

PERSONAL INFORMATION

MIRCEA MERCA



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Gender Male | Nationality Romanian

WORK EXPERIENCE

National University of Science and Technology
POLITEHNICA Bucharest, Romania

Oct. 2024 – present Full Professor, Department of Mathematical Methods and Models
Nov. 2022 – present PhD Supervisor, Doctoral School of Applied Sciences
Nov. 2022 – present Researcher, Fundamental Sciences Applied in Engineering Research Center
Oct. 2022 – Sep. 2024 Associate Professor, Department of Mathematical Methods and Models

Academy of Romanian Scientists, Romania

Apr. 2025 – present Corresponding Member
May 2023 – Mar. 2025 Associate Member
May 2017 – July 2020 Researcher

College of The Holy Cross, Worcester, USA

June – July 2017 Visiting Researcher, Department of Mathematics and Computer Science
July 2014 Visiting Researcher, Department of Mathematics and Computer Science

University of Craiova, Romania

July 2016 – Oct 2022 Associate Researcher, Department of Mathematics

Nicolae Grigorescu National College, Campina, Romania

Sep. 2014 – Sep. 2022 Teacher of Computer Science

Aurel Vlaicu High School, Breaza, Romania

Sep. 2003 – Aug. 2004 Teacher of Computer Science

Steaua Romana Refinery, Campina, Romania

Mar. 2000 – Aug. 2003 Board Member
Feb. 2000 – Aug. 2003 IT Manager

Energopetrol Company, Campina, Romania

Oct. 1994 – Feb. 2000 IT Analyst

Constantin Istrati Technical College, Campina, Romania

Sep. 2004 – Aug. 2014 Teacher of Computer Science
Sep. 1991 – Sep. 1994 Teacher of Computer Science

EDUCATION AND TRAINING

2021 Habilitation in Mathematics

School of Advanced Studies of the Romanian Academy (SCOSAAR),

Thesis: *Truncated theta series, partition-theoretic interpretations and Rogers-Ramanujan type identities*

2011–2014 PhD in Mathematics

University of Craiova, Department of Mathematics

Thesis: *New Algorithms and Relations Involving Integer Partitions*

2001–2003 Bachelor of Applied Science in Computer Science

University Politehnica of Bucharest

Thesis: *Mathematical identities generated by computer*

1987–1991 Bachelor of Science in Mathematics

Babes-Bolyai University, Cluj-Napoca

Thesis: *Uniform continuous approximation of 2π -periodic functions*

RESEARCH INTEREST

My research centers on the theory of partitions, number theory, combinatorics, special functions, algorithms and related areas. I have an interest in generating the integer partitions. The algorithm that I published in 2012 is considered the most efficient algorithm for generating the integer partitions. I am collaborating with George E. Andrews on truncated theta series. The first paper of this study appeared in november 2012, and the second in february 2018. In 2017, I published the Lambert series factorization theorem. This general result allowed me to obtain new connections between the seemingly disparate branches of the additive and multiplicative number theory. Few papers of this investigation appeared in 2017 and 2018. Recently, I published the first algorithm for proving the non-trivial linear homogeneous partition inequalities. Currently I am working on q -series and on further aspects of partitions and their amazing relationship with Rogers-Ramanujan's enigmatic identities.

GRANTS, HONORS AND AWARDS

2025 **Honorary Citizen** of the Commune of Săcuieu, Cluj, Romania

2024 **World's Top 2% Scientists** ranking by Stanford University

2023 **World's Top 2% Scientists** ranking by Stanford University

MDPI AG, Switzerland - Conference Travel Grant (CHF 300)

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 2000)

1. PN-IV-P2-2.3-PRECISI-2023-80691: On Two Truncated Quintuple Series Theorems, *Experimental Mathematics*, 31(2): 606–610 (2022) (RON 2000)

2022 **World's Top 2% Scientists** ranking by Stanford University

2021 World's Top 2% Scientists ranking by Stanford University

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 24000)

1. PN-III-P1-1.1-PRECISI-2021-59317: Generalized Lambert Series and Euler's Pentagonal Number Theorem, *Mediterranean Journal of Mathematics*, 18:29 (2021) (RON 2000)
2. PN-III-P1-1.1-PRECISI-2021-62326: Truncated Theta Series and Rogers-Ramanujan Functions, *Experimental Mathematics*, 30(3): 364–371 (2021) (RON 2000)
3. PN-III-P1-1.1-PRECISI-2021-63799: On the partitions into distinct parts and odd parts, *Quaestiones Mathematicae*, 44(8): 1095–1105 (2021) (RON 6000)
4. PN-III-P1-1.1-PRECISI-2021-64647: A further look at a generalization of Waring's formula, *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas*, 115(4): 195 (2021) (RON 6000)
5. PN-III-P1-1.1-PRECISI-2021-65911: On the Ramanujan-type congruences modulo 8 for the overpartitions into odd part, *Quaestiones Mathematicae*, Early access (2021) (RON 6000)
6. PN-III-P1-1.1-PRECISI-2021-67965: The powers of two as sums over partitions, *Quaestiones Mathematicae*, 44(12): 1745-1755 (2021) (RON 2000)

2020 Spiru Haret - 2018 Prize of the Romanian Academy.

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 16000)

1. PN-III-P1-1.1-PRECISI-2020-40742: q -Series congruences involving statistical mechanics partition functions in regime *III* and *IV* of Baxter's solution of the hard-hexagon model, *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas*, 114:156 (2020) (RON 6000)
2. PN-III-P1-1.1-PRECISI-2020-41042: Bernoulli numbers and symmetric functions, *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas*, 114(1):20 (2020) (RON 6000)
3. PN-III-P1-1.1-PRECISI-2020-41447: Two Symmetric Identities Involving Complete and Elementary Symmetric Functions, *Bulletin of the Malaysian Mathematical Sciences Society*, 43: 1661–1670 (2020) (RON 2000)
4. PN-III-P1-1.1-PRECISI-2020-41771: On identities of Watson type, *ARS Mathematica Contemporanea*, 17(1): 277–290 (2019) (RON 2000)

2019 Academy of Romanian Scientists - Research Grant: Applications of mathematical analysis in number theory, optimization, differential equations, other fields of mathematical or multidisciplinary research. (RON 12000)

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 8000)

1. PN-III-P1-1.1-PRECISI-2019-32496: Jacobi's Four and Eight Squares Theorems and Partitions into Distinct Parts, *Mediterranean Journal of Mathematics*, 16, 16-26 (2019) (RON 6000)
2. PN-III-P1-1.1-PRECISI-2019-32511: The partition function $p(n)$ in terms of the classical Möbius function, *The Ramanujan Journal*, 49, 87-96 (2019) (RON 2000)

2018 European Mathematical Society - Solidarity Travel Grant (€900)

Academy of Romanian Scientists - Research Grant: Applications of mathematical analysis in number theory, optimization, differential equations, other fields of mathematical or multidisciplinary research. (RON 15000)

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 28000)

1. PN-III-P1-1.1-PRECISI-2018-23027: Euler-Riemann Zeta Function and Chebyshev-Stirling Numbers of the First Kind, *Mediterranean Journal of Mathematics*, 15:123 (2018) (RON 6000)
2. PN-III-P1-1.1-PRECISI-2018-23034: New Connections Between Functions from Additive and Multiplicative Number Theory, *Mediterranean Journal of Mathematics*, 13:56 (2018) (RON 6000)
3. PN-III-P1-1.1-PRECISI-2018-23042: A q -analogue for sums of powers, *Acta Arithmetica*, 183, 185–190 (2018) (RON 2000)
4. PN-III-P1-1.1-PRECISI-2018-24072: Truncated Theta Series and a Problem of Guo and Zeng, *Journal of Combinatorial Theory, Series A*, 154, 610–619 (2018) (RON 6000)
5. PN-III-P1-1.1-PRECISI-2018-26481: Binomial transforms and integer partitions into parts of k different magnitudes, *The Ramanujan Journal*, 46, 765–774 (2018) (RON 2000)
6. PN-III-P1-1.1-PRECISI-2018-27721: Combinatorial proofs of two truncated theta series theorems, *Journal of Combinatorial Theory, Series A*, 160, 168–185 (2018) (RON 6000)

2017 Nicolae Teodorescu - 2015 Prize of Academy of Romanian Scientists for contributions in combinatorics and algorithm theory.

Academy of Romanian Scientists - Research Grant: Fundamental properties of differential systems solutions (RON 9000)

Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 10000)

1. PN-III-P1-1.1-PRECISI-201714957: New convolutions for the number of divisors, *Journal of Number Theory*, 170, 17–34 (2017) (RON 2000)
2. PN-III-P1-1.1-PRECISI-201714986: On families of linear recurrence relations for the special values of the Riemann zeta function, *Journal of Number Theory*, 170, 55–65 (2017) (RON 2000)
3. PN-III-P1-1.1-PRECISI-201715008: New relations for the number of partitions with distinct even parts, *Journal of Number Theory*, 176, 1–12 (2017) (RON 2000)
4. PN-III-P1-1.1-PRECISI-201720238: The Lambert series factorization theorem, *The Ramanujan Journal*, 44, 417–435 (2017) (RON 2000)
5. PN-III-P1-1.1-PRECISI-201721056: Parity of sums of partition numbers and squares in arithmetic progressions, *The Ramanujan Journal*, 44, 617–630 (2017) (RON 2000)

2015 Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 2000)

1. PN-II-RU-PRECISI-2015-9-9110: A generalization of Euler's pentagonal number recurrence for the partition function, *The Ramanujan Journal*, 37(3), 589–595 (2015) (RON 2000)

2014 Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 6000)

1. PN-II-RU-PRECISI-2014-8-5388: A note on the Jacobi-Stirling numbers, *Integral Transforms and Special Functions*, 25(3), 196–202 (2014) (RON 4000)
2. PN-II-RU-PRECISI-2014-8-5394: New upper bounds for the number of partitions into a given number of parts, *Journal of Number Theory*, 142, 298–304 (2014) (RON 2000)

2013 Romanian National Authority for Scientific Research, CNCS-UEFISCDI (RON 4000)

1. PN-II-RU-PRECISI-2013-7-3442: The truncated pentagonal number theorem, *Journal of Combinatorial Theory, Series A*, 119(8), 1639-1643 (2012) (RON 2000)
2. PN-II-RU-PRECISI-2013-7-3443: Binary Diagrams for Storing Ascending Compositions, *The Computer Journal*, 56(11), 1320-1327 (2013) (RON 2000)

2011–2014 Romanian Ministry of National Education (MEN) – PhD Student Grant (RON 35000)

PUBLICATIONS

From 2011 to the present, I published 161 papers as follows: 140 papers indexed ISI Web of Science (2 proceeding papers), 21 papers in journals indexed in other international data bases (4 papers as chapters books).

The impact of my work can be characterized by citations and h -index as follows:

- 1559 citations with 20 h -index in Google Scholar
- 1311 citations with 19 h -index in Semantic Scholar
- 1102 citations with 16 h -index in Scopus
- 987 citations with 16 h -index in ISI Web of Science
- 898 citations with 15 h -index in zbMATH Open
- 817 citations with 14 h -index in MathSciNet

ADDITIONAL INFORMATION

- Conference Papers
1. M. Merca: *On the Toeplitz-Hessenberg determinant*, The XVI th Annual Conference of the Romanian Mathematical Society, Petroleum-Gas University of Ploiesti, Romania, Oct. 2012
 2. M. Merca: *A Special Case of Restricted Integer Partitions*, Special Session on Discrete Mathematics and Theoretical Computer Science, Joint American Mathematical Society-Romanian Mathematical Society Meeting, Alba Iulia, Romania, Jun. 2013
 3. M. Merca: *On a double inequality*, The twelfth conference on nonlinear analysis and applied mathematics, Valahia University of Targoviste, Romania, June 2014.
 4. M. Merca: *A convolution for the number of divisors*, Summer research seminar, College of the Holy Cross, Worcester, USA, Jul. 2014
 5. M. Merca: *A refined form of a recent convolution for the number of divisors*, The XVIII th National Conference of the Romanian Mathematical Society, Alexandru Ioan Cuza University of Iasi, Romania, Oct. 2014
 6. M. Merca: *Lambert series and conjugacy classes in GL*, Spring Session, Academy of Romanian Scientists, Bucharest, Romania, March 24, 2017
 7. M. Merca: *A partition identity related to Stanley's theorem and applications*, Autumn Session, Academy of Romanian Scientists, Timisoara, Romania, October 12-14, 2017
 8. C. Ballantine, M. Merca: *Bisected theta series, least r -gaps in partitions, and polygonal numbers*, Joint Mathematics Meetings, San Diego, USA, Jan. 2018
 9. M. Merca: *The partition function $p(n)$ in terms of the classical Möbius function*, Scientific Conference, Academy of Romanian Scientists, Bucharest, Romania, March 30, 2018.
 10. M. Merca: *Non-trivial linear partition inequalities and the Prouhet-Tarry-Escott problem*, Combinatory Analysis 2018: Partitions, q -Series, and Applications, Pennsylvania State University, USA, June 2018.
 11. M. Merca: *A general method for proving the non-trivial linear homogeneous partition inequalities*, National Scientific Conference, The Romanian Academy of Scientists, Targoviste, Romania, September 20-22, 2018
 12. M. Merca: *A truncated theta identity of Gauss*, National Scientific Conference, Academy of Romanian Scientists, Bucharest, Romania, April 4-6, 2019.
 13. M. Merca: *Truncated Theta Series, Partitions Inequalities and Rogers-Ramanujan Functions*, Transient Transcendence in Transylvania, Brasov, Romania, May 13-17, 2019.
 14. M. Merca: *An algorithm for proving the non-trivial linear homogeneous partition inequalities*, The Ninth Congress of Romanian Mathematicians, Galati, Romania, June 28-July 3, 2019.
 15. M. Merca: *Truncated theta identities and rank partition functions*, National Scientific Conference, Academy of Romanian Scientists, Brasov, Romania, September 20-21, 2019.
 16. C. Ballantine, M. Merca: *On a minimal excludant theorem and its generalization*, Fall Southeastern Sectional Meeting, American Mathematical Society, University of Florida, Gainesville, USA, November 2-3, 2019.
 17. M. Merca: *Lacunary recurrence relations for the Bernoulli numbers and integer partitions*, National Scientific Conference, Academy of Romanian Scientists, Google Meet, June 8, 2020.
 18. C. Ballantine, M. Merca: *The minimal excludant and colored partitions*, The 32nd International Conference on Formal Power Series and Algebraic Combinatorics, FPSAC 2020 Online, July 6-24, 2020.
 19. M. Merca: *On a function involving the cubic partitions*, AMS Special Session on Partition Theory and Related Topics, Joint Mathematics Meetings, USA, April 6-9, 2022.
 20. C. Krattenthaler, M. Merca, C.-S. Radu: *Two different proofs of the Merca conjectures*, Algorithmic and Enumerative Combinatorics, Vienna, Austria, July 4-8, 2022.
 21. C. Ballantine, M. Merca: *Almost 3-regular overpartitions*, AMS Special Session on Number Theory at Non-PhD Granting Institutions I, Joint Mathematics Meetings, Boston, USA, January 4-7, 2023.
 22. M. Merca: *On the parts with the same parity in all the partitions of n* , The Tenth Congress of Romanian Mathematicians, Pitesti, Romania, June 30-July 5, 2023.
 23. M. Merca: *New interpretation on parts with the same parity in the partitions of n* , National Scientific Conference, Academy of Romanian Scientists, Constanta, September 21-23, 2023.
 24. C. Ballantine, M. Merca, C.-S. Radu: *Congruences for the number of 3 and 6-regular partitions and quadratic forms*, AMS Special Session on Partition Theory and q -Series I, Joint Mathematics Meetings, San-Francisco, USA, January 3-6, 2024.
 25. M. Merca: *Truncated forms of MacMahon's q -series*, National Scientific Conference, Academy of Romanian Scientists, Iasi, September 23-24, 2024.
 26. M. Merca: *Binomial coefficients and binary partitions*, National Scientific Conference, Academy of Romanian Scientists, Durau, September 17-19, 2025.

Conferences Attended	1. <i>Srinivasa Ramanujan: in celebration of the centenary of his election as FRS</i>, The Royal Society, London, UK, October 15-16, 2018. 2. <i>New York Number Theory Seminar: Combinatorial and additive number theory</i>, CANT 2020, New York, June 1-5, 2020. 3. <i>Fourteenth Algorithmic Number Theory Symposium, ANTS-XIV</i>, University of Auckland, New Zealand, June 29 - July 4, 2020. 4. <i>The 27th Annual Leonard C. Sulski Memorial Lecture</i>, College of the Holy Cross, USA, March 11, 2021. 5. <i>The 33rd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC)</i>, Bar-Ilan University in Ramat-Gan, Israel, January 17-20, 2022 6. <i>International Conference on Enumerative Combinatorics and Applications (ICECA)</i>, University of Haifa, Israel, September 4-6, 2023 7. <i>International Conference on Enumerative Combinatorics and Applications (ICECA)</i>, University of Haifa, Israel, August 26-28, 2024
Editor Activity	1. <i>Annals of the Academy of Romanian Scientists. Series on Mathematics and its Applications</i>. Ed. Acad. Oamen. Știință Rom., Bucharest. ISSN 2066-5997. (Since 2019) 2. <i>Axioms</i>, Basel. ISSN 2075-1680. (Since 2021) 3. <i>Fundamental Journal of Mathematics and Applications</i>. ISSN 2645-8845. (Since 2023) 4. <i>Communications in Calculus Analysis, Special Functions and Mathematical Physics</i>. eISSN: 3071-7000. (Since 2024 - Honorary Editor)
Reviewing Activity (264 Reviews)	I demonstrate my contribution to the scientific community with 36 reviews for Mathematical Reviews and 228 reviews for Zentralblatt MATH.
Refereeing Activity (75 Journals)	I contributed to the peer review process for many works on 68 ISI journals as: <i>Acta et Commentationes Universitatis Tartuensis de Mathematica Acta Mathematicae Applicatae Sinica - English Series, Acta Mathematica Scientia, Advances in Applied Mathematics, Advances in Difference Equations, Advances in Mathematics, Advances in Mathematics of Communications, Afrika Matematika, AIMS Mathematics, American Mathematical Monthly, Annales Mathematicae Silesianae, Annals of Combinatorics, Applicable Analysis and Discrete Mathematics, Applied and Computational Mathematics, Arabian Journal of Mathematics, Asian-European Journal of Mathematics, ARS Combinatoria, Boletín de la Sociedad Matemática Mexicana, Bulletin of the Australian Mathematical Society, Bulletin of the Malaysian Mathematical Sciences Society, Czechoslovak Mathematical Journal, Contributions to Discrete Mathematics, Cubo, A Mathematical Journal, Demonstratio Mathematica, Discrete Applied Mathematics, Discrete Mathematics, Electronic Journal of Combinatorics, Electronic Research Archive, European Journal of Combinatorics, Filomat, Heliyon, High Energy Density Physics, IEEE Access, Indagationes Mathematicae, Indian Journal of Pure and Applied Mathematics, Information Processing Letters, Information Sciences, Integral Transforms and Special Functions, International Journal of Mathematics and Mathematical Sciences, International Journal of Number Theory, Journal of Combinatorial Theory Series A, Journal of Computational and Applied Mathematics, Journal of Difference Equations and Applications, Journal of the Korean Mathematical Society, Journal of Mathematical Analysis and Applications, Journal of Number Theory, Kyungpook Mathematical Journal, Matematički Vesnik, Mathematica Slovaca, Mathematical Problems in Engineering, Mathematics, Miskolc Mathematical Notes, Notes on Number Theory and Discrete Mathematics, Numerical Algorithms, Open Mathematics, Proceedings of the American Mathematical Society, Proceedings of the Edinburgh Mathematical Society, Proceedings of the Indian Academy of Sciences-Mathematical Sciences, Punjab University Journal of Mathematics, Ramanujan Journal, Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas, Rocky Mountain Journal of Mathematics, Special Matrices, Studia Scientiarum Mathematicarum Hungarica, Symmetry, Turkish Journal of Mathematics, Utilitas Mathematica, Zeitschrift für angewandte Mathematik und Physik</i> and 7 refereed journals as: <i>Annals of the "Alexandru Ioan Cuza" University of Iași, AppliedMath, Integers, Journal of Mathematical Modelling and Algorithms, Journal of Ramanujan Society of Mathematics and Mathematical Sciences, Proceedings of Jangjeon Mathematical Society, The College Mathematics Journal.</i>