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Toposes as 'bridges' for mathematics and artificial intelligence

ABSTRACT

I will introduce the theory of toposes as unifying 'bridges', give a survey of the main results obtained so far and discuss some work in progress and future research directions on applying this theory to fundamental themes in the field of artificial intelligence, such as modelling of deep neural networks and automated theorem proving.

BIOGRAPHY

Olivia Caramello earned a Degree in Mathematics from the University of Turin and a Diploma in Piano at the age of 19, and later a Ph.D. in Mathematics from Trinity College in Cambridge. Then she worked at the University of Cambridge, the Scuola Normale Superiore of Pisa, the Max Planck Institute for Mathematics in Bonn, the University of Paris 7 and the Institut des Hautes Études Scientifiques (IHES), where since 2020 she has held the Gelfand Chair.

She is the author of the book "Theories, Sites, Toposes: Relating and studying mathematical theories through topos-theoretic 'bridges'" (Oxford University Press, 2017) as well as of numerous publications, and has given more than a hundred seminars internationally. She won the "Rita Levi Montalcini" competition of the Ministry of Education, University and Research in 2017 and is currently Associate Professor at the University of Insubria in Como.

Caramello is mostly known for having introduced and developed the unifying theory of topos-theoretic 'bridges', which exploits the existence of different representations for a given topos to establish deep connections between different areas of mathematics.

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