  | December 2014  |
| Emory University   | October 2014   |
| The Ohio State University  | April 2014     |
| Harvard University   | April 2014     |
| Banff International Research Station, Canada   | March 2014     |
| Yale University  | October 2013   |
| • <i>A Non-Reductive Approach to the Effective Cone of <math>\overline{M}_{0,n}</math></i> |                |
| Courant Institute  | September 2013 |
| Conference on Moduli and Birational Geometry, Pohang, South Korea                          | August 2013    |
| • <i>Hassett-Keel Program in Genus Four</i>  |                |
| University of Georgia  | March 2013     |
| Oklahoma State University  | February 2013  |
| University of Kentucky   | January 2013   |
| University of South Carolina   | January 2013   |
| American Institute of Mathematics  | December 2012  |
| The Ohio State University  | December 2012  |
| Columbia University  | November 2012  |
| Princeton University   | October 2012   |
| Stony Brook University   | April 2012     |
| Workshop on Moduli and Birational Geometry, Gyeongju, South Korea                          | July 2011      |
| • <i>Flips Between Compactifications of <math>M_{0,n}</math></i>                           |                |
| Boston College   | April 2013     |
| University of Texas  | September 2012 |
| Rice University  | September 2012 |
| Yale University  | September 2012 |
| University of Georgia  | January 2012   |
| University of Massachusetts, Amherst   | October 2011   |
| • <i>Curves, Chip Firing, and Catalan Numbers</i>  |                |
| Fordham University   | July 2014      |
| Washington and Lee University  | February 2013  |

- *Towards a Tropical Proof of the Gieseker-Petri Theorem*  
University of Colorado Colloquium November 2012  
Simons Postdoctoral Fellows Meeting April 2012
- *Beyond the Boundary: Log Minimal Models for the Moduli Space of Curves*  
University of Colorado November 2012  
Joint Mathematics Meetings, Special Session on Algebraic Geometry January 2011  
Stony Brook University September 2010
- *Rational Fibrations of  $\overline{M}_{g,1}$*   
Workshop on Moduli and Birational Geometry, Busan, South Korea July 2012  
Brown University March 2011  
Rice University April 2010  
University of Texas October 2009  
Texas A & M University March 2009

TEACHING  
EXPERIENCE

**Classes Taught at University of Kentucky**

- Math and Democracy Fall 2022 and Spring 2023
- Calculus I for the Life Sciences Spring 2020 and 2022
- Modern Algebra Fall 2015 and Spring 2020
- Rings and Modules Fall 2019, 2021, and 2024
- Chip Firing Spring 2019
- Matrix Algebra Fall 2018
- Introduction to Algebraic Geometry Spring 2018 and Fall 2022
- History of Math Spring 2018, Fall 2021 and Fall 2023
- Graduate Modern Algebra Fall 2016, Spring 2017, Fall 2023
- Calculus I Spring 2017 and Fall 2018
- Graduate Linear Algebra Fall 2015 and 2024
- Introduction to Algebraic Curves Spring 2015
- Calculus IV Fall 2014
- Introduction to Number Theory Fall 2014

**Classes Taught at Yale University**

- Undergraduate Algebraic Geometry Spring 2016
- Tropical Brill-Noether Theory Spring 2016
- Calculus I Spring 2014
- Algebraic Curves and Linear Series Fall 2013

**Classes Taught at Stony Brook University**

- Graduate Problem Seminar Fall 2011 and 2012
- Differential Equations with Linear Algebra Spring 2012
- Logic, Language and Proof Fall 2011
- Mathematical Puzzles and Games Spring 2011
- Introduction to Mathematical Thinking Spring 2011
- Calculus B Spring 2013 and Fall 2010

**Assistant Instructor Positions Held at the University of Texas**

- Saturday Morning Math Group and Austin Math Circle Spring and Fall 2009
- Foundations of Arithmetic Fall 2008

**Classes Taught at Canada/USA Mathcamp**

Summer 2007

- Algebraic Geometry
- Nonstandard Analysis
- Mathematics of Juggling



- Mathematics of Elections
- Constructible of Not?
- How to Win the Finite Group Game

STUDENT		
EXAMINATION	Ali Alsteri	Qualifying, February 2023
COMMITTEES	Kaelin Cook-Powell	Masters, February 2018 Qualifying, January 2020 PhD, June 2021
	Sarah Church	Qualifying, April 2023
	Joe Cummings	Masters, September 2018 Qualifying, March 2019
	Jessica Doering	Masters, April 2018
	Courtney George	Masters, September 2019 PhD, May 2023
	Will Gustafson	Qualifying, November 2019 PhD, April 2023
	Angela Hanson	Masters, October 2019 Qualifying, March 2021 PhD, April 2023
	Isaiah Harney	Masters, October 2014
	Casey Hill	Qualifying, November 2022
	Eric Kaper	Masters, September 2015 Qualifying, December 2015
	Anupam Kumar	Masters, April 2017
	Hunter Lehmann	Masters, April 2018 Qualifying, November 2018 PhD, June 2021
	Marie Meyer	Qualifying, October 2016 PhD, April 2018
	Michael Morrow	Masters, April 2021 Qualifying, December 2022
	McCabe Olsen	Masters, April 2015
	Darleen Perez-Lavin	PhD, March 2021
	Rachel Petrik	Qualifying, April 2017 PhD, April 2020
	Robert Pfeiffer	Qualifying, January 2017 PhD, April 2018
	Ya Qi	PhD, July 2022
	Eric Roemmele	PhD, April 2019
	Felix Röhrle	PhD, January 2023
	Kalila Sawyer	Masters, April 2017 Qualifying, February 2018 PhD, March 2020

Noah Speeter	Qualifying, March 2021 PhD, May 2023
Bill Trok	Qualifying, October 2016 PhD, April 2020
Menghan Wang	PhD, April 2023
Jay White	Masters, November 2016 Qualifying, September 2017 PhD, April 2021
Xiaowen Zhan	PhD, October 2018