

Skew monoidal categories and related structures: theory and applications

Summary

This objective of this position is to advance the theory and applications of skew monoidal categories, variations and specializations thereof, related structures such as skew multicategories and higher-dimensional generalizations.

Research field:	Information and communication technology
Supervisor:	Dr. Tarmo Uustalu
Availability:	This position is available.
Offered by:	School of Information Technologies Department of Software Science
Application deadline:	Applications are accepted between June 01, 2025 00:00 and June 30, 2025 23:59 (Europe/Zurich)

Description

Supervisor: Tarmo Uustalu

Co-supervisor: Nathanael Amariah Arkor

Name of the department/research group: Department of Software Science / Laboratory for High-Assurance Software

Description:

Monoidal categories are a classical and very important structure category theory, with many uses also in theoretical computer science. Skew monoidal categories are a weakening of monoidal categories. Although first isolated as a concept of any interest only around 2010, skew monoidal categories have turned out to be a very natural structure, they are well-behaved with abundant useful examples, and with applications in both theoretical computer science and category theory. They have therefore become a subject of quite active research.

This objective of this position is to advance the theory and applications of skew monoidal categories, their specializations and variations (such as skew braided monoidal, skew monoidal closed, skew non-monoidal closed categories), related structures (such as skew multicategories, skew promonoidal categories) and higher-dimensional generalizations (such as skew bicategories). The specific research questions to address, chosen during the project, can range from very well-defined basic questions about skew (braided) monoidal categories to highly open-ended exploration concerning higher-dimensional generalizations.

Responsibilities and tasks:

The student's primary responsibility is research on this PhD project. The student may have contributed to the teaching activities of the lab as a course assistant.

Qualifications:

- A MSc degree in computer science or mathematics
- Applicants should fulfill the following requirements:
- Solid knowledge in at least a few and interested in all of the following: algebra, logic, category theory



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