Jose Israel Rodriguez (Research Group Activity Log)

September 2025 - August 2026

06.**22 to 06**.**26** *Taking a Europe trip that is looking to be extended.*

> Topic: Neural networks
> *Metric Algebraic Geometry*, Institut Mittag-Leffler.

10.07 *Giving a virtual seminar!*

> Activation degree thresholds for polynomial neural networks
> *Codes and Expansions (CodEx) Seminar*, Virtual.

10.**03 to 10**.**05** *Giving a virtual seminar!*

> Activation degree thresholds for polynomial neural networks
> *Algebraic Methods in Mathematical Machine Learning*, 5th Biennial Meeting of the Pacific Northwest Section of SIAM, University of Washington ⋄.

08.**28 to 09**.**01** *I'm visiting Carlos Arreche at UT Dallas!* ⋄

> Discussion: Applications of Galois Groups
> *UT Dallas*, Dallas, TX.

September 2024 - August 2025

Cheers! Cheng received a travel award to attend the Iliad Conference on theoretical AI alignment at UC Berkeley ⋄

08.04 *Accepted to the Journal of Algebraic Statistics!*

> B. FINKEL, J. I. RODRIGUEZ, C. WU, AND T. YAHL, *Activation degree thresholds and expressiveness of polynomial neural networks*, 2025. `arXiv: 2408.04569`

Cheers! Aviva was accepted to a Graduate Research Training Program hosted by UH Manoa

08.**01** *Newly revised!*

> P. MILENKOVIC, J. I. RODRIGUEZ, AND Z. WANG, *Encircling singularities of a serial robot to find alternative inverse-kinematic solutions*, Doi:10.2139/ssrn.4946800, (2024). `DOI`

Cheers! Haley gave a talk on our joint work at ISSAC2025 ⋄

07.**21 to 07**.**25** *I visited Chicago to organize a conference!*

> New directions in Algebraic Statistics
> *Institute in Mathematical and Statistical Innovation*, Chicago, IL.

Cheers! Max and I organized an Applied Algebra day here at UW Madison ⋄

Cheers! Aviva was awarded an IFDS Research RA for Fall 2025

Cheers! SIAM AG25 was hosted here at UW Madison with a US record number of participants. Max, George, Botong and I were local organizers and many of the caucuses had additional participation

07.27 *Accepted to the Journal of Mathematical Biology (JOMB)!*

O. Henriksson, C. Amendola, J. I. Rodriguez, and P. Y. Yu, *Maximum likelihood estimation of log-affine models using detailed-balanced reaction networks*, Journal of Mathematical Biology *(To appear)*, (2024). `arXiv: 2411.07986`

07.09 *I gave a talk at SIAM AG25!*

Activation degree thresholds for polynomial neural networks
Algebraic Geometry and Machine Learning Special Session, SIAM 2025 Applied Algebraic Geometry, Madison, WI.

Cheers! Thomas organized a Macaulay2 conference ⋄

Cheers! Aviva gave a talk at SIAM AG in the *Discriminants in Evolutionary Biology* minisymposium ⋄

Cheers! Aviva and Bella attended the SLMath summer school New Perspectives on Discriminants and Applications ⋄

Cheers! Bella was awarded travel funding to attend the graduate student workshop Geometry, Topology, Algebra at Temple University ⋄

Cheers! Bella was awarded travel funding to attend the Summer School in Total Positivity and Quantum Field Theory at Harvard CMSA in Cambridge, Massachusetts ⋄

Cheers! Bella organized a special session at the AWM Research Symposium ⋄

Cheers! Aviva was awarded travel funds to visit the Fields Institute Workshop on Applications of Commutative Algebra ⋄

5.07 *I visited Ananth at Northwestern!*

Activation degree thresholds for polynomial neural networks
Algebraic Geometry Seminar, Northwestern University.

Cheers! Aviva's new paper is on the bioarxiv ⋄, and she won a Travel Award for SIAM AG25 to speak about this work

Cheers! Nikou is joining the University of British Columbia Math Phd program

03.27 *I gave a talk in Munich at an Algebraic Statistics conference!* ⋄

Activation degree thresholds for polynomial neural networks
Algebraic Statistics 2025, Munich, Germany.

Cheers! Aviva gave a lighting talk at the conference Matroids, Rigidity, and Algebraic Statistics hosted by ICERM ⋄

03.01 **to 03**.02 *I attended CA+ to give a talk, and Aviva gave a lightning talk!* ⋄

Curves, surfaces, and applied algebraic geometry
Commutative Algebra +, Iowa State, Ames, Iowa.

03.01 *Newly published article!*

L. T. G. Maxim, J. I. Rodriguez, and B. Wang, *Applications of singularity theory in applied algebraic geometry and algebraic statistics*, in Handbook of geometry and topology of singularities VII, Springer, Cham, [2025] ©2025, pp. 767–818. `DOI`

02.18 *I visited Tim Duff!*

The geometry of economic fragility and supply chain shocks
Math and Data Seminar, University of Missouri, Columbia, Missouri.

02.11 *Newly published article!*

A. K. ENGLANDER AND J. I. RODRIGUEZ, *Towards learning the positive real discriminant of the Wnt signaling pathway shuttle model*, ACM Commun. Comput. Algebra, 58 (2024), pp. 85–88. `DOI`

01.**10** *Newly published article!*

M. HILL AND J. I. RODRIGUEZ, *A maximum likelihood estimator for quartets under the Cavender-Farris-Neyman model*, ACM Commun. Comput. Algebra, 58 (2024), pp. 35–38. `DOI`

Newly published article!

J. LINDBERG, C. AMÉNDOLA, AND J. I. RODRIGUEZ, *Estimating Gaussian mixtures using sparse polynomial moment systems*, SIAM J. Math. Data Sci., 7 (2025), pp. 224–252. `DOI`

01.**07** *I gave a talk at JMM!*

The geometry of economic fragility and supply chain shocks
JMM 2025 Special Session, Seattle, Washington.

12.**03** *Newly published article!*

Y. ALEXANDR, M. BAKENHUS, M. CURIEL, S. K. DESHPANDE, E. GROSS, Y. GU, M. HILL, J. JOHNSON, B. KAGY, V. KARWA, J. LI, H. LYU, S. PETROVIĆ, AND J. I. RODRIGUEZ, *New directions in algebraic statistics: three challenges from 2023*, Algebr. Stat., 15 (2024), pp. 357–382. `DOI`

09.**14** – **09**.**05** *I visited UTSA for a special session!* ⋄

The geometry of economic fragility and supply chain shocks
AMS Special Session: Applications of Algebraic Geometry, San Antonio, Texas.

Cheers! Bella was awarded travel funding to attend the Combinatorics of Fundamental Physics Workshop at IAS in Princeton, NJ

Cheers! Aviva was accepted to the long program at ICERM on Phylogenetic Networks