

## Maria Monks Gillespie

### Address

Colorado State University  
Department of Mathematics  
Weber 125  
Fort Collins, CO 80523

### Contact

Maria.Gillespie@colostate.edu  
<https://www.mathematicalgemstones.com/maria>

## EMPLOYMENT

<i>Assistant Professor</i> , Colorado State University	August 2019–Present
<i>NSF Postdoctoral Fellow</i> , UC Davis	August 2017–June 2019
<i>Krener Assistant Professor</i> , UC Davis	August 2017–June 2019

## EDUCATION

<i>Ph.D.</i> , Mathematics UC Berkeley, Berkeley, CA	May 2016
<i>Master of Advanced Study</i> , Mathematics Cambridge University, Cambridge, UK	June 2011
<i>Bachelor of Science</i> , Mathematics Massachusetts Institute of Technology, Cambridge, MA	May 2010

## HONORS AND AWARDS

Colorado Math Award for Outstanding Service to Students (CSU Putnam coach)	2021
FPSAC Best Graduate Student Paper	2016
Morgan Prize	2011
Churchill Scholar	2010–2011
NCAA Academic All-American	2010
Morgan Prize Honorable Mention	2010
Alice T. Schafer Prize for Women in Mathematics	2009
Goldwater Scholar	2009
Putnam Honorable Mention	2006

## GRANTS

NSF Conference Grant, DMS 2130627, “Algebraic Combinatorics Virtual Expedition”, 2022-2025, \$49,857  
– Co-PIs: Laura Colmenarejo, Oliver Pechenik, Liam Solus.  
– Continuing as a virtual conference for long-term sustainability and accessibility  
– Pushing the boundaries of virtual technology to replicate in-person networking

NSF Grant, DMS 2054391, “Representation Theory and Moduli Spaces via Young Tableaux and Parking Functions”, 2021–2024, \$186,403.14.  
– Personal research grant  
– Built a virtual conferencing room at CSU for long-term sustainability in mathematics

Simons Foundation Collaboration Grants for Mathematicians, “Combinatorial interpretations of structure constants arising in geometry”, 2021–2026, \$42,000. (*Declined due to receiving the NSF grant above.*)

NSF Conference Grant, DMS 2130627, “Algebraic Combinatorics Virtual Expedition”, 2021, \$5394.00.  
Co-PIs: Laura Colmenarejo, Oliver Pechenik, Liam Solus.

Open Educational Resources Grant, CSU Libraries, 2020–2021, \$4,000.  
Co-PIs: Maria Gillespie, Henry Adams, Rachel Pries.

NSF Mathematics Postdoctoral Research Fellowship, 2016–2019.

Hertz Graduate Research Fellowship, 2011–2016.

NSF Graduate Student Research Fellowship, 2011–2016.

## RESEARCH PUBLICATIONS AND PREPRINTS

1. M. Gillespie, A. Reimer-Berg, A generalized RSK for enumerating linear series on  $n$ -pointed curves, *Algebraic combinatorics* (2022), to appear.
2. M. Gillespie, S. T. Griffin, J. Levinson, Degenerations and multiplicity-free formulas for products of  $\psi$  and  $\omega$  classes on  $\overline{M}_{0,n}$ , submitted to *International Math Research Notices*, 2022.
3. M. Gillespie, K. Salois, Inequality of a class of near-ribbon skew Schur Q functions, *Séminaire Lotharingien Combinatoire*, FPSAC 2022, to appear.
4. M. Gillespie, S. T. Griffin, J. Levinson, Tournaments and slide rules for products of  $\psi$  and  $\omega$  classes on  $\overline{M}_{0,n}$ , *Séminaire Lotharingien Combinatoire*, FPSAC 2022, to appear.
5. M. Gillespie, S. T. Griffin, J. Levinson, Lazy tournaments and multidegrees of a projective embedding of  $\overline{M}_{0,n}$ , Submitted to *Combinatorial Theory*, 2021.
6. M. Gillespie, K. Salois, Inequality of a class of near-ribbon skew Schur Q functions, Submitted to *Electronic Journal of Combinatorics*, 2021.
7. M. Gillespie, B. Rhoades, Higher Specht bases for generalizations of the coinvariant ring, *Annals of Combinatorics* (2021). <https://doi.org/10.1007/s00026-020-00516-1>
8. M. Gillespie, J. Hocevar, A. Kulshrestha, K. Upadhyay, Iterating the RSK Bijection, *Involve* Vol 14, No 3 (2021).
9. R. Cavalieri, M. Gillespie, L. Monin, Projective embeddings of  $\overline{M}_{0,n}$  and parking functions, *J. Comb. Theory Ser. A* Vol. 182, 105471 (2021).

10. R. Cavaliere, M. Gillespie, L. Monin, Projective embeddings of  $\overline{M}_{0,n}$  and parking functions, Extended abstract (FPSAC 2020 proceedings), *Séminaire Lotharingien de Combinatoire*, **84B.32** (2020), 12 pp.
11. M. Monks Gillespie, K. M. Monks, K. G. Monks. Enumerating anchored permutations with bounded gaps. *Discrete Mathematics*, Vol. 343, Issue 9 (2020), Article 111957.
12. M. Monks Gillespie, G. Hawkes, W. Poh, A. Schilling, Characterization of queer supercrystals, *Advances in Mathematical Sciences, Association for Women in Mathematics Series* **21**, AWM Research Symposium Proceedings, April 2019.
13. M. Monks Gillespie, G. Hawkes, W. Poh, A. Schilling. Characterization of queer supercrystals. *Journal of Combinatorial Theory, Ser. A*, Vol. 173 (2020), Article 105235.
14. M. Monks Gillespie, J. Levinson, K. Purbhoo. Schubert curves in the orthogonal Grassmannian. Submitted to *Discrete and Computational Geometry* (2019).
15. M. Monks Gillespie, J. Levinson. Axioms for shifted tableau crystals. *Electronic Journal of Combinatorics*, Vol. 26, Issue 2 (2019).
16. M. Monks Gillespie, J. Levinson, K. Purbhoo. A crystal-like structure on shifted tableaux. *DMTCS proc.*, **80B.71**, FPSAC 2018.
17. M. Monks Gillespie, J. Levinson, K. Purbhoo. A crystal-like structure on shifted tableaux. *Algebraic Combinatorics*, Volume 3 (2020) no. 3, pp. 693-725.
18. M. Monks Gillespie and J. Levinson. Monodromy and  $K$ -theory of Schubert curves via generalized Jeu de taquin. *Journal of Algebraic Combinatorics*, Vol 45, Issue 1, February 2017, 191–243.
19. M. Monks Gillespie and J. Levinson. Monodromy and  $K$ -theory of Schubert curves via generalized Jeu de taquin. *DMTCS proc. BC*, FPSAC 2016, 551–562.
20. M. Monks Gillespie, A combinatorial approach to Macdonald  $q, t$ -symmetry via the Carlitz bijection, *DMTCS Proceedings*, 28th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2016), pp. 563–574.
21. M. Monks Gillespie. A combinatorial approach to the  $q, t$ -symmetry relation in Macdonald polynomials. *Electronic Journal of Combinatorics*, Vol. 23, Issue 2 (2016).
22. K. Monks, K. G. Monks, K. M. Monks, and M. Monks. Strongly sufficient sets and the distribution of arithmetic sequences in the  $3x + 1$  graph. *Discrete Mathematics*, Volume 313, Issue 4, 28 February 2013, Pages 468-489.
23. M. Monks and K. Ono. Modular forms arising from  $Q(n)$  and Dyson’s rank. *Advances in Applied Mathematics*, Dennis Stanton issue 46 (2011), 457-466.
24. M. Monks. Number theoretic properties of generating functions related to Dyson’s rank for partitions into distinct parts. *Proceedings of the American Mathematical Society*, **138** (2010), 481-494.
25. M. Monks. Reconstructing permutations from cycle minors. *Electronic Journal of Combinatorics*, **16** (2009), #R19.
26. M. Monks. The Solution to the Partition Reconstruction Problem, *Journal of Combinatorial Theory, Series A*, Volume 116, Issue 1 (2009).
27. M. Monks. Endomorphisms of the 2-adic shift map, discrete derivatives, and applications. *Discrete Mathematics*, Vol. 309, Issue 16 (2009), 5196-5205.

## OTHER PUBLICATIONS

1. M. Gillespie, Review of “Professor Mommy: Finding Work-Family Balance in Academia”, Book review, *Notices of the American Math Society*, May 2022.
2. H. Adams, K. Emmrich, M. Gillespie, S. Golden, and R. Pries. *Counting Rocks! An Introduction to Combinatorics at Colorado State University*, Open Educational Resources (OER) Textbook, 2021, Online.
3. M. Monks Gillespie. Variations on a theme of Schubert calculus. *Recent Trends in Algebraic Combinatorics*, edited by Hélène Barcelo, Gizem Karaali, and Rosa Orellana (AWM Springer Series), Vol 16, 2019.

## PROFESSIONAL ACTIVITIES

### Conference/Seminar Organization

- AlCoVE (Algebraic Combinatorics Virtual Expedition) Co-Founder, June 2020–Present
- FRAGMENT seminar (co-organizer), Colorado State University, Fall 2020–Present
- Western Algebraic Geometry Symposium (WAGS), CSU, Spring 2022
- Special Session on Combinatorics of Moduli of Curves, Canadian Math Society (CMS) Winter meeting, Dec 3-6, 2021
- Rocky Mountain Algebraic Combinatorics Seminar, Colorado State University, Fall 2019–Present
- AMS Special Session on Combinatorial Representation Theory, Fall Western Sectional Meeting, Riverside, CA, Fall 2017
- Macdonald Polynomials Seminar, UC Berkeley, Spring 2013
- Berkeley/Davis Combinatorics Gatherings, UC Berkeley/UC Davis, 2015, 2016
- Student Combinatorics Seminar, UC Berkeley, 2015, 2016

### Committees/Service

- CSU Qualifying Exam Committee, 2019–present
- NSF Panelist, Fall 2019
- UC Berkeley Mathematics Graduate Student Association, 2012–2014 (2013 President)
- MIT Undergraduate Math Association, 2007–2010

### Research mentorship

- Current Ph.D. students: Kyle Salois, Andrew Reimer-Berg
- Graduated masters students: Kyle Salois
- Prove it! Math Academy Research Team Leader (High school level), Summer 2021
- Duluth REU Visitor/Mentor, Summer 2016
- Duluth REU Advisor, Summer 2010

### Math Competition Organization and Coaching

- CSU Putnam Team Coach, Fall 2019–Present
- USA Math Olympiad Problem Selection Committee, 2017–Present
- USA Math Olympiad Problem Writer and Reviewer, 2015–Present

- Bay Area Math Olympiad Grader, 2017
- Prove it! Math Academy (Co-founder and Instructor), 2015–2020
- Math Olympiad Summer Program (Instructor), 2008–2015, 2021
- USA Math Olympiad Grader, 2008, 2013
- IdeaMath Summer Program (Instructor), 2013
- Cambridge Trinity Training Program (Instructor), 2011
- IdeaMath Lexington High School Weekend Program (Instructor), 2010–2011
- USA China Girls’ Math Olympiad Team (Coach), 2008, 2011
- Art of Problem Solving Online School (Instructor, Grader, or Class Assistant), 2006–2017
- Harvard-MIT Mathematics Tournament Head Problem Writer, 2009
- Harvard-MIT Mathematics Tournament Registration Director, 2008
- American Regions Math League grader, 2007, 2008
- USA Mathematical Talent Search Grader, 2006–2008

### Community Outreach

- CSU Sonia Kovalevsky Day Volunteer, 2022
- MAA “Mugs to Donuts” newsletter interview, 2021
  - Interview available at <https://www.youtube.com/watch?v=6JbaphAgZr8&t=2s>
- Panelist on “What is Research, and How do I do it?” panel, Who is/What is seminar, CSU, 2021
- Presentation on “What is Algebraic Combinatorics?” at InteGIRLS Bay Area chapter online math competition (high school level), 2020
- CSU Math Day Volunteer, 2019
- AWM Women in Math Panelist, CSU, 2019
- MathCamp (Visitor/Instructor) 2018
- UC Davis Math Department Picnic Day (Volunteer), 2017
- Berkeley Math Circle guest instruction, 2011–2017
- Stanford Math Circle guest instruction, 2011–present
- Julia Robinson Math Festival (Volunteer), 2014
- Girls’ Angle (Mentor), 2010–2011

**Journals Refereed:** Electronic Journal of Combinatorics, Journal of Combinatorics, SIAM Journal on Discrete Mathematics, Australasian Journal of Combinatorics, Annals of Combinatorics, Séminaire Lotharingien de Combinatoire, Contributions to Discrete Mathematics, ALCO (Algebraic Combinatorics)

### Other

- Creator/Author of Mathematical Gemstones ([mathematicalgemstones.com](http://mathematicalgemstones.com)), 2012–Present
- SageMath open source software development, 2013–2014

## INVITED TALKS

1. *AMS Special Session on Presenting Research Mathematics through Visual Storytelling: Slides Without Words or Equations*, Joint Mathematics Meetings, Online, April 2022.
2. *Algebraic Geometry Seminar*, Washington University at St. Louis, Online, March 2022
3. *Math Department Colloquium*, University of Regina, Saskatchewan, CAN (Online), October 2021
4. *Rocky Mountain Algebraic Combinatorics Seminar*, Colorado State University, Fort Collins, CO, September 2021.
5. *NTAG Seminar*, Simon Fraser University, Vancouver, BC, CAN (Online), August 2021.
6. *Algebra, Geometry and Combinatorics (AGC) Online Seminar*, online, August 2021.
7. *Math Department Colloquium*, University of Ljubljana, Slovenia, online, April 2021.
8. *LaCIM Combinatorics Seminar*, UQAM, Online, April 2021.
9. *CMS Special Session on Enumerative Combinatorics*, Canadian Math Society Winter Meetings, Online, December 2020.
10. *Formal Power Series and Algebraic Combinatorics - Poster Session*, FPSAC 2020 Online, July 2020.
11. *Rocky Mountain Algebraic Combinatorics Seminar*, Colorado State University, Fort Collins, CO, June 2020.
12. *Math Department Colloquium*, University of Colorado Boulder, Boulder, CO, February 2020.
13. *Rocky Mountain Algebraic Combinatorics Seminar*, Colorado State University, Fort Collins, CO, November 2019.
14. *CanADAM (Canadian Discrete and Algorithmic Mathematics conference)*, Simon Fraser University, Vancouver, BC, May 2019.
15. *AWM Research Symposium*, Rice University, Houston, TX, April 2019.
16. *Formal Power Series and Algebraic Combinatorics (FPSAC)*, Dartmouth University, Hanover, NH, July 2018.
17. *Rocky Mountain Algebraic Combinatorics Seminar (RMAC)*, Colorado State University, Fort Collins, CO, April 2018.
18. *Combinatorics Seminar*, University of California, Berkeley, March 2018.
19. *AMS Special Session on Comb. Comm. Alg. and Polytopes*, Joint Math Meetings, San Diego, January 2018.
20. *AMS Special Session on Combinatorial Aspects of the Polynomial Ring*, UC Riverside, October 2017.
21. *5-day Graduate Mini-Course*, Equivariant Combinatorics Workshop, Center for Mathematics Research (CRM), Montreal, June 2017.
22. *AMS Special Session on Cohomologies and Combinatorics*, Hunter College, NY, May 2017.
23. *Combinatorics Seminar*, University of Illinois Urbana-Champaign, March 2017.
24. *Combinatorics Seminar*, University of Washington, March 2017.
25. *Combinatorics Seminar*, University of California, San Diego, Jan. 2017.
26. *AMS Special Session on Combinatorial Representation Theory*, St. Thomas Univ., Minneapolis, Oct. 2016.
27. *Algebra Seminar*, University of Virginia, October 2016.
28. *Combinatorics Seminar*, University of Southern California, Los Angeles, September 2016.
29. *Combinatorics Seminar*, University of California, Los Angeles, May 2016.
30. *Rocky Mountain Algebraic Combinatorics Seminar*, Colorado State University, Fort Collins, CO, May 2016.

31. *Algebra and Discrete Math Seminar*, University of California Davis, November 2016.
32. *Formal Power Series and Algebraic Combinatorics (FPSAC) Conference*, Vancouver, CAN, July 2016.
33. *Combinatorics Seminar*, University of Michigan, April 2015.
34. *Student Algebraic Geometry Seminar*, University of Michigan, April 2015.
35. *Combinatorics Seminar*, University of California Berkeley, April 2015.
36. *Berkeley/Davis Combinatorics Gatherings*, UC Davis, March 2015.
37. *Graduate Student Combinatorics Conference*, University of Minnesota, March 2013.
38. *AMS Session on Combinatorics and Graph Theory, Joint Mathematics Meetings*, January 2012.
39. *Combinatorics Seminar*, University of California Berkeley, October 2011.
40. *AMS Special Session for Undergraduate Research, Joint Mathematics Meetings*, January 2011.
41. *Rocky Mountain Algebraic Combinatorics Seminar*, Colorado State University, Fort Collins, CO, March 2010.
42. *Combinatorics Seminar*, University of Michigan, March 2010.
43. *AMS Special Session for Undergraduate Research, Joint Mathematics Meetings*, January 2010.
44. *Colloquium*, Colorado State University, Fort Collins, March 2009.
45. *AMS Special Session on  $q$ -series and partitions*, March 2009. *AMS Special Session on Automorphic and Modular Forms in Number Theory, Joint Mathematics Meetings*, January 2009.
46. *AMS Session on Combinatorics*, Joint Mathematics Meetings, January 2008.

## TEACHING

### Graduate Courses

- Spring 2022, Abstract Algebra II (Math 567), Colorado State University
- Fall 2021, Abstract Algebra I (Math 566), Colorado State University
- Summer 2021, Schubert Calculus Workshop, Summer School in Algebraic Combinatorics, Online.
- Fall 2020, Advanced Combinatorics I (Math 601), Colorado State University
- Spring 2020, Delta Conjecture Reading Group, Colorado State University
- Spring 2020, Combinatorics II (Math 502), Colorado State University
- Fall 2019, Combinatorics I (Math 501), Colorado State University
- Summer 2017, Graduate Mini-Course on Schubert Calculus, Equivariant Combinatorics Workshop, Center for Mathematics Research, Montreal

### Undergraduate Courses

- Spring 2022, Introduction to Combinatorial Theory (Math 301), Colorado State University
- Fall 2020, Introduction to Combinatorial Theory (Math 301), Colorado State University
- Spring 2019, Introduction to Abstract Mathematics (Math 108), UC Davis
- Fall 2017, Introduction to Abstract Mathematics (Math 108), UC Davis
- Spring 2014, Calculus (Math 1A), Graduate Student Instructor, UC Berkeley
- Fall 2014, Multivariable Calculus (Math 53), Graduate Student Instructor, UC Berkeley