

NICOLA TARASCA

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DEPARTMENT OF MATHEMATICS & APPLIED MATHEMATICS tarascan@vcu.edu
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EDUCATION

- 2008–2012 Ph.D. in Mathematics
HUMBOLDT UNIVERSITY IN BERLIN and
BERLIN MATHEMATICAL SCHOOL, Germany, supervised by Gavril Farkas.
- 2006–2008 *Master en Mathématiques Fondamentales*
PIERRE AND MARIE CURIE UNIVERSITY, Paris VI, France.
- 2003–2006 *Laurea Triennale* in Mathematics
UNIVERSITY OF TOR VERGATA IN ROME, Italy.

POSITIONS

- Since 2024 Associate Professor of Math., VIRGINIA COMMONWEALTH UNIVERSITY, USA.
- 2019–2024 Assistant Professor of Math., VIRGINIA COMMONWEALTH UNIVERSITY, USA.
- 2017–2019 Hill Assistant Professor, RUTGERS UNIVERSITY, USA.
- 01–07/2017 Postdoctoral Associate, UNIVERSITY OF GEORGIA, USA.
- 07–12/2016 Fields Postdoctoral Fellow, FIELDS INSTITUTE, Canada.
- 2013–2016 Research Assistant Professor, UNIVERSITY OF UTAH, USA.
- 2011–2013 Postdoctoral Fellow, LEIBNIZ UNIVERSITY HANNOVER, Germany.

RESEARCH INTERESTS

Geometry and combinatorics of curves, abelian varieties, and their moduli, vector bundles and Brill–Noether theory, modern Schubert calculus, geometric realizations of vertex operator algebras and conformal blocks, quantum invariants of framed links and 3-manifolds.

PAPERS

19. Higher rank series and root puzzles for plumbed 3-manifolds
with Allison Moore, Submitted, arXiv:2405.14972.
18. Coinvariants of metaplectic representations on moduli of abelian varieties
Submitted, arXiv:2301.13227.
17. A pointed Prym-Petri Theorem
TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY, 376:4 (2023),
PP. 2641–2656.

16. k -canonical divisors through Brill-Noether special points
with Iulia Gheorghita
 ANNALI DELLA SCUOLA NORMALE SUPERIORE DI PISA, *to appear*.
15. Incidence varieties in the projectivized k -th Hodge bundle over curves with rational tails
with Iulia Gheorghita
 COMMUNICATIONS IN CONTEMPORARY MATHEMATICS, 26:5 (2024).
14. Motivic classes of degeneracy loci and pointed Brill-Noether varieties
with Dave Anderson and Linda Chen
 JOURNAL OF THE LONDON MATHEMATICAL SOCIETY, 105:3 (2022), pp. 1787–1822.
13. Vertex algebras of CohFT-type
with Chiara Damiolini and Angela Gibney
 FACETS OF ALGEBRAIC GEOMETRY: A COLLECTION IN HONOR OF WILLIAM FULTON’S 80TH BIRTHDAY, London Mathematical Society Lecture Note Series (2022), pp. 164–189. Cambridge University Press.
12. On factorization and vector bundles of conformal blocks from vertex algebras
with Chiara Damiolini and Angela Gibney
 ANNALES SCIENTIFIQUES DE L’ÉCOLE NORMALE SUPÉRIEURE, 1:57 (2024), pp. 241–292.
11. Conformal blocks from vertex algebras and their connections on $\overline{\mathcal{M}}_{g,n}$
with Chiara Damiolini and Angela Gibney
 GEOMETRY & TOPOLOGY, 25:5 (2021), pp. 2235–2286.
10. K-classes of Brill-Noether loci and a determinantal formula
with Dave Anderson and Linda Chen
 INTERNATIONAL MATHEMATICS RESEARCH NOTICES, 16 (2022), pp. 12653–12698.
9. Classes of Weierstrass points on genus 2 curves *with Renzo Cavalieri*
 TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY, 372:4 (2019), pp. 2467–2492.
8. Du Val curves and the pointed Brill-Noether Theorem *with Gavril Farkas*
 SELECTA MATHEMATICA, 23:3 (2017), pp. 2243–2259.
7. Extremality of loci of hyperelliptic curves with marked Weierstrass points
with Dawei Chen
 ALGEBRA & NUMBER THEORY, 10:9 (2016), pp. 1935–1948.
6. Loci of curves with subcanonical points in low genus *with Dawei Chen*
 MATHEMATISCHE ZEITSCHRIFT, 284:3 (2016), pp. 683–714.

5. Divisors of secant planes to curves
JOURNAL OF ALGEBRA, 454 (2016), PP. 1–13.
4. Pointed Castelnuovo numbers *with* Gavril Farkas
MATHEMATICAL RESEARCH LETTERS, 23:2 (2016), PP. 389–404.
3. Double total ramifications for curves of genus 2
INTERNATIONAL MATHEMATICS RESEARCH NOTICES, 19 (2015), PP. 9569–9593.
2. Brill–Noether loci in codimension two
COMPOSITIO MATHEMATICA, 149:09 (2013), PP. 1535–1568.
1. Double points of plane models in $\overline{\mathcal{M}}_{6,1}$
JOURNAL OF PURE AND APPLIED ALGEBRA, 216:4 (2012), PP. 766–774.

OTHER PUBLICATIONS

- c. Middle school students’ emotional experiences in mathematics represented through emotion graphs: A multimodal discourse analysis, by Bontrager, B., Spring, A., Satyam, V. R., Bae, C. L., Aldi, M., Tarasca, N., & Moore, A. H. (accepted).
- b. Instructional moves to support middle school students’ engagement during a geometry camp, by Bontrager, B., Spring, A., Satyam, V. R., Bae, C. L., Aldi, M., Moore, A., Tarasca, N., & Freeman, H. Submitted to Proceedings of the 46th Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. –). Cleveland, OH.
- a. Embracing the Job Search, NOTICES OF THE AMS, 66:10 (2019), PP. 1656–1657.

GRANTS AND AWARDS

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|---------|---|
| 2024–27 | NSF Grant DMS-2404896: \$292,239. |
| 2022–27 | Simons Foundation: Travel Support for Mathematicians gift: \$42,000. |
| 2024–27 | NSF Conference Grant DMS-2408985: \$34,104.
PI, with Joel Lewis and Anna Pun. |
| 2023–25 | NSF Conference Grant DMS-2349810: \$26,430.
PI, with Marco Aldi and Allison Moore. |
| 2023–24 | NSF Conference Grant DMS-2240741: \$31,108.
Co-PI, with Marco Aldi and Allison Moore. |
| 2022–23 | VCU Quest Fund Award: \$47,794.
Co-PI, with Marco Aldi and Allison Moore. |
| 2022–23 | VCU Breakthroughs Fund Award: \$200,000.
PI, with Marco Aldi, Christine Lee Bae, Allison Moore, and Rani Satyam. |
| 2022–23 | Seed Award, VCU College of Humanities and Sciences: \$4,900. |
| 2018–19 | Academic Initiatives Program Award, Math Dept. at Rutgers U: \$3,480. |

- 2016–19 AMS-Simons Travel Grant: \$4,000.
 2016 Outstanding Postdoc Award, Math Dept. at University of Utah.

TALKS

Talks at conferences:

- Sep 2024 *AMS Session on A Showcase of Algebraic Geometry at Undergraduate Institutions*, University of Texas, San Antonio, USA.
 Jul 2024 Talks in two *Special Sessions* at the *Joint Meeting AMS-UMI* in Palermo, Italy.
 Jul 2023 *Algebraic Geometry in L'Aquila*, Italy.
 Mar 2020 *Moduli on Chestnut Hill*, Boston College, USA.
 Jun 2018 *Combinatorial Algebraic Geometry Retrospective Workshop*, Fields Institute, Canada.
 May 2018 *Ohio State Workshop on Schubert Calculus*, USA.
 Oct 2017 *Moduli of Curves in Gothenburg*, Sweden.
 Sep 2017 *AMS Session on Algebraic Curves and their Applications*, University of Central Florida, USA.
 Dec 2016 *Moduli and Birational Geometry*, Jeju island, South Korea.
 Dec 2016 *CMS Session on Combinatorial Algebraic Geometry*, Niagara Falls, Canada.
 Aug 2016 *Positivity of cycles*, AIM, San Jose, USA.
 May 2016 *Asymptotic invariants attached to linear series*, Pedagogical University in Cracow, Poland.
 Apr 2016 *AMS Session on Algebraic Geometry*, University of Utah, USA.
 Jan 2016 *JMM: AMS Session on Moduli Spaces in Algebraic Geometry*, Seattle, USA.
 Nov 2015 *AMS Session on Modern Schubert Calculus*, Rutgers University, USA.
 Jul 2015 *AMS Summer Institute in Algebraic Geometry*, University of Utah, USA.
 Jun 2015 *AMS-EMS-SPM International Meeting*, Porto, Portugal.
 Feb 2014 *Workshop on birational geometry and stability of moduli stacks and spaces of curves*, VIASM, Hanoi, Vietnam.
 Feb 2013 *Moduli Spaces in Algebraic Geometry*, Oberwolfach, Germany.
 Sep 2012 *Deutschen Mathematiker-Vereinigung: Jahrestagung*, Saarbrücken, Germany.
 May 2012 *Giornate di Geometria Algebrica e Argomenti Correlati*, Pisa, Italy.
 Nov 2011 *North German Algebraic Geometry Seminar*, Hannover, Germany.
 Jun 2010 *Géometrie Algébrique en Liberté XVIII*, Coimbra, Portugal.

Colloquium talks:

Nov 2018 Math Department, Virginia Commonwealth University, USA.

Sep 2018 Instituto de Matemáticas, Universidad Nacional Autónoma de México, Mexico.

Mar 2017 School of Mathematics and Statistic, University College Dublin, Ireland.

Talks at seminars:

USA: The University of North Carolina at Chapel Hill (Sep 2024), Tufts University (Mar 2024), University of Texas at Austin (Feb 2024), AG@PUI virtual seminar (Dec 2023), Stony Brook University (Apr 2023), Boston University (Mar 2023), Virginia Commonwealth University (Mar 2023, Dec 2021, Feb 2020, Oct 2019), University of California, San Diego (Dec 2021, Jun 2014), IAS (Apr 2021), Virginia Tech (Nov 2020), University of Maryland (Oct 2020), Colorado State University (Mar 2019, Apr 2017, May 2014), IAS/Princeton University (Feb 2019), Rutgers University (Feb 2019, Sep 2018, Sep 2017), Central Michigan University (Oct 2018), The Ohio State University (Feb 2018), University of Pennsylvania (Oct 2017), University of Georgia (Feb 2017), New York University (Nov 2016), University of Illinois at Chicago (Oct 2015), Northeastern University (Oct 2015), University of South Carolina (Sep 2015), University of Utah (Jan 2015, Sep 2013), University of California, Berkeley (Apr 2014), Boston College (Mar 2014).

GERMANY: Humboldt University in Berlin (May 2023, Jun 2022, Nov 2020, Jun 2015, Feb 2011), Leibniz University Hannover (Jun 2013), Freie University in Berlin (Jan 2012).

ITALY: University of Pisa (Jun 2022), University of Rome 3 (Jun 2022, Oct 2011).

MEXICO: Seminario Nacional de Geometría Algebraica en Línea (May 2022).

SWITZERLAND: ETH Zürich (Oct 2020; Dec 2019; May 2017).

CANADA: Fields Institute (Sep 2016).

TEACHING

At Virginia Commonwealth University. Lecturer for:

Advanced Calculus, MATH 407
—springs 2024, 2022 (x2), 2021 (x2)

Bridge to Modern Analysis, MATH 507
—falls 2024, 2022, 2021, 2020

Mathematical Structures, MATH 211
—falls 2022 (x2), 2020

Intro to Mathematical Reasoning,
MATH 300—fall 2024, spring 2020

General Topology, MATH 409
—fall 2021

Multivariate Calculus, MATH 307
—fall 2019 (x2)

Calculus I, MATH 200
—fall 2023

Calculus II, MATH 201
—spring 2024

At Rutgers University. Lecturer for:

Linear Algebra (2 sections in spring 2019)

Intro to Linear Algebra
(2 sections in spring 2018)

Introductory Topology I (fall 2018)

Multivariate Calculus (fall 2017)

At the University of Georgia. Lecturer for:

Calculus II for Science and Engineering (spring 2017)

At the University of Utah. Lecturer for:

Engineering Calculus II (spring 2016)

Engineering Calculus I (fall 2015)

Calculus II (spring 2015)

Calculus I (fall 2014)

Introduction to Differential Equations
(spring 2014)

Accelerated Engineering Calculus 2
(fall 2013)

At the Leibniz University Hannover. Teaching assistant for:

Calculus 2 for Engineers
(springs 2013, 2012)

Calculus 1 for Engineers
(winters 2013, 2012)

At the Humboldt University in Berlin and the Berlin Mathematical School.

Algebraic Geometry I (teaching assistant, winter 2010)

Tutor of the Berlin Mathematical School Team for the *International Mathematics Competition* (spring 2009). Participation in the work of the Jury at the IMC 2009, Budapest, Hungary.

ADVISING

- ◇ Jordan Calhoun, *Undergraduate Research Project*, VCU, fall 2024.
- ◇ Group Leader at *Combinatorics of Moduli of Curves*, Banff, Canada, 2024.
- ◇ Jeffrey Buffkin and Eric Evans, *Undergraduate Research Project*, VCU, fall 2022.
- ◇ Melissa Holly, *Directed Research*, VCU, spring 2022.
- ◇ Dylan Ryan, *Independent Studies*, VCU, 2020–2021.
- ◇ Mentor of three undergraduate students for the Math REU Program, Rutgers U, 2018.

SERVICE

- ◇ Co-organizer of the inaugural edition of the *VCU Geometry Summer Camp* for local middle-school students, June 2023.
- ◇ Co-organizer of the following research seminars:
 - the *Geometry Seminar* at Virginia Commonwealth University, since 2019;
 - the *Algebra Seminar* at Rutgers University, 2018–2019;
 - the *Algebraic Geometry Seminar* at the University of Utah, 2014–2016.
- ◇ Co-organizer of the following conferences:
 - *Mid-Atlantic Algebra, Geometry, and Combinatorics Workshop*, 2024;
 - *Richmond Geometry Meeting*, 2024;
 - *Mid-Atlantic Algebra, Geometry, and Combinatorics Workshop*, 2023;
 - *Richmond Geometry Meeting*, 2023;

- *Richmond Geometry Festival*, 2022;
- *Special Session at the AMS Meeting* at the University of Virginia, USA, 2022 (cancelled by AMS due to COVID-19);
- *Richmond Geometry Festival*, 2021;
- *Special Session at the JMM*, 2021;
- *Special Session at the AMS Meeting* at the University of Virginia, USA, 2020 (rescheduled by AMS due to COVID-19);
- *Special Session at the AMS Meeting* at the University of Michigan, USA, 2018;
- *Georgia Summer Workshop in Algebraic Geometry*, University of Georgia, USA, 2016;
- *Géométrie Algébrique en Liberté (GAeL) XX* in Grenoble, France, 2012;
- *GAeL XIX* in Berlin, Germany, 2011.
- ◇ Selected faculty committees at VCU:
 - *Colloquium of the Math Department* (chair), 2022–2023, 2020–2021;
 - *Undergraduate Curriculum Committee* (chair), 2022–2024;
 - *College of Humanities and Sciences' Faculty Council*, 2020–2022.
- ◇ External reviewer and committee member for PhD defense, HU Berlin, 2020.
- ◇ Committee member for Ph.D. defense (University of Utah, 2019) and general examination (University of Utah, 2017).
- ◇ Panel member conveying the postdoctoral experience at the Career Panel of the *Algebraic Geometry Northeastern Series* at Rutgers University, 2018.
- ◇ Trainer at the *Teaching Assistants Training Workshop*, University of Utah, summer 2015.
- ◇ Student representative at the *Admissions Committee* and the *Committee on Mentoring, Gender, and Diversity*, Berlin Mathematical School, 2008–2009.
- ◇ Reviewer for the National Science Foundation, USA.
- ◇ Referee of more than 45 papers for the following 32 journals:
 ADVANCES IN GEOMETRY, ADVANCES IN MATHEMATICS, ALGEBRA & NUMBER THEORY, ALGEBRAIC COMBINATORICS, ANNALI DI MATEMATICA PURA ED APPLICATA, ANNALI SNS, ARCHIV DER MATHEMATIK, BULLETIN OF THE LMS, COMMUNICATIONS IN MATHEMATICAL PHYSICS, COMPOSITIO MATHEMATICA, CONTEMPORARY MATHEMATICS OF THE AMS, CRELLE, DOCUMENTA MATHEMATICA, EUROPEAN JOURNAL OF MATHEMATICS, INTERNATIONAL MATHEMATICS RESEARCH NOTICES, JOURNAL OF ALGEBRA, JOURNAL OF ALGEBRAIC GEOMETRY, JOURNAL OF PURE AND APPLIED ALGEBRA, JOURNAL OF THE LMS, JOURNAL OF THE RAMANUJAN MATH SOCIETY, MANUSCRIPTA MATHEMATICA, MATHEMATICAL PROCEEDINGS OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY, MATHEMATICS (MDPI), MATHEMATISCHE NACHRICHTEN, MATHEMATISCHE ZEITSCHRIFT, MICHIGAN MATHEMATICAL JOURNAL, NOTICES OF THE AMS, PROCEEDINGS OF THE AMS, QUANTUM TOPOLOGY, SELECTA MATHEMATICA, SIGMA, TRANSACTIONS OF THE AMS.

LANGUAGES

Italian as mother tongue. Fluent in English and French. Intermediate in German and Polish.