

# Arguing Together: The Evolution of a Concurrent and Timed Argumentation Language

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## Abstract

Formal argumentation has become a central framework for modelling reasoning and interaction in AI, from deliberation and negotiation to decision support and explainability. While Dung-style argumentation frameworks—crisp or weighted—offer robust semantics for abstract argument relations, they lack the expressive power needed to model concurrent, dynamic, and temporally aware interactions among agents. In this talk, I will present the evolution of a concurrent and timed language for argumentation, designed to bridge this gap. Starting from the foundations of argumentation theory, I will motivate the need for a language-based approach to represent and simulate agents that argue, negotiate, and interact within a shared argumentative space. The proposed language provides constructs for concurrency and timing, allowing for two forms of parallelism: maximum parallelism, which models simultaneous independent steps, and interleaving, which captures more fine-grained agent-level transitions. I will illustrate how the language supports high-level patterns of argumentation and dialogue, and how it can be used to model debates, dialogues, and reasoning processes in a structured and semantically grounded way. The talk will conclude with insights on ongoing developments, including privacy concerns, local arguments, and the integration of high-level abstractions.

## Declaration on Generative AI

The author(s) have not employed any Generative AI tools.

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