CAFE-Dyn
Workshop in Complexity, Aperiodicity, Fractal and Ergodicity in Dynamics
February 10, 11 and 12, 2026 *IMECC - UNICAMP - Campinas (Brazil)*

A Bestiary of Symbolic Creatures

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The aim of this talk is to present and describe some classes of shift spaces, in the spirit of medieval bestiaries. While traditional bestiaries describe fantastic creatures, this bestiary is devoted to creatures that, though symbolic, are no less real than a lion or an elephant (and no less amazing and enchanting than a siren).

Given a non-empty countable set (an alphabet), the full shift over it is the set of all sequences over the alphabet indexed either by the non-negative integers (the one-sided shift) or by the integers (the two-sided shift). A shift space (or subshift) is a subset of the full shift consisting of all sequences that avoid a given set of forbidden finite words.

It is well known that if the alphabet is finite, then only *sofic shifts* can be presented by finite directed labeled graphs (in fact, to be presented by such a graph is an alternative definition for finite-alphabet sofic shifts). In contrast, it is easy to check that every countable-alphabet one-sided shift space can be presented by a countable directed labeled graph.

In this talk, I will present definitions of ***shifts of finite type (SFT)*** and ***sofic shifts*** that apply in a general setting and coincide with the classical ones for finite-alphabet shifts. Based on these definitions, I will introduce two new classes of shift spaces that properly exist only in the infinite-alphabet context: ***weakly sofic shifts*** and ***shifts of variable length (SVL)***. I will then investigate when a two-sided shift space can be presented by a countable directed labeled graph, and present results characterizing graphs that present one- or two-sided shifts of finite type and (weakly) sofic shifts.

SLIDES

Thursday - February 12, 2026 - 11:00 - 12:00
253 - Thesis Defense Room - 2nd Floor IMECC