

Francisco Ponce-Carrion

Raleigh, NC, US

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Education

- **North Carolina State University** **Raleigh, NC, US**
PhD Mathematics *August 2021 – May 2026*
- **Universidad San Francisco de Quito** **Quito, Ecuador**
BS Mathematics *August 2016 – May 2020*

Research Interests

I am interested in the use of algebraic and combinatorial tools to answer questions in other fields of mathematics (usually more applied ones). The main areas of applications I have worked on are: marginal independence models (mathematical statistics), continuous Newton's method (dynamical systems/homotopy continuation), and linear compartmental models (dynamical systems/mathematical biology).

I am also interested in real numerical algebraic geometry. In particular, I am interested in the problem of using homotopy continuation-based methods to find real roots of zero dimensional systems without having to compute non-real solutions.

Professional Experience

- **North Carolina State University** **Raleigh, NC, US**
Graduate Teaching Assistant *August 2021 – Present*
- **Universidad San Francisco de Quito** **Quito, Ecuador**
Mathematics Teaching Assistant *January 2021 – June 2021*
- **Banco Solidario** **Quito, Ecuador**
Data Analyst/Scientist (Intern from June-September) *June 2019 – June 2021*

Preprints and Publications

Preprints

- Francisco Ponce-Carrión and Seth Sullivant. Marginal Independence and Partial Set Partitions, 2024.
<https://arxiv.org/abs/2402.16292>
- Jonathan D. Hauenstein, Caroline Hills, Hoon Hong, and Francisco Ponce-Carrión. Geometry of Continuous Adjoint Newton's Method for Bivariate Quadratics, 2024.
To appear in Maple Transactions
- Nicolás Coloma, Maria Espericueta Sandoval, Erika Lopez, Francisco Ponce-Carrión, Gustavo Rama, Nathan C. Ryan, Alejandro Vargas-Altamirano. Repulsion of zeros close to $s = 1/2$ for L-functions, 2024.
<https://arxiv.org/abs/2401.07959>
To appear in Journal of Experimental Mathematics

Publications.....

- Johan Ceballos, Nicolás Coloma, Antonio Di Teodoro, Diego Ochoa-Tocachi, and Francisco Ponce. Fractional multicomplex polynomials. *Complex Analysis and Operator Theory*, 16(4):60, 2022.
- Nicolás Coloma, Antonio Di Teodoro, Diego Ochoa-Tocachi, and Francisco Ponce. Fractional Elementary Bicomplex Functions in the Riemann–Liouville Sense. *Advances in Applied Clifford Algebras*, 31(4):1–29, 2021.
- Johan Ceballos, Nicolas Coloma, Nicola Di Teodoro, and Francisco Ponce. Introduction to Clifford analysis: A new perspective. *Nova Science Publishers*, 2020.

Presentations

- **AMS Special Session: Numerical Algebraic Geometry and Applications. JMM.** **January 2026**
Talk *Washington DC, US*
- **Algebra and Combinatorics Seminar. NCSU.** **September 2025**
Invited Talk *Raleigh, NC, US*
- **New Directions in Algebraic Statistics. IMSI.** **July 2025**
Contributed Lightning talk *Chicago, IL, US*
- **AMS Special Session: Algebraic Statistics in Our Changing World. JMM.** **January 2025**
Invited Talk *Seattle, WA, US*
- **KTH Combinatorics seminar.** **October 2024**
Invited Talk *Virtual (Sweden)*
- **ISSAC 2024.** **July 2024**
Contributed Poster *Raleigh, NC, US*
- **Algebraic Statistics for Ecological and Biological Systems. IMSI.** **October 2023**
Contributed Lightning talk *Chicago, IL, US*

Select Workshops/Conferences attended

- **MRC: Real Numerical Algebraic Geometry** **July 2025**
Participant *Providence, RI, US*
- **Días de Combinatoria 2023** **December 2023**
Teaching assistant for mini-course dictated by Laura Colmenarejo *Bucaramanga, Colombia*
- **Invitation to Algebraic Statistics and Applications. IMSI.** **September 2023**
Participant *Chicago, IL, US*
- **Meeting on Applied Algebraic Geometry 2023** **April 2023**
Participant *Atlanta, GA, US*

Teaching Experience

Term	Course	Position	Institution
Fall 2025	MA 520 Linear Algebra	Instructor of record	NCSU
Summer 2025	MA 305 Introductory Linear Algebra and Matrices	Instructor of record	NCSU
Spring 2025	MA 131 Calculus for Life and Management Sciences A	Instructor of record	NCSU
Fall 2024	MA 305 Introductory Linear Algebra and Matrices	Instructor of record	NCSU
Summer 2024	MA 305 Introductory Linear Algebra and Matrices	Instructor of record	NCSU
Spring 2024	MA 241 Calculus II	Instructor of record	NCSU
Fall 2023	MA 305 Introductory Linear Algebra and Matrices	Instructor of record	NCSU
Spring 2023	MA 131 Calculus for Life and Management Sciences A	Instructor of record	NCSU
Fall 2022	MA 242 Calculus III (Honors section)	Recitation leader	NCSU
Spring 2022	MA 241 Calculus II	Recitation leader	NCSU
Fall 2021	MA 241 Calculus II	Recitation leader	NCSU
Spring 2021	MAT 1202 Integral Calculus (4 sections)	Recitation leader	USFQ

Service

- o Mentor for an undergraduate student for Undergrads Union Grads program. **Fall 2021.**
- o Organizer of Pure Graduate Seminar at NCSU **August 2024-May 2026**
- o Organizer of AMS Special Session at JMM 2026: Numerical Algebraic Geometry and its Applications **January 2026**

Languages

- o **English:** Fluent, certified CEFR C2 proficiency.
- o **Spanish:** Native language.
- o **French:** Basic.

Other skills and interests

- o **Programming:** R, Python, Macaulay2, Maple, Julia, Sage, C++ and Latex