# Vance T. Blankers

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## Current Employment

Associate Director for Research Development and Collaboration — Spring 2022 – Present
College of Science, Northeastern University — Boston, MA

Lecturer — Fall 2022 – Present
Mathematics Department, Northeastern University — Boston, MA

## Research Interests

Moduli of Curves; Moduli Spaces; Combinatorial Algebraic Geometry; Birational Geometry; Enumerative Geometry

## Education

Doctorate of Philosophy in Mathematics — May 2019
Colorado State University (CSU) — Fort Collins, CO
Thesis: *Properties of tautological classes and their intersections*
Advisor: Dr. Renzo Cavalieri

Bachelor of Arts in Mathematics Minor in Physics — May 2012
Concordia College — Moorhead, MN
Credo Honors Scholar, Summa Cum Laude

## Papers

Published

V. Blankers, S. Bozlee. *On compactifications of $\mathcal{M}_{g,n}$ with colliding markings*, Selecta Mathematica (2024), 30, 104.

V. Blankers. *Extremality of rational tails boundary strata in $\overline{\mathcal{M}}_{g,n}$*, European Journal of Mathematics (2022), 8, 523–539.

V. Blankers, R. Cavalieri. *Witten's conjecture and recursions for $\kappa$ classes*, European Journal of Mathematics (2021), 3, 309–339.

V. Blankers, R. Cavalieri. *Wall-crossings for Hassett descendant potentials*, International Mathematics Research Notices (2020), doi:10.1093/imrn/rnaa077.

V. Blankers. *Hyperelliptic classes are rigid and extremal in genus two*, Épijournal de Géométrie Algébrique, Volume 4 (2020), Article no.2.

V. Blankers. *Properties of tautological classes and their intersections*, Dissertation, Colorado State University (2019).

V. Blankers, T. Rendfrey, A. Shukert, P. Shipman. *Julia and Mandelbrot sets for dynamics over the hyperbolic numbers*, Fractal Fract (2019), 3(1), 6.

V. Blankers, R. Cavalieri. *Intersections of $\omega$ classes in $\overline{\mathcal{M}}_{g,n}$*, Proceedings of Gökova Geometry-Topology Conference (2018).

## Teaching

Northeastern University, as Instructor of Record — Boston, MA

    Math 2331 – Linear Algebra — Spring 2025
    Math 1231 – Calculus for Business and Economics — Spring 2024
    Math 1342 – Calculus 2 for Science and Engineering — Fall 2022, Spring 2023
    Math 7363 – Introduction to Moduli Spaces — Fall 2021
    Math 3175 – Group Theory — Fall 2020
    Data Science 2001 – Programming with Data: Science Practicum — Spring 2020, Fall '23, '24
    Math 1365 – Introduction to Mathematical Reasoning — Fall 2019

Colorado State University, as Instructor of Record — Fort Collins, CO

    Math 271 – Applied Math for Chemists I — Fall 2017, Fall 2018
    Math 272 – Applied Math for Chemists II — Spring 2018, Spring 2019
    Math 317 – Advanced Calculus of One Variable — Summer 2016
    Math 255 – Calculus for Biological Scientists II — Spring 2016, Fall 2016
    Math 161 – Calculus for Physical Scientists II — Fall 2015, Spring 2019
    Math 180 – One Year Calculus I — Fall 2014 – Spring 2015
    Math 155 – Calculus for Biological Scientists I — Fall 2013, Spring 2014

## Additional Experience

Northeastern University; Zelevinsky RTG Postdoctoral Fellow — Boston, MA
    Mathematics Research, Teaching, and Outreach — Fall 2019 – Fall 2021

ClearEdge3D; Research and Development Intern — Denver, CO
    Algorithm Development and Implementation — Summer 2019

Cargill, Inc.; Statistical Analysis Intern — Wayzata, MN
    Statistical Modeling; Large Data Analysis, Interpretation, and Prediction — Summer 2012

## Conference and Seminar Talks

Invited

*Descendent potentials of simplicially stable compactifications of $\mathcal{M}_{g,n}$* — March 2023
    Boston College AG/NT Seminar. Boston, MA
*Panel: Life With a Math Major* (moderator) — April 2022
    Western Algebraic Geometry Symposium. Fort Collins, CO
*Colliding point compactifications of the moduli space of curves* — April 2022
    Tufts Algebra Seminar. Medford, MA
*An alphabet of stability conditions* — March 2022
    NU Topology Seminar. Boston, MA
*Tropicalizing compactifications of $\mathcal{M}_{0,n}$* — March 2022
    AMS Special Session on Moduli in Algebraic and Tropical Geometry.
    Medford, MA
*An alphabet of stability conditions* — November 2021
    Valley Geometry Seminar at UMass Amherst. Amherst, MA
*Alternative compactifications of the moduli space of curves* — September 2021
    Virginia Commonwealth University G&T Seminar. Richmond, VA
*Alternative compactifications of the moduli space of curves* — September 2021
    Simon Fraser University NTAG Seminar. Burnaby, BC

*Extremality of rational tails strata in $\overline{\mathcal{M}}_{g,n}$*                                         October 2020
    Boston College NT & AG Seminar. Boston, MA

*Extremal strata in $\overline{\mathcal{M}}_{g,n}$*                                         May 2020
    FRAGMENT Seminar. Fort Collins, CO

*Wall-crossings for descendant potentials on Hassett spaces*                                         January 2020
    AMS Special Session on Cohomological Field Theories and Wall Crossing.
    Denver, CO

*Witten's conjecture and recursions for κ classes*                                         November 2018
    Geometry, Physics, and Representation Theory Seminar. Boston, MA

*Descendant potentials for Hassett spaces with diagonal weights*                                         May 2018
    Crossing the Walls in Enumerative Geometry conference. Snowbird, UT

*Witten's conjecture for κ-classes*                                         April 2018
    AMS Sectional; Special meeting on Moduli Spaces. Portland, OR

*Combinatorial structures in moduli spaces of stable pointed curves*                                         February 2018
    SF State Geometry & Topology Seminar. San Francisco, CA

Contributed

*The triangle of triangles*                                         January 2025
    NU Math Club. Boston, MA

*Fractals in Minkowski Space*                                         October 2022
    NU Math Club. Boston, MA

*Alice and Bob: a Love Story*                                         February 2022
    NU Math Club. Boston, MA

*Career Killers - Fun Problems to Avoid*                                         November 2021
    NU Math Club. Boston, MA

*Compactifying the moduli space of curves*                                         October 2021
    NU Pick My Brain Seminar. Boston, MA

*The triangle of triangles*                                         March 2021
    NU Math Club. Boston, MA

*Life after graduate school*                                         September 2020
    CSU AMS Alumni Series. Fort Collins, CO

*The tautological ring of the moduli space of curves*                                         September 2019
    NU Pick My Brain Seminar. Boston, MA

*The Witten conjecture for κ-classes on the moduli space of curves*                                         January 2019
    Joint Math Meetings. Baltimore, MD

*Descendant potentials on Hassett spaces and the Witten conjecture for κ-classes*                                         September 2018
    FRAGMENT Seminar. Fort Collins, CO

*Hyperelliptic classes are rigid and extremal in genus two*                                         January 2018
    Joint Math Meetings. San Diego, CA

*Hyperelliptic classes are rigid and extremal in genus two* (poster)                                         October 2017
    Western Algebraic Geometry Symposium. Los Angeles, CA

*The recursive structure of hyperelliptic loci in moduli spaces of curves*                                         September 2017
    FRAGMENT Seminar. Fort Collins, CO

Greenslopes Graduate Seminar (CSU)

*Alice and Bob: a Love Story*                                         February 2019
*Career Killers - Fun Problems to Avoid*                                         September 2018
*Some Differential Equations in Enumerative Geometry*                                         February 2018
*Impossible Things and Where to Find Them*                                         August 2017

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|---|---|
| *Topological Primes* | February 2017 |
| *Obstructions and Pathologies* | October 2016 |
| *Fat Points Nowhere and Everywhere: a Brief Introduction to Schemes* | February 2016 |
| *Graph Theory on the Moduli Space of Curves* | September 2015 |
| *The Double Ramification Cycle* | April 2015 |
| *Counting Curves, Stable Maps, and Gromov-Witten Invariants* | September 2014 |

Splinter Graduate Seminar (CSU)

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| *Schemes and You* | February 2019 |
| *The tautological ring of the moduli space of curves* | September 2018 |
| *A differential operator on generating functions of intersection numbers* | October 2017 |
| *Stick-figure Reproduction (and Graph Multiplication)* | March 2017 |
| *Hyperelliptic Curve Classes on $\overline{\mathcal{M}}_{g,n}$* | October 2016 |

Category Theory Lab (CSU)

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| *Sheaves in category theory and algebraic geometry* | October 2018 |
| *Moduli problems* | July 2018 |

Mathematical Physics Lab (CSU)

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| *Introduction to Minkowski space* | February 2019 |

Solving Problems in Applied Math Lab (CSU)

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| *Mandelbrot and Julia sets over the hyperbolic numbers* | October 2018 |

## Workshops

Co-organized

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| Combinatorics of Moduli of Curves | Summer 2024 |
| Banff International Research Station (BIRS), Alberta, Canada | |

Attended

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| Summer Graduate School in Tropical Geometry (as TA) | August 2022 |
| Mathematical Sciences Research Institute (MSRI), Moraga, CA | |
| Riemann Surfaces and Their Moduli Spaces | February 2020 |
| Salt Lake City, UT | |
| Stability, Moduli Spaces and Applications | December 2019 |
| Chicago, IL | |
| Flat Surfaces and Algebraic Curves | September 2018 |
| Oberwolfach, Germany | |
| Crossing the Walls in Enumerative Geometry | May 2018 |
| Snowbird, UT | |
| University of Georgia Summer Workshop in Algebraic Geometry | August 2016 |
| Athens, GA | |
| Summer School in Gromov-Witten Theory | June – July 2014 |
| Pingree Park, CO | |

## Service

Organizing

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| Pick My Brain Seminar | Fall 2021 |
| NU Summer Math Research Program REU | Summer 2021, Summer 2024 |

Geometry, Physics, and Representation Theory Seminar       Fall 2020 – Fall 2021
Lunch in the Time of COVID Seminar                  Summer 2020 – Summer 2022
CSU Summer REU                                                   Summer 2018
    Dynamics Over the Hyperbolic Numbers
Splinter Graduate Seminar                                          Spring 2018
Math Grads Tube Water Polo Manager                  Fall 2017 – Spring 2019
Western Algebraic Geometry Symposium                                Fall 2016
Mindful Mathematics Education, Learning, and Didactics   Fall 2015 – Spring 2016
FRAGMENT                                                          Fall 2015
Math Grads Soccer Manager                                       Summer 2015
Greenslopes Graduate Seminar                                     Spring 2015

Mentoring

Northeastern Graduate Student Mentor                              Fall 2021
Graduate Student Mentor                              Fall 2016 – Spring 2018
CSU Graduate Student Representative                  Fall 2016 – Spring 2017

Refereeing

Referee for Selecta Mathematica
Referee for Geometry & Topology
Referee for Combinatorial Theory
Referee for Communications in Mathematical Physics

Association Participation

American Mathematical Society (AMS)                    Fall 2017 – Present
    CSU Student Chapter Founder/Treasurer        Fall 2017 – Spring 2019
Society of Applied and Industrial Mathematics        Fall 2013 – Spring 2019
    Student Chapter Member

Other Outreach

Northern Colorado Math Circles (for Middle School Students)
    Session Facilitator
      *Decomposing Compositions*                          Summer 2018
      *Eot-Cat-Cit*                                        Summer 2017
      *It's All Greek to Me: Math in the Ancient World*    Summer 2016
      *Möbius Strips*                                      Summer 2015