



# Andrés Esteban Merino Toapanta

Mathematician  
Full professor

- October 18, 1990
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- Ecuadorian

## Online Profiles



## Languages

Español	● ● ● ● ●
English	● ● ● ● ●
Française	● ● ● ● ●

## Areas of Interest

- Descriptive Set Theory
- Foundations of Mathematics
- Data Science
- Machine Learning
- Editing and Composition in  $\text{\LaTeX}$
- Mathematics Education

## Education

feb-2024	<b>Master's Degree in Data Science</b>	Universitat Oberta de Catalunya
Thesis: Automatic Image Recognition for Plant-Pollinator Network Reconstruction		
mar-2017	<b>Master's Degree in Pure and Applied Mathematics</b>	Universidad Central del Ecuador
Thesis: Classification of Countable Compact Subsets in some Polish Spaces		
oct-2014	<b>Master 1</b>	Université Jean Monnet
Master Mathématiques 1		
oct-2014	<b>Mathematician</b>	Escuela Politécnica Nacional
Thesis: Classification of Countable Compact Subsets of the Reals		
<i>Summa Cum Laude</i>		
<b>High</b>		
jul-2008	<b>School Diploma</b>	Colegio Municipal Experimental "Sebastián de Benalcázar"
Specialization in Physics and Mathematics		

## Teaching Experience

apr-2017	<b>Full Professor</b>	Pontificia Universidad Católica del Ecuador
Mathematics Professor in the Faculty of Exact and Natural Sciences (current full-time job: 7 years)		
apr-2021	<b>Postgraduate Lecturer</b>	Pontificia Universidad Católica del Ecuador
Lecturer in the Master's Degree in Experimental Sciences Education, major in Mathematics and Physics (part-time: 1 year and 6 months)		
mar-2018	<b>Lecturer</b>	Escuela Politécnica Nacional
Mathematics Professor in the Department of Basic Education (half-time: 12 months)		
oct-2014	<b>Adjunct Professor</b>	Escuela Politécnica Nacional
Mathematics Professor in the Faculty of Sciences (2 years and 5 months)		
apr-2014	<b>Teacher</b>	Colegio Municipal "Sebastián de Benalcazár"
Mathematics Teacher (4 months)		

## Professional Experience (Non-teaching)

apr-2021	<b>Postgraduate Coordinator</b>	Universidad Central del Ecuador
Coordinator of the Master's Degree in Pure and Applied Mathematics in the Faculty of Sciences (part-time: 1 year and 9 months)		
jun-2019	<b>Editor</b>	Ministerio de Educación
Editor of Mathematics modules for the 10th year of Basic General Education in the National Curriculum Directorate (1 month)		
feb-2018	<b>Validator</b>	Instituto Nacional de Evaluación Educativa (INEVAL)
Validation of item production 2018 in the Item Production and Safeguarding Directorate (2 months)		
may-2015	<b>Monitor</b>	Instituto de Altos Estudios Nacionales (IAEN)
Monitor of the virtual Mathematics course in the Continuing Education Center (CEC-EP) (1 month)		

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## About Me

I have dedicated my career to teaching and research. In the latter, I collaborate in the areas of Descriptive Set Theory, Foundations of Mathematics, Mathematics Education, and Data Science. I have contributed knowledge and advancements through publications in scientific journals and participation in national and international conferences. My contributions include studies on the Cantor-Bendixson Derivative, Machine Learning models for data and image analysis, and innovative techniques for teaching Mathematics.

## Software



oct-2012	<b>Laboratory Assistant</b>	Escuela Politécnica Nacional
	Support in the seed research project "Flow over granular assemblies" (1 year)	
dec-2011	<b>Editing Assistant</b>	Abya Yala, Revista La Granja
	Layout, diagramming, and template design (3 years)	
mar-2011	<b>Laboratory Assistant</b>	Escuela Politécnica Nacional
	Editing in L <sup>A</sup> T <sub>E</sub> X and support in classes of Single Variable Calculus and Foundations of Mathematics (1 year and 3 months)	
aug-2010	<b>Editing Assistant</b>	Escuela Politécnica Nacional
	Editing and publication of books and journals in the Faculty of Sciences Publications Unit (6 months)	
nov-2010	<b>Editing Assistant</b>	Analítica, revista de análisis estadístico
	Editing, diagramming, and layout. (3 years)	

## Appointments

mar-2025	<b>Head of the Service Unit for Curriculum Development and Innovation</b>	
	<i>Pontificia Universidad Católica del Ecuador, Faculty of Exact, Natural and Environmental Sciences</i>	
	Current appointment	
jul-2023	<b>Coordinator of the School of Physical and Mathematical Sciences</b>	
	<i>Pontificia Universidad Católica del Ecuador, Faculty of Exact and Natural Sciences, School of Physical and Mathematical Sciences</i>	
	1 year and 8 months	
mar-2020	<b>Coordinator of Virtual Classrooms</b>	
	<i>Pontificia Universidad Católica del Ecuador, Faculty of Exact and Natural Sciences, School of Physical and Mathematical Sciences</i>	
	3 years	
apr-2021	<b>Coordinator of the Master's Degree in Pure and Applied Mathematics</b>	
	<i>Universidad Central del Ecuador, Faculty of Sciences</i>	
	1 year and 9 months	
sep-2018	<b>Coordinator of the Vector Calculus Course</b>	
	<i>Escuela Politécnica Nacional, Department of Basic Education</i>	
	6 months	
sep-2018	<b>Coordinator of the Linear Algebra Course</b>	
	<i>Escuela Politécnica Nacional, Department of Basic Education</i>	
	6 months	

## University Courses Taught

- Machine learning
- Single Variable Calculus
- Vector Calculus
- Mathematical Analysis
- Mathematical Logic and Set Theory
- Real Analysis
- Foundations of Mathematics
- Ordinary Differential Equations
- Linear Algebra
- Fuzzy Logic
- Discrete Mathematics
- Mathematics for Graphic Design

## Courses and Conferences Delivered (last 5 years)

nov-2025	<b>Presentation: Exploring the Didactic Potential of ChatGPT Hallucinations in Teaching</b> <i>VII Congreso Internacional de Tecnología y Educación - TEDUCA 2025</i> Universidad de Santander
jun-2025	<b>Conference: Exploring the Didactic Potential of ChatGPT Hallucinations in Teaching</b> <i>Workshop Internacional INCOIN LEARNING: Inteligencia Artificial aplicada a la Educación Superior, edición PUCE 2025</i> Pontificia Universidad Católica del Ecuador
aug-2024	<b>Conference: Integrating ChatGPT into the Flipped Classroom Methodology</b> <i>Workshop INCOIN: Inteligencia Artificial en la Educación Superior, edición PUCE 2024</i> Pontificia Universidad Católica del Ecuador
feb-2024	<b>Presentation: Use of ChatGPT for Teaching Differential Calculus</b> <i>MEM 2024</i> Universidad Antonio Nariño
oct-2023	<b>Presentation: Does ChatGPT Know How to Derive? An Experience in the Classroom</b> <i>STEM Miami 2023 Seminar</i> Broward International University
aug-2023	<b>Minicourse: Reinforcement Learning</b> <i>Summer School in Machine Learning 2023</i> Pontificia Universidad Católica del Ecuador (6 hours)
jul-2023	<b>Panel: Coordinators of Undergraduate and Postgraduate Programs in Data Science</b> <i>I Meeting on Big Data and Artificial Intelligence Methods and Tools Applied to the Study of Social Phenomena in Ecuador</i> Flacso Ecuador
sep-2022	<b>Presentation: Activity Guide for Mathematics Reinforcement Based on Gamification Directed at Upper Basic Level</b> <i>II International Education Congress: Crisis, Creativity, and Educational Transformation</i> Pontificia Universidad Católica del Ecuador
feb-2022	<b>Workshop: Innovative Didactics for Teaching and Learning Mathematics</b> La Salle, Distrito Lasllista Norandino (30 hours)
nov-2021	<b>Video Presentation: Designing Fonts through Bézier Curves and GeoGebra</b> <i>VIII International Workshop "Trends in Mathematics Education Based on Research in Alliance with the GeoGebra Latin American Community"</i> Benemérita Universidad Autónoma de Puebla
sep- 2021	<b>Course: Intermediate Level GeoGebra Software Management</b> Universidad Regional Amazónica Ikiam (10 hours)
dec-2020	<b>Conference: A Generalization of the Cantor Ternary Set</b> <i>II Ecuadorian Mathematics Days</i> Universidad Universidad Técnica de Manabí
dec-2020	<b>Conference: Equivalence of the Axiom of Choice with the Function Redefinition Problem</b> <i>II Ecuadorian Mathematics Days</i> Universidad Universidad Técnica de Manabí
dec-2020	<b>Conference: Ruled Surfaces in GeoGebra as a Link between Mathematics and Architecture</b> <i>II Ecuadorian GeoGebra Day</i> Universidad Nacional de Educación

## Conferences Attended (last 5 years)

Nov-2025	<b>VII Congreso Iternacional de Tecnología y Educación - TEDUCA 2025</b> <i>Universidad de Santander</i> Santa Marta–Colombia (16 hours)
Aug-2024	<b>INCOIN Workshop: Artificial Intelligence in Higher Education, PUCE 2024 edition</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito–Ecuador (18 hours)
Oct-2023	<b>STEM Miami Seminar 2023</b> <i>Broward International University</i> Miami–United States (8 hours)
sep-2022	<b>II International Education Congress: Crisis, Creativity, and Educational Transformation</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (40 hours)
jun-2022	<b>I International Symposium on Physics and Mathematics</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (10 hours)
feb-2022	<b>XII Symposium on Mathematics and Mathematics Education, XI International Congress on Mathematics Assisted by Computer (MEM2022)</b> <i>Universidad Antonio Nariño</i> Bogotá-Colombia (20 hours)
jan-2022	<b>Applied Data Science Research Congress – II National Congress of R Users Group</b> <i>Escuela Politécnica Nacional</i> Quito-Ecuador (34 hours)
nov-2021	<b>VIII International Workshop "Trends in Mathematics Education Based on Research in Alliance with the GeoGebra Latin American Community"</b> <i>Benemérita Universidad Autónoma de Puebla</i> Puebla-Mexico (10 hours)

## Teacher Training Courses (last 5 years)

Jul-2025	<b>Challenge-Based Learning</b> <i>Tecnológico de Monterrey</i> Monterrey–México (26 hours)
sep-2025	<b>Diploma in University Teaching</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito–Ecuador (140 hours)
feb-2025	<b>Advanced Exploration of Moodle Tools</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito–Ecuador (40 hours)
jan-2025	<b>Designing AI-Mediated Learning Experiences</b> <i>Tecnológico de Monterrey</i> Monterrey–México (24 hours)
feb-2024	<b>AI to Improve the Teaching and Learning Process</b> <i>IDEA-USFQ</i> Quito–Ecuador (6 hours)
jul-2023	<b>Artificial Intelligence Applied to Education</b> <i>Universidad Israel</i> Quito–Ecuador (80 hours)

jul-2022	<b>PUCE INNOVA: Towards a University Pedagogical Transformation</b> <i>Reimagine Education</i> Barcelona-Spain (16 hours)
dec-2021	<b>Concept and Development of a Prototype for Educational Transformation Using the RIEDUSIS Methodology</b> <i>Reimagine Education</i> Barcelona-Spain (65 hours)
oct-2021	<b>Certification in Neuroscience and Education Applied to Teaching</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (50 hours)
apr-2021	<b>Creating Self-Evaluative Activities with GeoGebra</b> <i>Instituto GeoGebra Extremeño</i> Mérida-Spain (30 hours)
feb-2021	<b>Advanced Course for Virtual Classroom Management</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (24 hours)

## Other Training Courses (last 5 years)

nov-2025	<b>Agentic AI</b> <i>Actumlogos</i> Mexico (36 hours)
mar-2025	<b>Introduction to Reinforcement Learning</b> <i>CEDIA</i> Cuenca-Ecuador (40 hours)
feb-2025	<b>Efficient Academy Writer with AI</b> <i>Sociedad Ecuatoriana de Estadística</i> Quito-Ecuador (20 hours)
feb-2025	<b>General Information Security Policy</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (20 hours)
nov-2024	<b>Elements of AI</b> <i>University of Helsinki</i> (50 hours)
nov-2024	<b>Gender-Based Violence Prevention</b> <i>Pontificia Universidad Católica del Ecuador</i> Quito-Ecuador (20 hours)
nov-2022	<b>Amazon Web Service for Data Science</b> <i>SDC Learning</i> Lima-Peru (64 hours)
mar-2021	<b>Machine Learning with Python</b> <i>Universidad Peruana Cayetano Heredia</i> Lima-Peru (32 hours)

## Publications

dec-2023	<b>Scientific Article</b> <i>Merino, A. and Heredia, S. (2023). Relationship of the Cantor-Bendixson Derivative with Set Algebra. <i>Selecciones Matemáticas</i>, 10(2), 339-351.</i> <a href="https://doi.org/10.17268/sel.mat.2023.02.10">https://doi.org/10.17268/sel.mat.2023.02.10</a> Area: Descriptive Set Theory
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- jan-2023      **Scientific Article**  
*Jiménez, S. and Merino, A. (2023). Machine Learning Models Based on CRISP-DM for the Analysis of Depression Levels in Students of the Escuela Politécnica Nacional. Latin-American Journal of Computing, 10(1), 22-43.*  
<https://lajc.epn.edu.ec/index.php/LAJC/article/view/335>  
Area: Data Science
- aug-2022      **Scientific Article**  
*Merino, A., Cueva, M., Sarmiento, M., and Paredes, A. (2022). Analysis of the Concepts of Variable and Constant in Students of the Unified General Baccalaureate of Ecuador. 593 Digital Publisher CEIT, 7(4-2), 175-185.*  
<https://doi.org/10.33386/593dp.2022.4-2.970>  
Area: Mathematics Education
- jun-2021      **Scientific Article**  
*Merino, A. and Ortiz-Castro, J. (2021). Continuity of Functions Based on Rearrangements of  $\beta$ -Expansions of a Number. Digital Journal of Mathematics, Education, and Internet, 22(1).*  
<https://doi.org/10.18845/rdmei.v22i1.5758>  
Area: Real Analysis
- feb-2021      **Scientific Article**  
*Álvarez-Samaniego, B. and Merino, A. (2021). Some Properties Related to the Cantor-Bendixson Derivative on a Polish Space. New Zealand Journal of Mathematics, 50, 207-218.*  
<http://dx.doi.org/10.17268/sel.mat.2020.02.04>  
Area: Descriptive Set Theory
- dec-2020      **Scientific Article**  
*Merino, A. and Heredia, S. (2020). A Generalization of the Cantor Ternary Set. Selecciones Matemáticas, 7(2), 222-233.*  
<http://dx.doi.org/10.17268/sel.mat.2020.02.04>  
Area: Real Analysis
- may-2020      **Scientific Article**  
*Merino, A. and Trujillo, J. C. (2020). Equivalence of the Axiom of Choice with the Function Redefinition Problem. Revista Politécnica, 45(2), 51-56.*  
<https://doi.org/10.33333/rp.vol45n2.05>  
Area: Foundations of Mathematics
- nov-2019      **Scientific Article**  
*Álvarez-Samaniego, B. and Merino, A. (2019). Countable Ordinal Spaces and Compact Countable Subsets of a Metric Space. Australian Journal of Mathematical Analysis and Applications, 16(2), article 12.*  
Area: Descriptive Set Theory
- jun-2019      **Scientific Article**  
*Ortiz, J. and Merino, A. (2019). Schematic Representation of the Set Classification Problem. The Classification of the Quadratic Equation of Two Variables. Mathematics ESPOL-FCNM JOURNAL, 17(1), 1-14.*  
Area: Mathematics Education
- sep-2016      **Scientific Article**  
*Álvarez-Samaniego, B. and Merino, A. (2019). A Primitive Associated to the Cantor-Bendixson Derivative on the Real Line. Journal of Mathematical Sciences: Advances and Applications 41 (1).*  
[http://dx.doi.org/10.18642/jmsaa\\_7100121692](http://dx.doi.org/10.18642/jmsaa_7100121692)  
Area: Descriptive Set Theory
- junio 2012      **Booklet**  
*Merino, A., Cueva, E. and Trujillo J.C. (2012). Single Variable Calculus: Summary and Solved Exercises. Publications Unit of the Faculty of Sciences.*  
Area: Mathematics Education

## Awards and Scholarships

Feb-2025	<b>Recognition for High Performance in Teaching Practice</b> <i>Facultad de Ciencias Exactas, Naturales y Ambientales – PUCE</i>
dec-2023	<b>Gratitude Button</b> <i>Asociación de Profesores de la Pontificia Universidad Católica del Ecuador</i>
jul-2021	<b>UOC Scholarship for Outstanding Students from Ecuador</b> <i>Universitat Oberta de Catalunya</i>
dec-2017	<b>Municipal Award Pedro Vicente Maldonado for the Best Published Work in the Area of Exact Sciences in 2017</b> <i>Municipio del Distrito Metropolitano de Quito</i> Work: A Primitive Associated to the Cantor Bendixson Derivative on the Real Line