

CONTACT INFORMATION PMA 12.146 lmvelasco@utexas.edu
2515 Speedway
Austin, TX 78751

EDUCATION **Department of Mathematics, The University of Texas at Austin**
Ph.D. Student, Mathematics August 2022 - Present
Advised by Nataša Pavlović

Departments of Mathematics and Physics, University of Dallas
B.S. in Mathematics and Physics August 2018 - May 2022
Thesis: *Developing a Machine Learning-enabled Monte Carlo Event Generator*.
Advised by Richard Olenick

RESEARCH INTERESTS Kinetic and dispersive equations, mathematical physics, analysis, probability

PUBLICATIONS

Submitted:

Six-wave kinetic equation in exponentially weighted L^∞ spaces.
with N. Pavlović and M. Tasković, arXiv:2501.10565

Refereed Articles:

On the Diophantine equations of the form $\lambda_1 U_{n_1} + \lambda_2 U_{n_2} + \dots + \lambda_k U_{n_k} = w p_1^{z_1} p_2^{z_2} \dots p_s^{z_s}$.
with E. Goedhart, B. Ha, L. McBeath
To be seen in Boletín de la Sociedad Matemática Mexicana (2024)

cFAT-GAN: Conditional Simulation of Electron-Proton Scattering Events with Variate Beam Energies by a Feature Augmented and Transformed Generative Adversarial Network. In: Wani M.A., Raj B., Luo F., Dou D. (eds) Deep Learning Applications, Volume 3 (2022). Advances in Intelligent Systems and Computing, vol 1395. Springer, Singapore.

Simulation of Electron-Proton Scattering Events by a Feature-Augmented and Transformed Generative Adversarial Network (FAT-GAN) Thirtieth International Joint Conference on Artificial Intelligence, IJCAI-21, edited by Zhi-Hua Zhou (International Joint Conferences on Artificial Intelligence Organization, 2021) pp. 2126 - 2132

cFAT-GAN: Conditional Simulation of Electron-Proton Scattering Events with Variate Beam Energies by a Feature Augmented and Transformed Generative Adversarial Network 2020 19th IEEE International Conference on Machine Learning and Applications (ICMLA), 2020, pp. 372-375.

RESEARCH TALKS

- Six-wave kinetic equation in exponentially weighted L^∞ spaces* January 2025
Joint Math Meetings – Seattle, WA
- The Six-Wave Kinetic Equation* October 2024
Junior Analysis Seminar, UT Austin - Austin, TX
- An Introduction to Wave Turbulence and the Wave Kinetic Equation* April 2024
Junior Analysis Seminar, UT Austin - Austin, TX
- Brownian Motion and the Heat Equation* November 2023
Junior Analysis Seminar, UT Austin - Austin, TX
- Convergence of Single-Layer Neural Network* April 2023
Junior Analysis Seminar, UT Austin - Austin, TX
- Deriving the Boltzmann Equation in the Case of Hard Spheres* March 2023
Texas Women in Math Symposium, UT Austin - Austin, TX
- Introduction to the Euler Equations for Fluid Dynamics* November 2022
Junior Analysis Seminar, UT Austin - Austin, TX
- Calculus of Variations* October 2022
Sophex Seminar, UT Austin - Austin, TX
- Writing a Product of Prime Powers as a Sum of Recurrence Terms* October 2021
Gulf Coast Undergraduate Research Symposium, Rice University - Virtual
- Writing a Product of Prime Powers as a Sum of Recurrence Terms* August 2021
Young Mathematicians Conference, Ohio State University - Virtual
- cFAT-GAN: Conditional Simulation of Electron-Proton Scattering Events with Variate Beam Energies by a Feature Augmented and Transformed Generative Adversarial Network* December 2020
International Conference for Machine Learning Applications - Virtual
- Improving the Particle Multiplicity Generator for the Empirically Trained Hadronic Event Regenerator* October 2019
Division of Nuclear Physics Conference - CEU Undergraduate Poster Session

CONFERENCES ATTENDED

- Joint-Math Meeting 2025**
Special session: Advances in Nonlinear Dispersive and Kinetic Equations (invited speaker)
January 10, 2025
- Summer School on Effective Approximation and Dynamics of Many-Body Quantum Systems**
Summer school on many-body quantum systems at Lorraine University, UFR Mathematics, Informatics and Mechanics / Institute Élie Cartan of Lorraine (Participant)
June 24 - June 27, 2024
- Mathematical Aspects of Fluid Flows**
Summer school on recent mathematical (PDE) theories relevant to processes involving fluids sponsored by the European Mathematical Society (Participant)
May 12 - May 17, 2024

Summer School of Wave Turbulence

Summer school on Wave Turbulence sponsored by the Simons collaboration
(Participant)

July 24 - July 28, 2023

Stability and Dynamics in Fluid Mechanics and Kinetic Theory

Summer School at Imperial College, London (Participant)

July 10 - July 14, 2023

**AWARDS AND
HONORS**

NSF Graduate Research Fellowship, NSF	2024
Frank Gerth III Teaching Excellence Award, University of Texas at Austin	2023
Frank Gerth III Graduate Excellence Award, University of Texas at Austin	2023
Dean's Strategic Fellowship, University of Texas at Austin	August 2022
Outstanding Math Major, University of Dallas	May 2022
First Academic Honors, University of Dallas	May 2022
Goldwater Scholar, Goldwater Foundation	May 2020
Outstanding Teaching Assistant, University of Dallas	Spring 2019
Honorable Mention, Mathematical Contest in Modeling	January 2019
Trustee Scholarship, University of Dallas	August 2018
Physics Departmental Scholarship, University of Dallas	August 2018

**RESEARCH
EXPERIENCE****NSF REU: Diophantine Equations**

SMALL at Williams College, Williamstown, MA June 2021 - August 2021

Jefferson Sciences Associates (JSA) Intern: Theoretical Nuclear Physics

Jefferson National Lab - Virtual September 2019 - December 2020

NSF REU: Theoretical Nuclear Physics

Old Dominion University, Norfolk, VA May 2019 - August 2019

**TEACHING
EXPERIENCE**

Teaching Assistant, University of Texas at Austin

M 408C: Differential and Integral Calculus Fall 2023

Teaching Assistant, University of Dallas

PHYS 2311: General Physics I (Calculus) Spring 2020

PHYS 2312: General Physics II (Calculus) Spring 2019

SERVICE

Representative on the Math Grad Rep Committee

August 2024 - present

Organizer Distinguished Women in Math Colloquium

April 2023-present

Conference Organizer Texas Women in Math Symposium

March 2023

Mentor in Directed Reading Program, UT Austin

Fall 2022-present

Mentees:

Fall 2022: Asim Suhail – Analytic number theory

Spring 2024: Samantha Ward – Functional analysis

Summer 2024: Jessica Loyola – Point-set topology

Fall 2024: Audrie Ibanez – Functional analysis

Spring 2025: Jacob Busby and Fiona Roman – Measure theory and probability

Officer of Math Club, University of Dallas

2021-2022

Mathematics Tutor at University of Dallas

Fall 2021 - Spring 2022