

# Preface

It is a pleasure for me to write a preface for Ornella Dardha's Ph.D. thesis in the occasion of its publication in the Atlantis Studies in Computing, as recipient of a prize for "Best Italian 2015 Ph.D. Thesis in Theoretical Computer Science" awarded by the Italian Chapter of EATCS.

I am happy that Ornella has obtained the prize, as a reward for the time and the energy that she has invested into research during the Ph.D. period. Ornella's achievement is also gratifying for the Focus team and the whole Department of Computer Science of the University of Bologna, in which the thesis has been carried out. I like to think that Focus and the Department have provided a fertile environment in which her desire of learning and growing has been nourished.

The general topic of Ornella's thesis is type systems for programming languages. Type systems have been developed in sequential languages, initially with the goal of improving the efficiency of programs, and later also with the goals of ensuring certain correctness properties during execution and of specifying the intended use of certain objects or components in a program. The application of type systems to concurrency is more recent. The field has presented, and still presents, a number of challenges: in a concurrent system new features, such as interactions, have to be taken into account; other features, such as dynamic reconfigurations, take a prominent role. Concurrency has sometimes led to the design of new type systems. A relevant example is the so-called session types, roughly types capable of specifying the protocols that a set of components should follow, in order to accomplish a certain task. The past two decades have seen a thorough investigation of session types. Ornella's thesis shows how types can be used in presence of interactions and dynamic reconfiguration to guarantee some fundamental behavioural properties of distributed systems, such as forms of consistency, deadlock freedom, progress. Moreover, the thesis sheds light into the foundations of session types. The thesis shows that session types, at least in their most common format, are not a primitive concept, as they had been treated in the literature: they can be derived from more

basic and well-known type constructs. This is important, both to understand better the concept, and to develop its metatheory.

I would like to conclude with my personal congratulations to Ornella for the work done, and my warmest wishes for her future.

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