

CELEBRATING THE LEGACY OF MARTA BUNGE: A TRIBUTE

MARIA MANUEL CLEMENTINO, VALERIA DE PAIVA, AND JONATHON FUNK

This special volume of *Theory and Applications of Categories* (TAC) is dedicated to honoring the work of Professor Marta Cavallo Bunge. Originally conceived as a homage celebrating her pioneering decades of profound and innovative contributions to category theory, it now stands as a commemoration of her legacy, as she was tragically taken from us on October 25, 2022.

Marta was born in Buenos Aires, Argentina, in 1938, and pursued her masters and doctoral studies at the University of Pennsylvania (Ph.D. 1966), under the guidance of Professors Peter Freyd and William Lawvere. Later, she organized a special volume dedicated to both of them, celebrating their 80th birthdays in 2017. Dr. Bunge embarked on her postdoctoral fellowship at McGill University in 1966, later joining the faculty as an Assistant Professor in 1969. Over the years, she ascended the academic ranks, becoming a full professor in 1985 and eventually achieving emeritus status in 2003. Marta was married to Mario Bunge (1919-2020), a renowned Argentine-Canadian philosopher and physicist who held the Frothingham Professorship of Logic and Metaphysics at McGill University until his retirement at the age of 90.

Theirs was a family of intellectual prowess; they had two children, Eric and Silvia. Eric is a celebrated architect based in Brooklyn, New York, while Silvia is a distinguished cognitive neuroscientist professor at the University of California, Berkeley.

Marta Bunge's contributions to category theory mark her as one of its foundational figures. Alongside other luminaries in the field, she shaped its trajectory and made significant strides across various domains, from categorical logic (a cornerstone of the McGill group) to topos theory, synthetic differential geometry, and synthetic differential topology. Marta possessed a keen eye for identifying and delving into fundamental ideas, coupled with a profound appreciation for the collaborative nature of category theory. Her collaborative endeavors include the monograph "Singular Coverings of Toposes" (Lecture Notes in Mathematics 1890, Springer, 2006) and the book "Synthetic Differential Topology" (London Mathematical Society Lecture Note Series 448, Cambridge University Press, 2018).

Drawing from Marta's personal webpage, we glean insights into her research interests, which spanned distributions and singular coverings of topoi, higher-dimensional stacks over a topos, the synthetic differential theory of smooth maps, and the fundamental groupoid of a topos. Her dedication to foundational inquiries extended to elucidating the intrinsic nature of higher stacks, investigating the fundamental groupoid of toposes, and

exploring smooth mappings using Penon infinitesimals.

Marta Bunge's academic lineage, as documented by the Mathematical Genealogy, reflects her mentorship and scholarly legacy. She nurtured four doctoral students at McGill University, leaving an indelible mark on the academic landscape.

Efforts to preserve Prof. Bunge's academic contributions are underway, including plans to retypeset her Ph.D. thesis, "Categories of Set-Valued Functors," in LaTeX and make it accessible electronically with the consent of her heirs.

The announcement of this special volume elicited widespread approval and contributions from colleagues eager to honor Marta's life's work. Due to her untimely passing, the organizers extended the submission deadline to accommodate the outpouring of scholarly contributions. We are pleased to report that 18 papers have been accepted, reflecting the breadth and depth of Marta Bunge's scholarly endeavors.

We extend our gratitude to all the authors, reviewers, and supporters who have collaborated to produce this special volume. Marta's enthusiasm for this project was palpable, even as she humbly questioned whether she truly deserved such recognition. Undoubtedly, she merits this special volume, and we only lament not initiating the process sooner.

In closing, we reflect on Marta Bunge's own words from 1995, encapsulating the essence of category theory and its transformative impact on mathematics. Her visionary perspective and pioneering spirit continue to inspire generations of mathematicians:

Category theorists are conceptual mathematicians of a special kind. What binds them together is that they approach mathematical problems with a point of view that is radically different from that on which traditional mathematics is based, and which emphasizes interactions between mathematical objects over their individual constituents. Their results are often surprising, provide new insights, and are obtained by the invention of sophisticated notions, theories, and techniques. Category Theory is only little more than 50 years old (dating it back to the work of S. Eilenberg and S. MacLane in 1945) – yet, its impact on several branches of mathematics has been considerable, in spite of the reluctance to recognize it as a revolutionary independent field dealing with foundational questions, very different from Set Theory.

The Guest Editors: Maria Manuel Clementino, Valeria de Paiva, and Jonathon Funk

Added in print: We were very sad to learn that one of our collaborators in this volume Dr. Marek Zawadosvki passed away unexpectedly on 3rd March 2024. Marek's kindness, sense of humour, his unflinching optimism as well as his deep insights into category theory will be very much missed by us all. *The Guest Editors*

This article may be accessed at <http://www.tac.mta.ca/tac/>

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Articles appearing in the journal have been carefully and critically refereed under the responsibility of members of the Editorial Board. Only papers judged to be both significant and excellent are accepted for publication.

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