Research Interest: Algebra and Combinatorics. In algebra, I am mostly interested in the study of the phenomenon of non-uniqueness of factorizations into irreducibles in integral domains and finite-rank monoids using techniques of combinatorics, linear algebra, and number theory. My research in combinatorics focuses on matroids and posets. I am also interested in polyhedral geometry and cluster algebras.

List of Coauthors: David F. Anderson, Nick R. Baeth, Scott T. Chapman, Anastasia Chavez, Rebecca Conaway, Jyrko Correa-Morris, Jim Coykendall, Alfred Geroldinger, Marly Gotti, Richard E. Hasenauer, Jesse Horton, Bangzheng Li, Chris O'Neill, Roberto Pelayo, Harold Polo, Mesa Pracht, William W. Smith, Salvatore Tringali, Joseph Vulakh, Brian Wissman, and Muhammad Zafrullah.

Scientific Publications

38. *On the arithmetic of polynomial semidomains*
(with H. Polo)
Forum Mathematicum (to appear)
Preprint on arXiv: `https://arxiv.org/abs/2203.11478`

37. *On the subatomicity of polynomial semidomains*
(with H. Polo)
In: Algebra and Polynomials: Algebraic, Number Theoretic, and Topological Aspects of Ring Theory (Eds. J. L. Chabert, M. Fontana, S. Frisch, S. Glaz, and K. Johnson). Springer Nature, Switzerland. (to appear)

36. *Atomic semigroup rings and the ascending chain condition on principal ideals*
(with B. Li)
Proceedings of the American Mathematical Society, Vol. **151** (2023) 2291–2302.

35. *Integral domains and the IDF property*
(with M. Zafrullah)
Journal of Algebra, Vol. **614** (2023) 564–591.

34. *Hereditary atomicity in integral domains*
(with J. Coykendall and R. Hasenauer)
Journal of Pure and Applied Algebra Vol. **227** (2023) 107249.

33. *On the additive structure of algebraic valuations of polynomial semirings*
(with J. Correa-Morris)
Journal of Pure and Applied Algebra, Vol. **226** (2022) 107104.

32. *On semigroup algebras with rational exponents*
Communications in Algebra, Vol. **50** (2022) 3–18.

31. *Divisibility in rings of integer-valued polynomials*
(with B. Li)
New York Journal of Mathematics, Vol. **28** (2022) 117–139.

30. *Bounded and finite factorization domains*
(with D. F. Anderson)
In: Rings, Monoids, and Module Theory (Eds. A. Badawi and J. Coykendall) pp. 7–57.
Springer Proceedings in Mathematics & Statistics, Vol. **382**, Singapore, 2022.

29. *Length-factoriality in commutative monoids and integral domains*
(with S. T. Chapman, J. Coykendall, and W. W. Smith)
Journal of Algebra, Vol. **578** (2021) 186–212.

28. *Bi-atomic classes of positive semirings*
(with N. R. Baeth and S. T. Chapman)
Semigroup Forum, Vol. **103** (2021) 1–23.

27. *On strongly primary monoids, with a focus on Puiseux monoids*
(with A. Geroldinger and S. Tringali)
Journal of Algebra, Vol. **567** (2021) 310–345.

26. *When is a Puiseux monoid atomic?*
(with S. T. Chapman and M. Gotti)
The American Mathematical Monthly, Vol. **128** (2021) 302–321.

25. *Geometric and combinatorial aspects of submonoids of a finite-rank free commutative monoid*
Linear Algebra and Its Applications, Vol. **604** (2020) 146–186.

24. *Factorization in upper triangular matrices over information semialgebras*
(with N. R. Baeth)
Journal of Algebra, Vol. **562** (2020) 466–496.

23. *The system of sets of lengths and the elasticity of submonoids of a finite-rank free commutative monoid*
Journal of Algebra and Its Applications, Vol. **19** (2020) 2050137.

22. *Irreducibility and factorizations in monoid rings*
In: Numerical Semigroups (Eds. V. Barucci, S. T. Chapman, M. D'Anna, and R. Fröberg) pp. 129–139.
Springer INdAM Series, Vol. **40**, Switzerland, 2020.

21. *On the molecules of numerical semigroups, Puiseux monoids, and Puiseux algebras*
(with M. Gotti)
In: Numerical Semigroups (Eds. V. Barucci, S. T. Chapman, M. D'Anna, and R. Fröberg) pp. 141–161.
Springer INdAM Series, Vol. **40**, Switzerland, 2020.

20. *The elasticity of Puiseux monoids*
(with C. O'Neill)
Journal of Commutative Algebra, Vol. **12** (2020) 319–331.

19. *Factorization invariants of Puiseux monoids generated by geometric sequences*
(with S. T. Chapman and M. Gotti)
Communications in Algebra, Vol. **48** (2020) 380–396.

18. *On the atomicity of monoid algebras*
(with J. Coykendall)
Journal of Algebra, Vol. **539** (2019) 138–151.

17. *Systems of sets of lengths of Puiseux monoids*
Journal of Pure and Applied Algebra, Vol. **223** (2019) 1856–1868.

16. *Increasing positive monoids of ordered fields are FF-monoids*
Journal of Algebra, Vol. **518** (2019) 40–56.

15. *How do elements really factor in $\mathbb{Z}[\sqrt{-5}]$?*
(with S. T. Chapman and M. Gotti)
In: Advances in Commutative Algebra (Eds. A. Badawi and J. Coykendall), pp. 171–195, Springer Trends in Mathematics, Birkhäuser, Singapore, 2019.

14. *On positroids induced by rational Dyck paths (Extended Abstract)*
Séminaire Lotharingien de Combinatoire, Vol. **80B** (2018) 12pp.

13. *Puiseux monoids and transfer homomorphisms*
Journal of Algebra, Vol. **516** (2018) 95–114.

12. *Minimal presentations of shifted numerical semigroups*
(with R. Conaway, J. Horton, C. O'Neill, R. Pelayo, M. Williams, and B. Wissman)
International Journal of Algebra and Computation, Vol. **28** (2018) 53–68.

11. *Dyck paths and positroids from unit interval orders*
(with A. Chavez)
Journal of Combinatorial Theory Series A, Vol. **154** (2018) 507–532.

10. *Atomicity and boundedness of monotone Puiseux monoids*
(with M. Gotti)
Semigroup Forum, Vol. **96** (2018) 536–552.

9. *Dyck paths and positroids from unit interval orders (Extended Abstract)*
(with A. Chavez)
Séminaire Lotharingien de Combinatoire, Vol. **78B** (2017) 12pp.

8. *On the atomic structure of Puiseux monoids*
Journal of Algebra and Its Applications Vol. **16** (2017) 1750126.

Doctoral Dissertation

7. *Matroids and convex geometry in combinatorics and algebra*
eScholarship University of California (PhD Dissertation).

Undergraduate Thesis

6. *On delta sets and their realizable subsets in Krull monoids with cyclic class groups*
(with S. T. Chapman and R. Pelayo)
Colloquim Mathematicum, Vol. **137** (2014) 137–146.

Submitted Manuscripts with Available Preprints

5. *Positroids induced by rational Dyck paths*
Preprint on arXiv: `https://arxiv.org/abs/1706.09921`

4. *Tilings and matroids on the lattice points of a regular triangle*
(with H. Polo)
Preprint on arXiv: `https://arxiv.org/abs/1802.05633`

3. *Divisibility and a weak ascending chain condition on principal ideals*
(with B. Li)
Preprint on arXiv: `https://arxiv.org/abs/2212.06213`

2. *On the atomic structure of torsion-free monoids*
(with J. Vulakh)
Preprint on arXiv: `https://arxiv.org/abs/2212.08347`

1. *Hereditary atomicity and ACCP in abelian groups*
Preprint on arXiv: `https://arxiv.org/abs/2303.01039`