

Jose Israel Rodriguez

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EMPLOYMENT

Assistant Professor, Department of Mathematics	2020-Present
Van Vleck Visiting Assistant Professor, Department of Mathematics	2018-2020
University of Wisconsin-Madison, WI	
Other affiliations: Affiliate Faculty, Department of Electrical & Computer Engineering; Affiliate Faculty, Institute for Foundations of Data Science	
Provost's Postdoctoral Scholar, Department of Statistics	2016-2018
NSF Postdoctoral Fellow, Department of Statistics	2015-2016
The University of Chicago, Chicago, IL	
Mentor: Lek-Heng Lim	
NSF Postdoctoral Fellow, Applied & Computational Mathematics and Statistics	2014-2015
University of Notre Dame, Notre Dame, IN	
Mentor: Jonathan Hauenstein	

EDUCATION

Doctor of Philosophy, Mathematics	
University of California, Berkeley	May 2014
Thesis: Numerical algebraic geometry for maximum likelihood estimation	
Advisor: Bernd Sturmfels	
Bachelor of Science, Mathematics	
University of Texas at Austin	May 2010
Thesis: Bounding the degree of Belyi polynomials	
Advisor: Eric Katz	

PEER REVIEWED PUBLICATIONS (Selected Fifteen)

1. L. G. Maxim, J. I. Rodriguez, B. Wang, and L. Wu, *Logarithmic cotangent bundles, Chern-Mather classes, and the Huh-Sturmfels involution conjecture*, Comm. Pure Appl. Math., 77 (2024), pp. 1486–1508.
2. M. Hill, S. Roch, and J. I. Rodriguez, *Maximum Likelihood Estimation for Unrooted 3-Leaf Trees: An Analytic Solution for the CFN Model*, Bull. Math. Biol., 86 (2024), p. Paper No. 106.
3. L. G. Maxim, J. I. Rodriguez, B. Wang, and L. Wu, *Linear optimization on varieties and Chern-Mather classes*, Adv. Math., 437 (2024), pp. Paper No. 109443, 22.
4. T. Duff, A. Leykin, and J. I. Rodriguez, *u-generation: solving systems of polynomials equation-by-equation*, Numer. Algorithms, 95 (2024), pp. 813–838.
5. J. Lindberg, N. Nicholson, J. I. Rodriguez, and Z. Wang, *The maximum likelihood degree of sparse polynomial systems*, SIAM J. Appl. Algebra Geom., 7 (2023), pp. 159–171.
6. J. D. Hauenstein, A. Leykin, J. I. Rodriguez, and F. Sottile, *A numerical toolkit for multiprojective varieties*, Math. Comp., 90 (2021), pp. 413–440.

7. J. I. Rodriguez, J.-H. Du, Y. You, and L.-H. Lim, *Fiber product homotopy method for multiparameter eigenvalue problems*, Numer. Math., 148 (2021), pp. 853–888.
 8. T. Brysiewicz, J. I. Rodriguez, F. Sottile, and T. Yahl, *Solving decomposable sparse systems*, Numer. Algorithms, 88 (2021), pp. 453–474.
 9. L. G. Maxim, J. I. Rodriguez, and B. Wang, *Euclidean distance degree of the multiview variety*, SIAM J. Appl. Algebra Geom., 4 (2020), pp. 28–48.
 10. J. I. Rodriguez and B. Wang, *The maximum likelihood degree of mixtures of independence models*, SIAM J. Appl. Algebra Geom., 1 (2017), pp. 484–506.
 11. C. Améndola, N. Bliss, I. Burke, C. R. Gibbons, M. Helmer, S. Hoşten, E. D. Nash, J. I. Rodriguez, and D. Smolkin, *The maximum likelihood degree of toric varieties*, J. Symbolic Comput., 92 (2019), pp. 222–242.
 12. (Accepted) Y. Alexandr, M. Bakenhus, M. Curiel, S. K. Deshpande, E. Gross, Y. Gu, M. Hill, J. Johnson, V. Kagy, Bryson Karwa, J. Li, H. Lyu, S. Petrovic, and J. I. Rodriguez, *New directions in algebraic statistics: Three challenges from 2023*, Journal of Algebraic Statistics.
 13. (Accepted) J. Lindberg, C. Améndola, and J. I. Rodriguez, *Estimating Gaussian mixtures using sparse polynomial moment systems*, SIAM Journal on Mathematics of Data Science.
 14. (Accepted) L. G. Maxim, J. I. Rodriguez, and B. Wang, *Applications of singularity theory in applied algebraic geometry and algebraic statistics*, arXiv: 2305.19842, Handbook of Singularities.
 15. (Accepted) M. Hill and J. I. Rodriguez, *A maximum likelihood estimator for quartets under the Cavender-Farris-Neyman model*, ACM Communications of Computer Algebra.
- ***Awarded Distinguished Software Presentation at ISSAC 2024

FUNDING, HONORS, AND AWARDS

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|--|-----------|
| • Alfred P. Sloan Fellow, Sloan Foundation | 2023-2025 |
| • Nellie McKay Fellow, University of Wisconsin — Madison | 2022-2023 |
| • NSF Award 2408333 <i>Conference: GAeL XXXI (Geometrie Algebrique en Liberte)</i> | 2024 |
| • Fall Research Competition (PI)
<i>Nonlinear Algebra for Unbalanced Procrustes Problems</i> | 2024 |
| • Institute for Mathematical and Statistical Innovation (Long Program)
<i>Algebraic statistics and our changing world: New methods for new challenges</i> | Fall 2023 |
| • Fall Research Competition (PI)
<i>Algebraic Degree of Polynomial Optimization</i> | 2022 |
| • ICERM Hot Topics Workshop
<i>Galois Groups in applications and Enumerative geometry</i> | 2020 |
| • US Junior Oberwolfach Fellow | 2020 |
| • Resident Honored Instructor | 2019 |
| • Lathisms Feature | 2017 |
| • Chancellor's Fellowship, University of California, Berkeley | 2010 |
| • Williams Scholar, University of Texas at Austin | 2010 |
| • Ronald E. McNair Scholar, University of Texas at Austin | 2008 |

TRAINING STUDENTS

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| 1. Bella Finkel (UW Madison Mathematics)
Specialty: <i>Applied algebra for physics</i> | 2024-Current |
| 2. Caitlin Davis (UW Madison Mathematics)
Specialty: <i>Homological properties of nonstandard graded rings</i> | 2023-Current |
| 3. Boyana Martinova (UW Madison Mathematics)
Specialty: <i>Veronese subrings in the non-standard graded setting</i> | 2023-Current |

4. Aviva Englander (UW Madison Mathematics) 2023-Current
Specialty: *Phylogenetic invariants for level-k networks*
5. Zinan Wang (Ph.D., UW Madison Mathematics) 2020-2024
Applied algebra in kinematics of a spatial serial robot
6. Julia Lindberg (Ph.D., UW Madison ECE) 2020-2022
Applications of convex algebraic geometry to power systems, statistics, and optimization

Masters students mentored

7. Nikou Lei (M.A., UW Madison Mathematics) 2024-2025
Noetherian operators and linear PDEs with constant coefficients
8. Emma Thomas (M.A., UW Madison Mathematics) 2022-2023
Invitation to Nonlinear Algebra
9. Yiling You (M.A., University of Chicago Statistics) 2016-2018
Polynomial eigenvalue problems

Undergraduate research supervised

10. Noah Blum, Moulik Mehta, and Yutaro Yokoyama 2023
Madison Experimental Mathematics Lab
Algebra in Systems Biology: The Hunt for Positive Real Solutions
11. Mengwei Sun (Undergraduate, UW Madison) 2022-2023
Beyond linear algebra
12. Lina Liu (Undergraduate **McNair Scholar**, UW Madison) 2020-2022
Galois groups
13. Xinyang Hu (Undergraduate, UW Madison) 2020-2021
Algebraic statistics: Maximum likelihood degrees of log-linear models
14. Joel Steinberg (Undergraduate, UW Madison) 2020
Algebraic kinematics
15. Xiabin Li (Undergraduate, UW Madison) 2019-2020
Numerically computing Euler characteristics

Postdocs mentored

16. Thomas Yahl 2023-2026
Van Vleck Visiting Assistant Professor

TEACHING

Topics courses developed

- MATH/ECE 842: Topics in Applied Algebra: *Varieties, applications and polynomial systems*
- MATH/ECE 842: Topics in Applied Algebra: *Algebraic Statistics*

Additional courses taught at UW Madison

- MATH 234 Calculus—Functions of Several Variables
- MATH 341 Linear Algebra
- MATH 443 Applied Linear Algebra
- MATH 221 Calculus and Analytic Geometry 1

SERVICE AND ORGANIZING

Conferences

- *SIAM Applied Algebra and Geometry (AG25)*, lead local organizer July 2025
 - *ISSAC Tutorial Chair* July 2024
 - *ICERM Hot Topics: Galois Groups in applications and Enumerative geometry* Fall 2020
- NSF IMSI Long program: Algebraic Statistics and Our Changing World** Fall 2023
- *Questions and Consulting Seminar Organizer*

- *Spotlights and Treats Organizer*
- *Daily Debrief Organizer*
- *An invitation to Algebraic Statistics Workshop (5 days) Organizer*

Seminar series organized

- *Applied Algebra Seminar* 2018-Current
- *SIAM Seminar in Applied Geometry and Algebra (SAGA)* 2020-2022
- *Algebraic Geometry Seminar* (University of Chicago) 2016-2017

Local events and service

- Center for Academic Excellence (CAE) Panelist on academic success. August, 2022
- ASAI (Algebraic Statistics Afternoon Impromptu) August 2022
- Junior Math Faculty Virtual Meet-and-Greet 2020-2021
- UW Madison Mathematics Colloquium Organizer 2020-2021
- Postdoc panel: Discussing job applications, CVs, and research statements. 2019
- Matroids Seminar Organizer: Graduate student seminar and reading group 2019

Short meetings organized

- *Matroids day 2* (University of Wisconsin, Madison, WI) 2022
- *Numerical algebraic geometry day* (Georgia Tech School of Math, Atlanta, GA) 2019
- *Matroids day* (University of Wisconsin, Madison, WI) 2019

Networking and mentoring activities

- *Meet the algebra speakers* (Marina Garrota and Teresa Yu) 2023
- *Meet the algebra speaker* (Colby Long) and applying to liberal arts colleges 2022
- *How to AG21?* (Virtual) 2021
- *Meet and greet with treats* (Pre-AMS Sectional Event) 2019

Special sessions and minisymposia organized

- *Joint Mathematics Meetings*
 1. Algebraic Statistics In Our Changing World, Seattle, Washington 2025
 2. Theory and Applications of Numerical Algebraic Geometry, Boston, MA 2017
- *AMS Sectional Special Sessions*
 3. Applications of Algebra and Geometry, University of Wisconsin — Milwaukee 2024
 4. Applications of Algebra and Geometry, University of Wisconsin — Madison 2019
- *SIAM Mathematics of Data Science*
 5. Algebraic Geometry and Machine Learning, Atlanta, Georgia 2024
- *SIAM Annual Meeting Minisymposia*
 6. Numerical Differential Geometry Meets Numerical AG, Portland, Oregon 2018
 7. Algebraic Statistics: Data Analysis, Portland Oregon 2018
 8. Algebraic Statistics, Daejeon, South Korea 2016
- *SIAM Applied Algebraic Geometry Minisymposia*
 9. Numerical methods in algebraic geometry, Eindhoven, Netherlands 2023
 10. Algebraic Statistics Bern, Switzerland 2019
 11. Numerical Methods in Algebraic Geometry, Bern, Switzerland 2019
 12. Likelihood Geometry, Atlanta, Georgia 2017
 13. Maximum Likelihood Degrees and Critical Points, Daejeon, South Korea 2015
- *Latinx in the Mathematical Sciences Conference*
 14. Algebra and combinatorics session, IPAM 2022
- *Joint Statistics Meetings*
 15. Algebraic Statistics Contributed Session 2018