

The logo for SIMBa, featuring the text "SIMBa" in a bold, black, serif font on a bright orange rectangular background.

# Seminari Informal de Matemàtiques de Barcelona

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**Speaker:** Arnau Gàmez i Montolio.

**University:** City, University of London.

**Date:** Thursday, April 27th, 2023.

**Schedule:** 13:00, *virtual coffee break*; 13:20, talk.

**Place:** UB (FMI aula B7) and Zoom.

**Language:** English.

**Title:** Playing with Mixed Boolean-Arithmetic algebra

**Abstract:** A Mixed Boolean-Arithmetic (MBA) expression is an algebraic expression composed of integer arithmetic operators, e.g.  $(+, -, \times)$  and bitwise operators, e.g.  $(\wedge, \vee, \oplus, \neg)$ . State-of-the-art software protection mechanisms leverage MBA semantics-preserving transformations to obfuscate code. This possibility is motivated by the fact that the combination of operators from these different fields *do not interact well together*. Moreover, computer algebra systems do not support bitwise operators with symbolic variables (let alone combining them with arithmetic expressions).

In this talk, we introduce the fundamental ideas, constructions and research literature covering MBA algebra, focusing on (and motivated by) applications in program analysis and software protection. We also outline several open problems and research directions aiming to advance the theoretical formalization and tooling development for MBA algebra reasoning and manipulation.

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**About us:** *SIMBa* is a mathematics seminar organized by graduate students in the Barcelona area. It is aimed towards graduate and last course undergraduate students. Our goals are divulging the knowledge from different branches of mathematics for those interested and promote networking between the attendants.

This seminar is backed by the Faculty of Mathematics and Computer Science at Universitat de Barcelona, Faculty of Mathematics and Statistics at Universitat Politècnica de Catalunya, the Department of Mathematics from Univesitat Autònoma de Barcelona, CRM, IMUB and BGSMath.

For more information, visit at [www.ub.edu/simba/en/](http://www.ub.edu/simba/en/).

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