

## Luis David García Puente

Department of Mathematics and Computer Science  
Colorado College  
Colorado Springs, CO, 80903

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<https://luisgarciapuate.github.io>

### Professional Preparation

#### Universidad Nacional Autónoma de México (UNAM)

*B.S. Mathematics (with Honors)*

Mexico City, México

1999

#### Virginia Polytechnic Institute and State University

*Ph.D. Mathematics*

Blacksburg, VA

2004

- Advisor: Reinhard Laubenbacher
- Dissertation: Algebraic Geometry of Bayesian Networks

#### University of California, Berkeley

*Postdoctoral Fellow*

Berkeley, CA

Summer 2004

- Mentor: Lior Pachter

#### Mathematical Sciences Research Institute (MSRI)

*Postdoctoral Fellow*

Berkeley, CA

Fall 2004

- Mentor: Bernd Sturmfels

#### Texas A&M University

*Visiting Assistant Professor*

College Station, TX

2005 – 2007

- Mentor: Frank Sottile

### Appointments

#### Colorado College

*Department Chair of Mathematics and Computer Science*

Colorado Springs, CO

2023 –

#### Colorado College

*Professor of Mathematics and Computer Science*

Colorado Springs, CO

2021 –

#### Sam Houston State University

*Professor of Mathematics*

Huntsville, TX

2019 – 2021

#### Sam Houston State University

*Associate Department Chair*

Huntsville, TX

Fall 2017 – 2021

#### Sam Houston State University

*Associate Professor of Mathematics*

Huntsville, TX

2013 – 2019

#### Statistical and Applied Mathematical Sciences Institute

*SAMSI New Researcher fellowship*

Research Triangle Park, NC

Spring 2009

#### Sam Houston State University

*Assistant Professor of Mathematics*

Huntsville, TX

2007 – 2013

#### Virginia Bioinformatics Institute (Virginia Tech)

*Graduate Research Assistant*

Blacksburg, VA

Spring 2004

**Virginia Polytechnic Institute and State University**

*Graduate Teaching Assistant*

Blacksburg, VA

2002 – 2003

**University of Genova**

*Research Fellow*

Genova, Italy

Fall 2002

– Mentor: Lorenzo Robbiano

**Physical Science Laboratory (New Mexico State University)**

*Graduate Research Fellow*

Las Cruces, NM

Summer 2000

**New Mexico State University**

*Graduate Teaching Assistant*

Las Cruces, NM

1999-2001

**Universidad Nacional Autónoma de México (UNAM)**

*Ayudante de Profesor tipo A (Teaching Assistant)*

Mexico City, Mexico

1997-1998

## Research Interests

Algebraic Statistics, Applied and Computational Algebraic Geometry, Algebraic Combinatorics

## Honors and Awards

**American Mathematical Society**

*Fellow of the American Mathematical Society*

2022 Class

**Lathisms: Latin@s and Hispanics in the Mathematical Sciences**

*Featured Mathematician in honor of the Hispanic Heritage Month*

Notices of the AMS

October 2016

**Sistema Nacional de Investigadores**

*Investigador Nacional Nivel I*

Consejo Nacional de Ciencia y Tecnología, México

2015 – 2017

**Sociedad Matemática Mexicana**

*Sotero Prieto Award*

México

1999

– Nationwide honor awarded for the best undergraduate mathematics thesis of the year awarded by the Mexican Mathematical Society.

## Grants

**Colorado College 2023 Open Education Curriculum Development Grant**

\$2,000.00

**Colorado College 2022 Summer Student Collaborative Research (SCoRe) Grant**

\$8,000.00

– PI in the proposal “Exploring small Ramsey numbers”.

**Colorado College 2022-2023 Faculty Scholarship Development Teaching-Release Block Award**

**2020 American Institute of Mathematics SQuaRE program**

– AIM SQuaRE project on “Algebraic Geometry of Chemical Reaction Networks”. SQuaRE members: Elizabeth Gross, Heather A. Harrington, Nicolette Meshkat, Anne Shiu, and Luis David García Puente

**American Mathematical Society Travel Grant**

\$1,350.00

– Travel grant to attend the 2017 Mathematical Congress of the Americas in Montréal, Canada.

<b>SHSU EURECA' Summer 2017 Faculty and Student Team (FAST) Award</b>	\$8,000.00
– PI in the proposal “Computational Algebraic Geometry Applications to Theoretical Neuroscience”.	
<b>SACNAS Mini-Collaboration Grant</b>	\$3,135
– Funded through award DMS 1643235 (PI: Pamela E. Harris and Shannon Talbott).	
<b>National Science Foundation DMS - Combinatorics</b>	\$5,650.00
<i>Award Number: 1633874</i>	<b>2016</b>
– Co-PI in the proposal “CombinaTexas 2016: A South-Central Combinatorics Conference”.	
<b>2015–2017 American Institute of Mathematics SQuaRE program</b>	
– AIM SQuaRE project on “Ideals in algebraic systems biology”. SQuaRE members: Elizabeth Gross, Heather A. Harrington, Nicolette Meshkat, Anne Shiu, and Luis David García Puente	
<b>National Science Foundation DMS - Mathematical Biology</b>	\$15,000.00
<i>Award Number: 1503562</i>	<b>2015</b>
– Co-PI in the proposal “ACSB 2015: A Conference on Algebraic and Combinatorial Approaches in Systems Biology”.	
<b>National Security Agency Research Experience for Undergraduates</b>	\$58,530.00
<i>Award Number: H98230-14-1-0131</i>	<b>2013</b>
– Co-PI in the proposal “Pacific Undergraduate Research Experience in Mathematics”.	
<b>2013 Simons Foundation Collaboration Grants for Mathematicians</b>	\$35,000.00
<i>Award Number: 282241</i>	<b>2013</b>
– PI in the proposal “Applied Algebraic Geometry”.	
<b>Institute for Computational and Experimental Research in Mathematics</b>	\$1,600.00
– ICERM travel grant to attend the 2013 Modern Math Workshop and the 2013 SACNAS National Conference in San Antonio, TX. October 2013. (approx. amount.)	
<b>2013 American Mathematical Society Travel Grant</b>	\$1,600.00
– Travel grant to attend the 2013 Mathematical Congress of the Americas in Guanajuato, Mexico.	
<b>SHSU Faculty Research Grant (FRG) 2012</b>	\$5,000.00
– PI in the proposal “Rational Linear Precision of Toric Bézier Volumes”.	
<b>NSF Conferences and Workshops in the Mathematical Sciences</b>	\$9,110.00
<i>DMS-1101781</i>	<b>Accepted 2010</b>
– PI in the proposal “CombinaTexas 2011: A two-day conference focusing on algebraic combinatorics”.	
<b>NSA Mathematical Sciences Program – Conferences and Special Situations</b>	\$10,000.00
<i>Grant #22050</i>	<b>2011</b>
– co-PI in the proposal “CombinaTexas 2011: A two-day conference focusing on algebraic combinatorics”.	
<b>NSF Travel Award (administered by the University of Alaska Fairbanks)</b>	\$2,000.00
– Travel award to support attendance to the Kickoff Workshop on Algebraic Geometry in the Sciences at the Centre of Mathematics for Applications, University of Oslo, Norway.	
<b>2007 Norman Hackerman Advanced Research Program (ARP)</b>	\$144,000.00
<i>grant no. 010366-0054-2007</i>	<b>2008 – 2010</b>

- Collaborative project with Frank Sottile entitled “Applications of Algebraic Geometry to Algebraic Statistics and Geometric Modeling”.

#### Internal Texas A&M University Grant

2006

- Awarded in support of the proposal “Mathematical Foundations for Probabilistic Boolean Networks” submitted to the Career Awards at the Scientific Interface program of the Burroughs Wellcome Fund.

## Publications

1. Luis David García Puente, Elizabeth Gross, Heather A. Harrington, Matthew Johnston, Nicolette Meshkat, and Anne Shiu. Absolute concentration robustness: algebra and geometry. In progress.
2. Luis David García Puente, Marina Garrote-López, Elima Shehu. Computing algebraic degrees of phylogenetic varieties. Submitted to Algebraic Statistics. <https://arxiv.org/abs/2210.02116>
3. Carlos Améndola, Luis David García Puente, Roser Homs, Olga Kuznetsova, Harshit Motwani. Computing maximum likelihood estimates for Gaussian graphical models with Macaulay2. *Journal of Software for Algebra and Geometry* Vol. 12 (2022), 1-10. DOI: 10.2140/jsag.2022.12.1 <https://msp.org/jsag/2022/12-1/p01.xhtml>
4. Kassie Archer, Abigail Bishop, Alexander Diaz-Lopez, Luis David García Puente, Darren Glass, Joel Louwsma. Arithmetical structures on bidents. *Discrete Mathematics*. Volume 343, Issue 7, July 2020, 111850. <https://doi.org/10.1016/j.disc.2020.111850>
5. Benjamin Braun, Hugo Corrales, Scott Corry, Luis David García Puente, Darren Glass, Nathan Kaplan, Jeremy L. Martin, Gregg Musiker, and Carlos E. Valencia. Counting arithmetical structures on paths and cycles. *Discrete Mathematics* Volume 341, Issue 10, October 2018, Pages 2949–2963. <https://doi.org/10.1016/j.disc.2018.07.002>
6. Rebecca Garcia, Luis David García Puente, Ryan Kruse, Jessica Liu, Dane Miyata, Ethan Petersen, Kaitlyn Phillipson, and Anne Shiu. Gröbner bases of neural ideals. *International Journal of Algebra and Computation*. Vol. 28, No. 04, pp. 553–571 (2018) <https://doi.org/10.1142/S0218196718500261>
7. David Kahle, Ruriko Yoshida, and Luis Garcia-Puente. Hybrid schemes for exact conditional inference in discrete exponential families. *Ann Inst Stat Math* **70**, 983–1011 (2018). <https://doi.org/10.1007/s10463-017-0615-z>
8. Ethan Petersen, Nora Youngs, Ryan Kruse, Dane Miyata, Rebecca Garcia, Luis David García Puente (2018) Neural Ideals in SageMath. In: Davenport J., Kauers M., Labahn G., Urban J. (eds) *Mathematical Software – ICMS 2018*. ICMS 2018. Lecture Notes in Computer Science, vol 10931. Springer, Cham. [https://doi.org/10.1007/978-3-319-96418-8\\_22](https://doi.org/10.1007/978-3-319-96418-8_22)
9. Carlos Améndola, Marta Casanellas, Luis David García Puente. Tapas of Algebraic Statistics. *Notices of the American Mathematical Society* Volume 65, Number 8, September 2018, Pages 936–938. <https://www.ams.org/journals/notices/201808/rnoti-p936.pdf>
10. Demara Austin, Megan Chambers, Rebecca Funke, Luis David García Puente and Lauren Keough. The multivariate avalanche polynomial. *The Australasian Journal of Combinatorics*. Volume **72(3)** (2018), Pages 421–445. [https://ajc.maths.uq.edu.au/pdf/72/ajc\\_v72\\_p421.pdf](https://ajc.maths.uq.edu.au/pdf/72/ajc_v72_p421.pdf)

11. Luis David García-Puente. Multisided toric Bézier patches. In *Multivariate Splines and Algebraic Geometry* (organized by H. Schenck, L. Schumaker and T. Sorokina). Oberwolfach Reports. Volume **12**, Issue 2, 2015, pp. 1139–1200. Part of DOI: <https://doi.org/10.4171/owr/2015/21>
12. Paola Vera-Licona, Abdul Jarrah, Luis David García-Puente, John McGee, and Reinhard Laubenbacher. An algebra-based method for inferring gene regulatory networks. *BMC Systems Biology* 2014, **8**:37. Ranked as a '**Highly accessed**' article. <https://doi.org/10.1186/1752-0509-8-37>
13. Luis David García-Puente, Sonja Petrović, and Seth Sullivant. Graphical Models. *The Journal of Software for Algebra and Geometry* **5** (2013), 1–7. <https://doi.org/10.2140/jsag.2013.5.1>
14. Scott Chapman, Rebecca Garcia, Luis David García-Puente, Martin E. Malandro, and Ken W. Smith. Algebraic and combinatorial aspects of sandpile monoids on directed graphs. *Journal of Combinatorial Theory, Series A* **120** (2013) 245–265. <https://doi.org/10.1016/j.jcta.2012.08.001>
15. Luis David García-Puente, Nickolas Hein, Christopher Hillar, Abraham Martín Del Campo, James Ruffo, Frank Sottile, and Zach Teitler. The secant conjecture in the real Schubert calculus. *Experimental Mathematics*, 21:3, (2012) 252–265. <https://doi.org/10.1080/10586458.2012.661323>
16. Luis David García-Puente, Frank Sottile, and Chungang Zhu. Toric degenerations of Bézier patches. *ACM Transactions on Graphics*, Vol. 30, No. 5, Article 110, October 2011. <https://doi.org/10.1145/2019627.2019629>
17. Elena Dimitrova, Luis David García-Puente, Franziska Hinkelmann, Abdul S. Jarrah, Reinhard Laubenbacher, Brandilyn Stigler, Michael Stillman, and Paola Vera-Licona. Parameter estimation for Boolean models of biological networks. *Special Issue on Foundations of Formal Reconstruction of Biochemical Networks. Theoretical Computer Science*, **412/26**, pp. 2816–2826. (2011). <https://doi.org/10.1016/j.tcs.2010.04.034>
18. Christopher Hillar, Luis García-Puente, Abraham Martín Del Campo, James Ruffo, Zach Teitler, Stephen L. Johnson, and Frank Sottile. Experimentation at the Frontiers of reality in Schubert calculus. *Gems in Experimental Mathematics, AMS Contemporary Mathematics*, **517**, 2010, 365–380. Part of ISBN: <https://www.worldcat.org/isbn/9780821848692>
19. Luis D. García-Puente, Sarah Spielvogel, and Seth Sullivant. Identifying causal effects with computer algebra. P. Grünwald and P. Spirtes (Editors). *Proceedings of the 26<sup>th</sup> Conference of Uncertainty in Artificial Intelligence (UAI 2010)*. AUAI Press (2010). [https://event.cwi.nl/uai2010/papers/UAI2010\\_0087.pdf](https://event.cwi.nl/uai2010/papers/UAI2010_0087.pdf)
20. Luis David García-Puente, Frank Sottile. Linear precision for parametric patches. *Advances in Computational Mathematics*, **33/2** (2010) pp. 191–214. <https://doi.org/10.1007/s10444-009-9126-7>
21. Gheorghe Craciun, Luis David García-Puente, and Frank Sottile. Some geometrical aspects of control points for toric patches. *Mathematical Methods for Curves and Surfaces 2008 (M. Dæhlen et al. Eds). Lecture Notes in Computer Science* **5862**, pp. 111–135. Springer, Heidelberg (2010). Part of ISBN: <https://www.worldcat.org/isbn/9783642116209>
22. Maria A. Aviño-Díaz, Luis D. García-Puente. Computing the additive structure of indecomposable modules over Dedekind-like rings using Gröbner bases. in *Journal of Algebra and Its Applications*, **6/2** (2007) pp. 291–304. <https://doi.org/10.1142/s0219498807002211>

23. Luis David Garcia, Abdul Salam Jarrah, and Reinhard Laubenbacher. Sequential dynamical systems over words. *Applied Mathematics and Computation*, **174/1** (2006) pp. 500-510.  
<https://doi.org/10.1016/j.amc.2005.04.101>
24. Luis David Garcia, Michael Stillman, and Bernd Sturmfels. Algebraic geometry of Bayesian networks. *Journal of Symbolic Computation*, **39/3-4** (2005) pp. 331-355. Special issue on the occasion of Mega 2003. <https://doi.org/10.1016/j.jsc.2004.11.007>
25. Marta Casanellas, Luis David Garcia, and Seth Sullivant. Catalog of small trees. In *Algebraic Statistics for Computational Biology*, (L. Pachter and B. Sturmfels Eds.) Cambridge University Press, (2005) pp. 291-304. <https://doi.org/10.1017/cbo9780511610684.019>
26. Luis David Garcia. Algebraic Statistics in model selection. M. Chickering and J. Halpern, editors, *Proceedings of the 20<sup>th</sup> Conference of Uncertainty in Artificial Intelligence*, (2004) 177-184.  
<https://dl.acm.org/doi/10.5555/1036843.1036865>
27. Luis David García Puente. Bases de Gröbner asociadas a módulos finitos. *Miscelánea Matemática (MMS)* **30** (2000), pp. 65-70. Part of ISSN:  
<https://portal.issn.org/resource/ISSN/1665-5478>

## Media Appearances

- (1) Featured mathematician as part of the American Mathematical Society' Lathisms project:  
<http://www.lathisms.com>. The AMS initiated this project to provide an accessible platform that features prominently the extent of the research and mentoring contributions of Latin@s and Hispanics in different areas of the Mathematical Sciences.
- (2) Recorded a video on sandpiles for the Numberphile project.  
<https://www.youtube.com/watch?v=1MtEUErz7Gg>. Currently this video has more than 500,000 views. Numberphile is a project supported by the Mathematical Sciences Research Institute.

## Courses Taught

### Colorado College

Colorado Springs, CO

Fall 2023	MA129 Calculus 2 (Block 3)
Spring 2023	MA129 Calculus 2 (Block 5)
	MA421 Abstract Algebra 2 (Block 7)
Fall 2022	MA201 Foundations of Discrete Mathematics (Block 2)
	MA126 Calculus 1 (Block 3)
Spring 2022	MA220 Linear Algebra (Block 6)
	MA126 Calculus 1 (Block 8)
Fall 2021	MA251 Number Theory (Block 1)
	MA126 Calculus 1 (Block 3)

### Sam Houston State University

Huntsville, TX

Sum. 2021	MATH 1332 - College Mathematics (two online sections)
Spring 2021	MATH 5397 - Discrete Mathematics (two sections)
Fall 2020	MATH 1332 - College Mathematics (online) MATH 6340 - Algebraic Geometry (Section 01)
Sum. 2020	MATH/STAT 3379 - Statistical Methods in Practice (two online sections)
Spr. 2020	MATH 1332 - College Mathematics (online) MATH 2395 - Discrete Mathematics (Section 01)
Fall 2019	MATH 1332 - College Mathematics (online) MATH 4377 - Algebraic Structures (Section 01)
Sum. 2019	MATH 1332 - College Mathematics (two online sections)
Spr. 2019	MATH 1332 - College Mathematics (online) MATH 6340 - Algebraic Geometry (Section 01)
Fall 2018	MATH 1332 - College Mathematics (online) MATH 3377 - Linear Algebra (Section 01)
Sum. 2018	MATH 1332 - College Mathematics (three online sections)
Spr. 2018	MATH 2395 - Discrete Mathematics (Section 01)
Fall 2017	MATH 1332 - College Mathematics (online) MATH 2395 - Discrete Mathematics (Section 01) MATH 6398 - Research and Thesis (Section 01)
Sum. 2017	MATH 1332 - College Mathematics (two online sections)
Spr. 2017	MATH 1332 - College Mathematics (online)
Fall 2016	MATH 1410 - Elementary Functions (Section 02) MATH 2395 - Discrete Mathematics (Section 01) MATH 6335 - Abstract Algebra (Section 01)
Spr. 2016	MATH 1316 - Plane Trigonometry (Section 05) MATH 1430 - Calculus 2 (Section 01) MATH 4370 - Special Topics: Applied Algebra (Section 01)
Fall 2015	MATH 1430 - Calculus 2 (Section 02) MATH 2395 - Discrete Mathematics (Section 01) MATH 4377 - Algebraic Structures (Section 01)
Spr. 2015	MATH 1332 - College Mathematics (Section 10) MATH 4377 - Algebraic Structures (Section 01) MATH 5397 - Discrete Mathematics (Section 01)
Fall 2014	MATH 1332 Honors - College Mathematics (Section 11) MATH 2395 - Discrete Mathematics (Section 01) MATH 6340 - Algebraic Geometry (Section 01)
Spr. 2014	MATH 1332 - College Mathematics (Section 12)
Fall 2013	MATH 1316 Plane Trigonometry (Section 02) MATH 1332 Honors - College Mathematics (Section 15) MATH 1332 - College Mathematics (Section 16)
Spr. 2013	MATH 2395 Discrete Mathematics (Section 01)

	MATH 6336 Abstract Algebra 2 (Section 01)
Fall 2012	MTH 1316 Plane Trigonometry (Section 02)
	MTH 1430 Calculus 2 (Section 03)
	MTH 6335 Abstract Algebra 1 (Section 01)
Spr. 2012	MATH 1430 Calculus 2 (Section 01)
	MATH 5360 Special Topics: Algebraic Geometry (Section 01)
Fall 2011	MTH 163 Plane Trigonometry (Section 02)
	MTH 163 Plane Trigonometry (Section 05)
	MTH 477 Algebraic Structures (Section 01)
Spr. 2011	MTH 142 Calculus 1 (Section 2)
	MTH 143 Calculus 2 (Section 2)
	MTH 163 Plane Trigonometry (Section 6)
Fall 2010	MTH 142 Calculus 1 (Section 02)
	MTH 199 Mathematics for Managerial Decision Making (Sections 03)
	MTH 597 Discrete Mathematics (Section 01)
Sum. 2010	MTH 163 Plane Trigonometry (Section 03)
	MTH 164 College Mathematics (Section 04)
Spr. 2010	MTH 142 Calculus 1 (Section 02)
	MTH 199 Mathematics for Managerial Decision Making (Section 10)
	MTH 636 Abstract Algebra 2 (Section 01)
Fall 2009	MTH 142 Calculus 1 (Section 03)
	MTH 677 Abstract Algebra 1 (Section 01)
Sum. 2009	MTH 164 College Mathematics (Section 04)
	MTH 199 Mathematics for Managerial Decision Making (Section 04)
Fall 2008	MTH 142 Calculus 1 (Section 02)
	MTH 163 Plane Trigonometry (Section 14)
	MTH 470W/560 Special Topics: Algebraic Geometry (Section 01)
Sum. 2008	MTH 032 Developmental Mathematics 2 (Section 02)
	MTH 163 Plane Trigonometry (Section 01)
Spr. 2008	MTH 164 College Mathematics (Sections 07 and 10)
	MTH 142 Calculus 1 (Section 05)
Fall 2007	MTH 164 College Mathematics (Sections 11 and 12)
	MTH 376 Differential Equations (Section 01)

### University of Hawaii–Hilo

Hilo, Hawaii

Sum. 2015	EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) course on applied algebraic geometry
Sum. 2014	EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) course on sandpile groups
Sum. 2013	EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) course on sandpile models
Sum. 2011	EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) course on sandpile models



**Texas A&M University**

College Station, TX

- Sum. 2007 IMA PI Summer Program for Graduate Students on Applicable Algebraic Geometry (Assistant Instructor)
- Spr. 2007 Math 689 Applicable Algebraic Geometry (Section 604 – with Frank Sottile)
- Fall 2006 Math 251 Calculus III (Sections 502 and 506)
- Sum. 2006 Math 662 REU/VIGRE course on Algebraic Methods in Computational Biology (Section 100 – with Maurice Rojas)
- Spr. 2006 Math 308 Differential Equations (Section 512)
- Fall 2005 Math 142 Business Calculus II (Sections 501 and 508)
- Sum. 2005 Math 662 REU/VIGRE course on Algebraic Methods in Computational Biology (Section 100 – with Maurice Rojas and Lenny Fukshansky)
- Spr. 2005 Math 152 Calculus II (Sections 519, 520, 521, 522, 523, and 524)

**Virginia Polytechnic Institute and State University**

Blacksburg, VA

- Fall. 2003 Math 1205 Calculus I (1 section)
- Spr. 2002 Math 1205 Calculus I (TA in 2 sections)

**Dipartimento di Matematica, Università degli Studi di Genova**

Genova, Italy

- Fall 2002 Seminar on Algebraic Statistics

**University of Puerto Rico–Humacao**

Humacao, Puerto Rico

- Sum. 2001 NSF/REU Summer Institute in Mathematics for Undergraduates (Teaching Assistant for Reinhard Laubenbacher)

**New Mexico State University**

Las Cruces, NM

- 1999–2001 MATH 120 Intermediate Algebra (2 sections)
- MATH 190G Trigonometry and Pre-Calculus (2 sections)

**Universidad Nacional Autónoma de México**

Mexico City, Mexico

- 1997-1998 Teaching Assistant for the following undergraduate courses: Ciencias de la Computacion I (Introduction to Computer Science I), Ciencias de la Computacion II (Introduction to Computer Science II), Algebra Superior (College Algebra), Algebra Lineal (Linear Algebra).

**Mentoring****Undergraduate Students**

- 2023–2024 Galileo Fries (Undergraduate Thesis)
- Sum. 2023 Elise Farr, Galileo Fries, Vuong Nguyen Hoang: Research supported through the **2023 Pomona Research in Mathematics Experience (PRiME 2023)**
- 2022–2023 Casmali Lopez (Undergraduate Thesis), Timothy Somerset (Independent study)

Sum. 2022	Iverson Wang, Haoru Yang: Research supported through the <b>Colorado College 2022 Summer Student Collaborative Research</b>
Spring 2021	Zafer Cesur, Eyobel Gebre, Samuel Gilman: Research conducted as part of a Research Course in Graph Theory taught by Pamela Harris at Williams College.
2018–2019	JJ Hoo (SHSU): Research conducted as part of the MATH 4395 Undergraduate Research in Mathematics course.
Sum. 2017	Alexander Farrack, Justin Jones, Alexander Norman: Research supported through Sam Houston State University <b>EURECA's Summer 2017 Faculty and Student Team (FAST) Award</b> .
Sum. 2016	Carlos Agrinoni Santiago, Diane Christine Alar, Angel Burr, Ernest Castorena, Jonathan Celaya, Anna Comito, Karlie Elliott, Jennifer Garcia, Micah Henson, Cecily Santiago, Ruben Hurtado, Tafari James, Casandra Monroe, Drisana Mosaphir, Dominika Palinko, Maleek Richardson, Justin Rivera, Ricardo Rojas-Echenique: Research supported through the <b>Mathematical Sciences Research Institute - Undergraduate Program (MSRI-UP 2016)</b> .
Sum. 2015	Vanessa Aguirre, Ihmar Aldana, Kainalu Barino, Monica Busser, Iliana De La Cruz, Ryan Kruse, Dane Miyata, Ethan Petersen, Taylor Spino, Melissa Stadt, Catherine Sullivan, Aaron Wagner: Research supported through the <b>EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math)</b> Interns program.
Sum. 2014	Demara Austin, Angel Castillo, Megan Chambers, Jeffrey Davis, Rebecca Funke, Elizabeth Herman, Joshua Klarmann, Vince Longo, Amadeus Martin, Bianca Mastache, Bryan Oakley, and Zalia Rojas: Research supported through the <b>EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math)</b> Residents program.
Fall 2013	Jay Pruett (SHSU): Supervised an independent study course on Large Social Networks.
Fall 2012	Denise Brown (SHSU): Supervised an Honors Calculus 2 course.
Sum. 2013	Sarah Baumgardner, Brittany Boribong, Andrew Fry, Cody Kalā, Armando Salinas, Reina Shintaku, Raven Showels, Reuben Tate, Amanda Urquiza, Gautam Webb, Kathreen Yanit, Andrew You: Research supported through the <b>EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math)</b> Interns program.
2011–2012	Jesse Hering, Everett Meza, and Christina Nieuwoudt (SHSU): Research supported through the <b>NSF/MCTP Long Undergraduate Research Experience (LURE) program</b> .
Sum. 2011	Emily Chang, Yan Dai, Kimberly Emig, Yohan Kim, Tynan Lazarus, Reina Ojiri, Brandon Rivera, Jesse Robert, Akashi Rouse, Kendall Tada, Daisy Vasquez, Jermaine Vitales: Research supported through the <b>EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math)</b> Interns program.
2008–2010	Alexander Diaz and Sarah Spielvogel (SHSU): Research supported through the 2007 Norman Hackerman Advanced Research Program grant no. 010366-0054-2007.
2008–2009	Andrew Howard (SHSU): Research supported through the 2007 Norman Hackerman Advanced Research Program grant no. 010366-0054-2007.

- Fall 2009 Maelani Negrito (SHSU). Supervised an Honors Calculus 1 course.
- Sum. 2006 Hannah Saugier and Stacey Stokes: Research conducted (with Maurice Rojas) during the **REU Summer Program at Texas A&M University**.
- Sum. 2005 Elizabeth Dong, Guangming Lang, and Jacob Porter: Research conducted (with Maurice Rojas) during the **REU Summer Program at Texas A&M University**.

### Graduate Students

- Sum. 2023 Mark Curiel (University of Hawaii) Research Assistant supported through the 2023 Pomona Research in Mathematics Experience (PRiME 2023).
- 2020 Ligia Flores (SHSU) MS in Mathematics Independent Research Project: Dynamical system models of *Aspergillus fumigatus* iron regulation and oxidative stress response.
- 2018–2019 Mackenzie Unger (SHSU) MS in Mathematics Independent Research Project: Cyclic sandpile groups of bident complements.
- 2017 Marco Polo Castillo Villalba (Centro de Ciencias Genómicas, UNAM-Cuernavaca). External Ph.D. Committee Member.
- 2017–2018 Chamika Nishan Adimali (SHSU) MS in Mathematics Independent Research Project: Cyclic sandpile groups of almost complete graphs.  
Katlin Pinelli (SHSU) MS in Mathematics Independent Research Project: Visualization methods in theoretical neuroscience  
Rutger Yager (SHSU) MS in Mathematics Thesis: Algebraic methods in theoretical neuroscience.
- Sum. 2016 Natalie Hobson (University of Georgia) and Jacob Russell-Madonia (City University of New York). Graduate Assistants supported through the Mathematical Sciences Research Institute - Undergraduate Program (MSRI-UP 2016).
- 2016 Merve Karakis (SHSU). MS in Mathematics Independent Research Project in "Algebraic Methods in Theoretical Neuroscience".
- 2015 Alma Kelley (SHSU). MS in Mathematics Independent Research Project in "Toppling polynomial of a sandpile group".
- Sum. 2015 Kaitlyn Phillipson (Texas A&M University). Graduate Assistant supported through the EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) Interns program.
- Sum. 2014 Lauren Keough (University of Nebraska-Lincoln). Graduate Assistant supported through the EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) Residents program.
- 2013–2014 Colin Lawson (SHSU). MS in Mathematics Independent Research Project in "Computational Algebraic Geometry."
- Sum. 2013 Anastasia Chavez (University of California, Berkeley). Graduate Assistant supported through the EMSW21-MCTP Pacific Undergraduate Research Experience in Mathematics (PURE Math) Interns program.
- 2011–2012 Sarah Spielvogel (SHSU). MS in Mathematics Thesis Project entitled "Noether's PhD thesis and computational invariant theory". (jointly with R. Garcia)
- 2011–2012 Luis David Molina (SHSU). MS in Mathematics Thesis Project entitled "Clique sums of sandpile groups".

2011–2012	Robert Williams (SHSU). MS in Mathematics Thesis Project entitled “Planar graphs of trivariate monomial ideals”.
2011	Chandana Abeysinghe (SHSU). MS in Mathematics Independent Research Project in “Algebraic geometry applications in engineering”.
2010–2011	Alacia Voth (SHSU). Research partially supported through the 2007 Norman Hackerman Advanced Research Program grant no. 010366-0054-2007.
2009–2010	Jessica Ellis (SHSU). Research supported through the 2007 Norman Hackerman Advanced Research Program grant no. 010366-0054-2007.
2009–2010	Anton Petrov (SHSU). MS in Mathematics Research Project in “Graphical methods for identifiability in structural equation models”.
2009–2011	Javier Muñoz Bernabé. Member of Ph.D. Dissertation Committee. Department of Mathematics, Cinvestav, Mexico City, México.

### **Post-doctoral Faculty**

2023–	Postdoctoral Mentor as part of the ASCEND Mentor Network.
Sum. 2016	Ashley K. Wheeler (University of Arkansas). Post-doctoral mentor supported through the Mathematical Sciences Research Institute - Undergraduate Program (MSRI-UP 2016).

### **Early Career Faculty**

2022-2023	Juan Miguel Arias, Sarah Keleher, Antonio Alves Meira Neto, Diana Norton, Joey Zhao. Convener as part of Colorado College’s Mentoring Alliance Program.
2016–2017	Joshua Hallam (Wake Forest University). Early Career Faculty Mentor. MAA Mentoring Network.
Sum. 2017	Kassie Archer (University of Texas at Tyler), Abigail Bishop (Iona College), Alexander Diaz-Lopez (Villanova University), Joel Louwsma (Niagara University). Undergraduate Faculty Research Mentor. 2017 ICERM Research Experiences for Undergraduate Faculty (REUF).

## **Departmental and University Committee Service**

<b>Colorado College Mentoring Alliance Program Convener</b>	2022–
<b>Colorado College Curriculum Executive Committee</b>	2022–2023
<b>Colorado College Antiracism Commitment Committee</b>	2021–2023
<b>Colorado College Departmental Outreach Committee</b>	2022–2023
<b>Colorado College Mentoring Alliance Program member</b>	2021–2022
<b>Colorado College Computer Science Hiring Committee</b>	Fall 2022
<b>Colorado College Departmental Website Committee</b>	2021–2022
<b>Colorado College Mathematics VAP Hiring Committee</b>	2021–2022
<b>Colorado College Computer Science Hiring Committee</b>	Fall 2021
<b>SHSU Associate Department Chair</b>	2017–2021
<b>SHSU Hiring Committee</b>	2019–2020
<b>Department of Mathematics and Statistics Policy Committee</b>	2017–2019

<b>B.S. in Mathematics Undergraduate Curriculum Committee</b>	2016–2021
<b>SHSU Math 1332 College Mathematics Textbook Committee</b>	Spring 2019
<b>M.S. in Mathematics Self-Study Committee</b>	2016–2017
<b>SHSU Hiring Committee (Chair)</b>	2014–2015
<b>Assistant M.S in Mathematics Graduate Coordinator</b>	2014–2021
<b>SHSU Hiring Committee for Visiting Assistant Professor</b>	Spring 2014
<b>SHSU Diversity Committee</b>	2012–2015
<b>SHSU Mathematics and Statistics Colloquium Organizer</b>	2012–2016
<b>SHSU College of Science Mission/Vision Committee</b>	Fall 2012
<b>SHSU Hiring Committee for Visiting Assistant Professor</b>	Summer 2012
<b>SHSU Calculus Textbook Committee</b>	Spring 2012
<b>SHSU Hiring Committee</b>	2011–2012
<b>SHSU Graduate Program in Mathematics Committee</b>	2010–2021
<b>SHSU Hiring Committee</b>	2009–2010
<b>SHSU Department of Mathematics and Statistics Library Liaison</b>	2008–2021
<b>SHSU MTH 163 – Trigonometry Textbook Committee</b>	Spring 2008
<b>SHSU MS in Mathematics Revision Committee</b>	2007–2009
<b>SHSU Engineering–Technology Committee (College of Arts and Sciences)</b>	2007–2008

## Service to the Academic Community

- Executive Committee Member, Rocky Mountain Section of the Mathematical Association of America (2023 – )

## Editorial, Referee and Review Activities

### Editorial Activities

- Associate Editor, Notices of the American Mathematical Society (2025 – 2027)
- Associate Editor, American Mathematical Monthly (2012 – 2018)
- Associate Editor, Journal of Algebraic Statistics (2013 – 2018)
- Contributing Editor, AMS blog On Teaching and Learning Mathematics (2016 – 2017)

### Reviewer Activities

- Cambridge University Press
- Mathematical Reviews (since 2007)
- Zentralblatt MATH (since 2007)

### Journals refereed

- Advances in Applied Mathematics
- Advances in Numerical Analysis
- Applied Mathematics and Computation

- Bulletin of Mathematical Biology
- Communications in Algebra
- Communications in Statistics – Theory and Methods
- Computer Aided Geometric Design
- Discrete Mathematics, Algorithms and Applications
- Electronic Journal of Combinatorics
- European Journal of Combinatorics
- Foundations of Computational Mathematics
- IEEE/ACM Transactions on Computational Biology and Bioinformatics
- Journal of Algebra
- Journal of Algebra and Its Applications
- Journal of Algebraic Statistics
- Journal of Commutative Algebra
- Journal of Machine Learning Research
- Journal of Symbolic Computation
- La Matematica
- Selecta Mathematica
- SIAM Journal of Discrete Mathematics
- SIAM Journal on Matrix Analysis and Applications
- The Scientific World Journal

#### **Conferences refereed**

- 2022 International Symposium on Symbolic and Algebraic Computation (ISSAC)
- Special issue on Nonlinear Computational Geometry of the IMA Volumes in Mathematics and its Applications, Springer–Verlag
- Algebraic Biology 2007 Conference Proceedings
- 2009 Effective Methods in Algebraic Geometry (MEGA) Conference

#### **Granting agencies refereed**

- Division Physical Sciences of Netherlands Organisation for Scientific Research
- National Security Agency (NSA) Mathematical Sciences Grant Program
- National Science Foundation (NSF) Research Experiences for Undergraduates Program
- National Science Foundation (NSF) International Research Fellowship Program
- National Science Foundation (NSF) Division of Mathematical Sciences
- México's Consejo Nacional de Ciencia y Tecnología (Conacyt)

### **Conference, Meeting and Seminar Organization**

- |             |  |
|-------------|--|
| 2024        | Spring 2024 Rocky Mountain Section Meeting of the Mathematical Association of America. Local Organizing Committee (with Molly Moran).  |
| 2018 – 2020 | CombinaTexas Annual Conference Scientific Committee Member.  |
| 2017        | (with Alicia Dickenstein and Carina Curto). Special session on Applied and Computational Algebra and Geometry. Mathematical Congress of the Americas 2017, Montréal, Canada. |

- 2016 Mathematics and Statistics Colloquium, Sam Houston State University, Huntsville, TX.  
 (with Alicia Dickenstein and Carina Curto). Thematic session on Computational Algebra and Applications of Algebra. XXI Coloquio Latinoamericano de Álgebra, Buenos Aires, Argentina.  
 (with Daniela Ferrero, Laura Matusevich, Ken Smith, and Catherine Yan). CombinaTexas 2016 Conference, Texas A&M University, College Station, TX.
- 2015 Mathematics and Statistics Colloquium, Sam Houston State University, Huntsville, TX.  
 (with Dino Lorenzini, Criel Merino, David Perkinson, and Carlos Valencia). Workshop on Sandpile Groups. Banff International Research Station (BIRS) Affiliate Casa Matemática Oaxaca (CMO), Oaxaca, México.  
 (with Martha Paola Vera-Licona, Jason Cory Brunson, Elena Dimitrova, and Brandilyn Stigler). 2015 Conference on Algebraic and Combinatorial Approaches in Systems Biology, University of Connecticut Health Center, Farmington, CT.
- 2014 Mathematics and Statistics Colloquium, Sam Houston State University, Huntsville, TX.  
 (with Laura Matusevich, Jacob White, and Catherine Yan). CombinaTexas 2014 Conference, Texas A&M University, College Station, TX.
- 2013 (with Damon Hay and Ed Swim). Mathematics and Statistics Colloquium, Sam Houston State University, Huntsville, TX.  
 (with Sergi Elizalde, Daniela Ferrero, and Carlos Valencia). Special session on Applied Combinatorics. Mathematical Congress of the Americas 2013, Guanajuato, México.  
 (with Frank Sottile). Minisymposium on Approximation Theory, Geometric Modeling, and Algebraic Geometry. 2013 SIAM Conference on Applied Algebraic Geometry, Colorado State University, Fort Collins, CO.
- 2012 Mathematics and Statistics Colloquium, Sam Houston State University, Huntsville, TX.  
 (with Daniela Ferrero, Martin Malandro, Alison Marr, Lucas Rusnak, and Catherine Yan). CombinaTexas 2012 Conference, Southwestern University, Georgetown, TX.
- 2011 (with Daniela Ferrero, Martin Malandro and Ken Smith). CombinaTexas 2011 Conference, Sam Houston State University, Huntsville, TX.  
 (with Ken Smith). Working Algebra Seminar, Sam Houston State U., Huntsville, TX.  
 (with Tatyana Sorokina). Minisymposium on Interactions Among Algebraic Geometry, Geometric Modeling, and Approximation Theory. SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh, NC.  
 (with Rebecca Garcia). Scientific Symposia Session on Mathematical Models: Current Research Of Present-Day Role Models Of The Underrepresented. SACNAS 2011 National Conference, San Jose Convention Center, San Jose, CA.
- 2010 (with Frank Sottile). AMS–SIAM special session on Applications of Algebraic Geometry. 2010 Joint Mathematics Meetings, San Francisco, CA.  
 (with Scott Chapman, Rebecca Garcia, Martin Malandro and Ken Smith). Algebra and Combinatorics Seminar, Sam Houston State University, Huntsville, TX.

- 2009 (with Frank Sottile). AMS special session on Applicable Algebraic Geometry. 2009 Fall Central Section Meeting of the AMS, Baylor University, Waco, TX.
- (with Tatyana Sorokina). Second International Workshop on Algebraic Geometry and Approximation Theory, Towson University, Towson, MD.
- (with Scott Chapman, Rebecca Garcia, Martin Malandro and Ken Smith) Algebra and Combinatorics Seminar, Sam Houston State University, Huntsville, TX.
- 2008 (with Tatyana Sorokina). First International Workshop on Algebraic Geometry and Approximation Theory, Towson University, Towson, MD.
- (with Scott Chapman, Rebecca Garcia, Martin Malandro and Ken Smith). Algebra and Combinatorics Seminar, Sam Houston State University, Huntsville, TX.
- 2007 (with Frank Sottile). Algebra and Combinatorics Seminar, Texas A&M University, College Station, TX.
- 2006 (with Frank Sottile). Algebra and Combinatorics Seminar, Texas A&M University, College Station, TX.
- 2003 (with Reinhard Laubenbacher). Algebraic Statistics Seminar, Virginia Tech., Blacksburg, VA.
- 2002 (with Lorenzo Robbiano). Algebraic Geometry of Graphical Models Seminar, University of Genova, Italy.
- Founder of the SIAM Graduate Student Seminar, Virginia Tech., Blacksburg, VA.
- 2001 (with Reinhard Laubenbacher). Gröbner Bases and Convex Polytopes Seminar, New Mexico State University, Las Cruces, NM.

## General Public Talks

### Tiger Talks

*Diversity, Equity and Inclusion in Mathematics*

Colorado College  
Colorado Springs, CO  
October 2021

## Plenary Talks

**Colorado Conference for Underrepresented Students in Mathematics 2023** Colorado State Univ.  
*An Introduction to Algebraic Statistics* Fort Collins, CO  
April 2023

**Latinx in the Mathematical Sciences Conference 2022** Institute for Pure & Applied Mathematics  
*Arithmetical structures* Los Angeles, CA  
July 2022

**2019 Mathematical Sciences Research Institute – Undergraduate Program** MSRI  
*Self-organized criticality, power laws, and parking functions* Berkeley, CA  
July 2019



**2018 Blackwell-Tapia Conference***Counting arithmetical structures*

ICERM

Providence, RI

November 2018

**Modern Math Workshop 2015***An Introduction to the Theory of Sandpiles**Minicourse*

SACNAS The National Diversity in STEM Conference

Washington, DC

October 2015

**Algebraic Statistics 2015***Tutorial on Algstat: an R package for algebraic statistics*

University of Genova

Genova, Italy

June 2015

**Algebraic Statistics 2014***Noncommutative Fourier analysis of partially ranked data*

Illinois Institute of Technology

Chicago, IL

May 2014

**Conference Talks****Algebraic Statistics for Ecological and Biological Systems***Algebraic Statistics and Our Changing World*

Inst. for Math. and Stat. Innovation

Chicago, IL

October 2023

**Computations and Data in Algebraic Statistics Workshop***Identifiability of Structural Equation Models*

BIRS Casa Matemática Oaxaca

Oaxaca, Mexico

May 2023

**Combinatorial, Computational, and Applied Algebraic Geometry 2022***Algebraic degrees of phylogenetic varieties (poster)*

University of Washington

Seattle, WA

June 2022

**Southwest Local Algebra Meeting***Counting arithmetical structures*

Tulane University

New Orleans, LA

March 2020

**Comp. Algebra and Applications of Algebra***Absolute concentration robustness*

XXIII Coloquio Latinoamericano de Álgebra

México City, México

August 2019

**Computational Algebraic Geometry Session****International Congress on Mathematical Software (ICMS 2018)***Neural ideals in SageMath*

University of Notre Dame

Denton, TX

July 2018

**Applicable and Computational Algebraic Geometry****2017 AMS Fall Central Sectional Meeting***Gröbner bases of neural ideals*

University of North Texas

Denton, TX

September 2017

**Geo. Combinatorics and Combinatorial Commutative Alg.****2017 AMS Fall Central Sectional Meeting***Counting arithmetical structures*

University of North Texas

Denton, TX

September 2017

**Sesión de Combinatoria algebraica***Counting arithmetical structures*

XXII Coloquio Latinoamericano de Álgebra

Quito, Ecuador

August 2017

**Sesión de Álgebra Computacional y Aplicaciones del Álgebra***Gröbner bases of neural ideals*

XXII CLA

Quito, Ecuador

August 2017

<b>Session on Applied and Computational Algebra and Geometry</b> <b>Mathematical Congress of the Americas 2017</b> <i>Gröbner bases of neural ideals</i>	McGill University Montréal, Canada July 2017
<b>Workshop on Graph Theory and Combinatorics</b> <b>Foundations of Computational Mathematics 2017</b> <i>Counting arithmetical structures (poster)</i>	Universitat de Barcelona Barcelona, Spain July 2017
<b>Workshop on Algebraic Statistics</b> <b>Mathematisches Forschungsinstitut Oberwolfach</b> <i>AlgStat: Computational Algebraic Statistics</i>	Oberwolfach, Germany April 2017
<b>Chip-Firing and Divisors on Graphs and Complexes</b> <b>2016 AMS Fall Central Sectional Meeting</b> <i>Accessibility numbers in abelian sandpile model on a directed graph</i>	University of St. Thomas Minneapolis, MN October 2016
<b>Abstract Algebra Research Topics for Undergraduates</b> <i>Sandpile groups for undergraduates</i>	SACNAS National Conference Long Beach, CA October 2016
<b>Algebraic and Combinatorial Methods in Mathematical Biology</b> <b>2016 AMS Spring Southeastern Sectional Meeting</b> <i>Algebraic Statistics Applications in Epidemiology</i>	University of Georgia Athens, GA March 2016
<b>Workshop on Multivariate Splines and Algebraic Geometry</b> <b>Mathematisches Forschungsinstitut Oberwolfach</b> <i>Multivariate toric Bézier patches</i>	Oberwolfach, Germany April 2015
<b>AMS Special Session on Parameters in Graph Theory</b> <b>2015 Joint Mathematics Meetings</b> <i>Accessibility numbers in the sandpile monoid of a directed graph</i>	San Antonio, TX January 2015
<b>Sesión de Combinatoria algebraica</b> <i>Accessibility numbers in the sandpile monoid of a graph</i>	XX Coloquio Latinoamericano de Álgebra Lima, Perú December 2014
<b>Workshop on algebraic statistics</b> <b>Prague Stochastics 2014</b> <i>Algebraic Statistics in R: Markov Bases</i>	Institute of Information Theory and Automation Prague, Czech Republic August 2014
<b>Contributed Session</b> <b>CombinaTexas 2014</b> <i>Identifiability of structural equation models</i>	Texas A&M University College Station, TX April 2014
<b>Special Session on Applied Combinatorics</b> <b>Mathematical Congress of the Americas 2013</b> <i>Algebraic and combinatorial structure of sandpile monoids on digraphs</i>	CIMAT Guanajuato, Mexico August 2013
<b>Minisymposium Identifiability Problems in Biology and Stats.</b> <b>SIAM Conference on Applied Algebraic Geometry</b> <i>Identifiability of structural equation models on 6 random variables</i>	Colorado State Univ. Fort Collins, CO August 2013
<b>Minisymposium Approx. Theory, Geom. Modeling, and Alg. Geo.</b> <b>SIAM Conference on Applied Algebraic Geometry</b> <i>Toric degenerations of (irrational) Bézier patches</i>	Colorado State U. Fort Collins, CO August 2013
<b>Session on Algebraic Statistics</b> <b>Southern Regional Council on Statistics Research Conference</b> <i>Graphical causal models: An algebraic perspective</i>	University of Louisville Burns, TN June 2013

<b>Algebraic Geometry and Geometric Modeling Workshop</b> <i>The control polyhedron of a rational Bézier surface</i>	Banff IRS Vancouver, Canada January 2013
<b>CombinaTexas 2012</b> <i>Ideals of graph homomorphisms</i>	Southwestern University Georgetown, TX April 2012
<b>MAA Invited Paper Session on Algebraic Statistics</b> <b>2012 Joint Mathematics Meetings</b> <i>What is an Algebraic Statistical Model?</i>	Boston, MA January 2012
<b>Minisymposium on Graphical Statistical Models</b> <b>First SIAM Conference on Applied Algebraic Geometry</b> <i>Parameter identification of structural equation models</i>	North Carolina State University Raleigh, NC October 2011
<b>Kickoff Workshop on Algebraic Geometry in the Sciences</b> <i>Toric degenerations of Bézier patches</i>	CMA, University of Oslo Oslo, Norway January 2011
<b>9<sup>th</sup> International Workshop ACCOTA</b> <i>Ideals of graph homomorphisms</i>	Playa del Carmen, Quintana Roo, México November 2010
<b>2<sup>nd</sup> Southeast Texas Workshop on Discrete Math</b> <i>What is algebraic statistics?</i>	Sam Houston State University Huntsville, TX October 2010
<b>Parameter Identification in Graphical Models Workshop</b> <i>Identifying causal effects with computer algebra</i>	American Inst. of Mathematics Palo Alto, CA October 2010
<b>Macaulay2 Workshop at Colorado College</b> <i>Algebraic statistics library for Macaulay2</i>	Colorado Springs, CO August 2010
<b>Special Session on Advances in Algebraic Statistics</b> <b>AMS 2010 Spring Southeastern Sectional Meeting</b> <i>Identifiability of graphical models</i>	University of Kentucky Lexington, KY March 2010
<b>Special Session on Applications of Math Software to Math Research</b> <b>International Conference on Applications of Computer Algebra</b> <i>Experimentation at the frontiers of reality in Schubert calculus</i>	ÉTS Montréal, Canada June 2009
<b>Transition Workshop</b> <b>Algebraic Methods in Systems Biology and Statistics</b> <i>Applications of toric varieties in the sciences</i>	SAMSI Research Triangle Park, NC June 2009
<b>2<sup>nd</sup> International Workshop on Alg. Geometry and Approx. Theory</b> <i>Geometric properties of toric patches</i>	Towson University Towson, MD April 2009
<b>Special Session on Mathematics of Biochemical Reaction Networks</b> <b>2009 Spring AMS Southeastern Section Meeting</b> <i>Injectivity of toric patches</i>	NCSU Raleigh, NC April 2009
<b>SAMSI Two-Day Undergraduate Workshop</b> <b>2008-09 SAMSI Education and Outreach Program</b> <i>Introductory lecture on algebraic statistical models</i>	SAMSI Research Triangle Park, NC February 2009
<b>Special Session on Computational Algebra and Convexity</b> <b>2009 Joint Mathematics Meetings</b> <i>Geometrical aspects of control points for toric patches</i>	Washington, D.C. January 2009

<b>Workshop on Algebraic Statistical Models</b>	SAMSI
<b>Algebraic Methods in Systems Biology and Statistics</b>	Research Triangle Park, NC
<i>Algebraic methods for phylogenetic inference (poster)</i>	January 2009
<b>8<sup>th</sup> International Workshop ACCOTA</b>	Oaxaca City, Oaxaca, México
<i>Sandpile models</i>	December 2008
<b>8<sup>th</sup> International Workshop ACCOTA</b>	Oaxaca City, Oaxaca, México
<i>Algebra, geometry and combinatorics of sandpiles (poster)</i>	December 2008
<b>Fourth Annual Texas Undergraduate Mathematics Conference</b>	SHSU
<i>How to draw complex functions</i>	Huntsville, TX
	September 2008
<b>Workshop on Geometry and Representation Theory of Tensors</b>	MSRI
<i>Phylogenetic algebraic geometry</i>	Berkeley, CA
	July 2008
<b>1<sup>st</sup> International Workshop on Alg. Geometry and Approx. Theory</b>	Towson University
<i>Linear precision for toric patches</i>	Towson, MD
	April 2008
<b>1<sup>st</sup> International Workshop on Alg. Geometry and Approx. Theory</b>	Towson University
<i>What is computational algebraic geometry?</i>	Towson, MD
	April 2008
<b>Special session on Toric Varieties</b>	University of Central Florida
<b>32<sup>nd</sup> SIAM Southeastern-Atlantic Section Conference</b>	Orlando, FL
<i>Linear precision for toric patches</i>	March 2008
<b>Second Workshop on Constructive Function Theory</b>	Sam Houston State University
<i>Linear precision for toric patches</i>	Huntsville, TX
	October 2007
<b>IMA PI Summer Program in Applicable Algebraic Geometry</b>	Texas A&M University
<i>Bézier curves and surfaces</i>	College Station, TX
	July 2007
<b>Workshop on Non-Linear Computational Geometry Applications</b>	IMA
<i>Linear precision for parametric patches (poster)</i>	Minneapolis, MN
	May 2007
<b>Special Session on Computational Algebraic and Analytic Geometry</b>	
<b>2007 Joint Mathematics Meetings</b>	New Orleans, LA
<i>Linear precision for parametric patches</i>	January 2007
<b>Special Session on Algebraic Geometry</b>	
<b>Sixth Joint AMS–SMM International Meeting</b>	Houston, TX
<i>Algebraic geometry applications in Bayesian model selection</i>	May 2004
<b>Workshop on Algorithmic, Combinatorial and Applicable Real Alg. Geo.</b>	MSRI
<b>Topological Aspects of Real Algebraic Geometry</b>	Berkeley, CA
<i>Algebraic geometry applications in model selection</i>	April 2004
<b>Computational Algebraic Statistics</b>	American Institute of Mathematics
<i>Independence varieties of Bayesian networks</i>	Palo Alto, CA
	December 2003
<b>Closing Workshop</b>	SAMSI
<b>Challenges in Stochastic Computation</b>	Research Triangle Park, NC
<i>Algebraic geometry of Bayesian networks with hidden variables</i>	June 2003

<b>Effective Methods in Algebraic Geometry Conference</b> <i>Algebraic geometry of Bayesian networks</i>	Kaiserslautern, Germany June 2003
<b>International School on Algebraic Statistics</b> <b>Grostat VI Conference</b> <i>Algebraic classification of Bayesian networks</i>	Université Nice Sophia Antipolis Nice, France February 2003
<b>Special Session on Systems</b> <b>2002 SIAM Discrete Mathematics Conference</b> <i>Classification of finite dynamical systems</i>	San Diego, CA August 2002
<b>Graduate Oral Presentations in Mathematics</b> <b>SACNAS National Conference</b> <i>Mathematical foundations for computer simulations</i>	Phoenix, AZ September 2001
<b>Graduate Oral Presentations in Mathematics</b> <b>SACNAS National Conference</b> <i>Combinatorial tools for the analysis of decision systems</i>	Atlanta, GA October 2000
<b>Computational Algebra with Applications Conference</b> <i>Computing Gröbner bases associated to finite modules</i>	University of Wyoming Laramie, WY June 1999
<b>Computational Algebra with Applications Conference</b> <i>Computing syzygies à la Gauß-Jordan</i>	University of Wyoming Laramie, WY June 1999
<b>CIMAT-MSRI Conference on Gröbner Bases</b> <i>Gröbner bases associated to finite modules</i>	CIMAT Guanajuato, México February 1999

## Colloquium and Seminar Talks

<b>Colorado College Mathematics &amp; Computer Science Seminar</b> <i>Arithmetical Structures</i>	Colorado Springs, CO September 2023
<b>Pomona College Mathematics Colloquium</b> <i>An Introduction to Algebraic Statistics</i>	Claremont, CA September 2022
<b>Pomona College Algebra/Number Theory/Combinatorics Seminar</b> <i>Arithmetical Structures</i>	Claremont, CA September 2022
<b>University of Wisconsin-Milwaukee Mathematics Colloquium</b> <i>An Introduction to Algebraic Statistics</i>	Milwaukee, WI September 2022
<b>Trinity University Mathematics Seminar</b> <i>An Introduction to Nonlinear Algebra</i>	San Antonio, TX March 2022
<b>Lathisms: Café con Leche</b> <i>Sandpile Monoids</i>	Lathisms: Latinxs and Hispanics in the Mathematical Sciences October 2021
<b>Colorado College Mathematics &amp; Computer Science Seminar</b> <i>Estimating Gaussian Mixtures</i>	Colorado Springs, CO October 2021
<b>Colorado College Mathematics &amp; Computer Science Seminar</b> <i>An Introduction to Algebraic Statistics</i>	Colorado Springs, CO February 2021

<b>Sam Houston State University ProfSPEAK 2017-2018 speaker series</b> <i>Modern Algebra Techniques in Theoretical Neuroscience</i>	Huntsville, TX February 2018
<b>Sam Houston State University Teaching Seminar</b> <i>Creating a Sustainable Undergraduate Research Program</i>	Huntsville, TX September 2017
<b>The University of Texas at Tyler Mathematics REU Colloquium</b> <i>What is a sandpile group?</i>	Tyler, TX June 2017
<b>SHSU Department of Mathematics and Statistics Colloquium</b> <i>Modern mathematics in cancer studies: The need for small data analysis</i>	Huntsville, TX May 2017
<b>Northern Arizona University Special Interdisciplinary Colloquium</b> <i>Modern mathematics in cancer studies: The need for small data analysis</i>	Flagstaff, AZ April 2017
<b>Northern Arizona University Mathematics Colloquium</b> <i>Modern Algebra Techniques in theoretical neuroscience studies</i>	Flagstaff, AZ April 2017
<b>Northern Arizona University Honors Day Lecture</b> <i>What is a sandpile group?</i>	Flagstaff, AZ April 2017
<b>University of Kentucky Math Club Seminar</b> <i>Euclidean Steiner Tree Problem</i>	Lexington, KY March 2017
<b>University of Kentucky Discrete CATS Seminar</b> <i>What is a sandpile group?</i>	Lexington, KY March 2017
<b>University of Kentucky Applied Mathematics Seminar</b> <i>Algebraic Statistics Applications in Epidemiology</i>	Lexington, KY March 2017
<b>Texas A&amp;M University Algebra and Combinatorics Seminar</b> <i>Counting Arithmetical Structures</i>	College Station, TX February 2017
<b>University of Houston Mathematics Colloquium</b> <i>Toric degenerations of Bézier patches</i>	Houston, TX April 2016
<b>Sam Houston State University Teaching Seminar</b> <i>The Active Classroom</i>	Huntsville, TX March 2016
<b>Southern Methodist University Statistical Science Seminar</b> <i>Identifiability of structural equation models</i>	Dallas, TX November 2014
<b>Reed College Mathematics Colloquium</b> <i>Noncommutative Fourier analysis of partially ranked data</i>	Portland, OR April 2014
<b>Cinvestav Mathematics Colloquium</b> <i>Algebraic Geometry of Linear Structural Equation Models</i>	Cinvestav, Mexico City, México August 2013
<b>Texas A&amp;M Algebra and Combinatorics Seminar</b> <i>Algebraic and combinatorial structure of sandpile monoids on directed graphs</i>	College Station, TX April 2013
<b>Sam Houston State University Mathematics Colloquium</b> <i>Sandpile groups of book graphs</i>	Huntsville, TX November 2012
<b>Texas Tech University Mathematics Colloquium</b> <i>The control polyhedron of a rational Bézier surface</i>	Lubbock, TX November 2012
<b>Dartmouth College Mathematics Colloquium</b> <i>The control polyhedron of a rational Bézier surface</i>	Hanover, NH September 2012
<b>Pacific Undergraduate Research Experience Colloquium</b> <i>Sandpile groups of book graphs</i>	Hilo, HI July 2012
<b>Sam Houston State University Friday Afternoon Club</b> <i>Algebraic Statistics: Recent advances and future progress</i>	Huntsville, TX December 2011

<b>Texas State University Discrete Mathematics Seminar</b> <i>The control polyhedron of a rational Bézier surface</i>	San Marcos, TX December 2011
<b>Georgia Institute of Technology Algebra Seminar</b> <i>The control polyhedron of a rational Bézier surface</i>	Atlanta, GA November 2011
<b>Sam Houston State University Friday Afternoon Club</b> <i>Teaching Algebraic Structures using the ABC</i>	Huntsville, TX September 2011
<b>Duke University Algebraic Geometry Seminar</b> <i>Toric degenerations of Bézier patches</i>	Durham, NC April 2011
<b>Sam Houston State University Mathematics Colloquium</b> <i>Toric degenerations of Bézier patches</i>	Huntsville, TX March 2011
<b>Sam Houston State University Friday Afternoon Club</b> <i>How to draw complex functions</i>	Huntsville, TX January 2011
<b>Sam Houston State University Friday Afternoon Club</b> <i>What is Schubert calculus?</i>	Huntsville, TX November 2010
<b>University of Dallas Mathematics Colloquium</b> <i>How to draw complex functions</i>	Dallas, TX April 2010
<b>Southern Methodist University Research Colloquium</b> <i>What is algebraic statistics ... good for?</i>	Dallas, TX November 2009
<b>Coloquio del Instituto de Matemáticas</b> <i>The Geometry of Toric Patches</i>	UNAM, Mexico City, México April 2009
<b>Cinvestav Mathematics Colloquium</b> <i>The Geometry of Toric Patches</i>	Cinvestav, Mexico City, México April 2009
<b>North Carolina State University Symbolic Computation Seminar</b> <i>The Geometry of Toric Patches</i>	Raleigh, NC March 2009
<b>Clemson University Algebra and Discrete Mathematics Seminar</b> <i>The Geometry of Toric Patches</i>	Clemson, SC March 2009
<b>SAMSI Algebraic Statistics and Experimental Design Seminar</b> <i>Linear Precision of toric patches is ML degree 1 of toric statistical models</i>	Res. Triangle Park, NC February 2009
<b>Reed College Mathematics Colloquium</b> <i>The Geometry of Toric Patches</i>	Portland, OR February 2009
<b>Sam Houston State University Mathematics Colloquium</b> <i>What is algebraic statistics ... good for?</i>	Huntsville, TX November 2008
<b>Sam Houston State University Mathematics Colloquium</b> <i>Phylogenetic Algebraic Geometry</i>	Huntsville, TX August 2007
<b>Texas A&amp;M University Algebra and Combinatorics Seminar</b> <i>Linear precision for multi-sided toric patches</i>	College Station, TX March 2007
<b>North Carolina State University Mathematics Colloquium</b> <i>What is algebraic statistics?</i>	Raleigh, NC January 2007
<b>Sam Houston State University Mathematics Colloquium</b> <i>Linear precision for multi-sided toric patches</i>	Huntsville, TX January 2007
<b>Sam Houston State University Mathematics Colloquium</b> <i>What is algebraic statistics?</i>	Huntsville, TX November 2006
<b>Texas A&amp;M University Algebra and Combinatorics Seminar</b> <i>Finite Abelian <math>p</math>-groups and toric ideals</i>	College Station, TX May 2006

<b>Texas A&amp;M University Postdoc Seminar</b> <i>What is algebraic statistics?</i>	College Station, TX October 2005
<b>UC Berkeley Algebraic Statistics for Computational Biology Seminar</b> <i>Catalog of small trees</i>	Berkeley, CA March 2005
<b>MSRI Postdoc Seminar</b> <i>Minimal Cohen–Macaulay deformations of matroid ideals</i>	MSRI, Berkeley, CA December 2004
<b>Texas A&amp;M University Algebraic Geometry Seminar</b> <i>Solving the likelihood equations of small phylogenetic trees</i>	College Station, TX November 2004
<b>Sam Houston State University Mathematics Colloquium</b> <i>Tropical Mathematics</i>	Huntsville, TX October 2004
<b>University of Washington Algebra Seminar</b> <i>Algebraic geometry of Bayesian networks</i>	Seattle, WA April 2004
<b>Georgia Tech Informal Geometry Seminar</b> <i>Algebraic geometry of Bayesian networks</i>	Atlanta, GA August 2003
<b>Instituto de Matemáticas Unidad Morelia Algebra Seminar</b> <i>Algebraic geometry of Bayesian networks</i>	UNAM, Morelia, México May 2003
<b>UC Berkeley Workshop on Algebraic Statistics</b> <i>Algebraic geometry of Bayesian networks</i>	Berkeley, CA January 2003
<b>University of Cantabria Algebra Seminar</b> <i>Algebraic geometry of Bayesian networks</i>	Santander, Spain December 2002
<b>University of Cantabria Combinatorics Seminar</b> <i>Resolutions of Cohen-Macaulay deformations of matroid ideals</i>	Santander, Spain December 2002
<b>Politecnico di Torino Algebraic Statistics Seminar</b> <i>Algebraic geometry of Bayesian networks</i>	Torino, Italy November 2002
<b>MSRI Combinatorial Commutative Algebra Seminar</b> <i>Resolutions of matroid ideals</i>	MSRI, Berkeley, CA August 2002
<b>Virginia Tech SIAM Graduate Student Seminar</b> <i>Resolutions of matroid ideals</i>	Blacksburg, VA March 2002
<b>Virginia Tech SIAM Graduate Student Seminar</b> <i>Combinatorics of the primary decomposition of Cohen-Macaulay monomial ideals</i>	Blacksburg, VA March 2002
<b>University of Bordeaux I Seminar</b> <i>Mathematical foundations for computer simulations</i>	Bordeaux, France October 2001

## Professional Associations

American Mathematical Society (AMS)  
Mathematical Association of America (MAA)  
National Alliance for Doctoral Studies in the Mathematical Sciences  
Society for Industrial and Applied Mathematics (SIAM)  
Society for Advancement of Chicanos and Native Americans in Science (SACNAS)  
Sociedad Matemática Mexicana (SMM)



## Programming Skills

**Languages:** C, C++, Perl, Python, R

**Operating Systems:** Linux, UNIX, Mac OS X

**Computer Algebra Systems:** CoCoA, Macaulay2, Maple, Mathematica, Matlab, SageMath, Singular

**Web Development:** MySQL, PHP, HTML, CSS

## Software

- GraphicalModelsMLE.m2: A Macaulay2 package to compute maximum likelihood estimates for Gaussian graphical models. Package included in the standard Macaulay2 distribution (joint work with Carlos Améndola, Roser Homs, Olga Kuznetsova, and Harshit Motwani). Macaulay2 is a computer algebra system developed by Michael Stillman and Daniel Grayson.  
<http://www.math.uiuc.edu/Macaulay2/Packages/>
- NeuralIdeals: A SageMath package to perform computations with neural ideals associated to neural codes (with Ethan Petersen, Nora Youngs, Ryan Kruse, Dane Miyata, and Rebecca Garcia).  
<https://github.com/e6-1/NeuralIdeals>
- Algstat: An R package for algebraic statistics (with David Kahle and Ruriko Yoshida). Package included in the The Comprehensive R Archive Network (cran).  
<https://github.com/dkahle/algstat>
- GraphicalModels.m2: A Macaulay2 package for algebraic statistics. Package included in the standard Macaulay2 distribution (joint work with Mike Stillman, Sonja Petrovic and Seth Sullivan). Macaulay2 is a computer algebra system developed by Michael Stillman and Daniel Grayson.  
<http://www.math.uiuc.edu/Macaulay2/Packages/>
- Designer and principal developer of the Identifiability of Structural Equation Models website (with Sarah Spielvogel and Seth Sullivan). This website contains software and data related to the parameter identifiability problem for Gaussian graphical models.  
<https://www.coloradocollege.edu/aapps/ldg/>
- Collaborator in the *Polynome: Discrete System Identification* project. Polynome is a web-based software for the reconstruction and parameter estimation of algebraic models in systems biology, now subsumed into ADAM: Analysis of Dynamic Algebraic Models.  
<http://adam.plantsimlab.org>
- Collaborator in the *Frontiers of reality in Schubert calculus* project. We develop software to execute a large-scale computation to study questions in the Schubert calculus, with a focus on generalizations of the Shapiro conjecture. <http://www.math.tamu.edu/~secant/>
- Designer and principal developer of the Small Phylogenetic Trees website: This website contains algebraic information of small phylogenetic trees under several models of biological evolution. Maple package to perform all computations is included (with J. Porter).  
<https://www.coloradocollege.edu/aapps/ldg/small-trees/>

- Singular library to compute all complex solutions to the critical equations of the maximum likelihood function of a statistical model. Singular is a computer algebra system developed at the University of Kaiserslautern.
- CoCoA library to compute the primary decomposition of zero dimensional ideals. CoCoA is a computer algebra system developed at the University of Genova, Italy.
- C++ program to compute combinatorial homotopy of simplicial complexes (with R. Laubenbacher).