Universes in Type-Theoretical Semantics*
(invited talk)

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In this talk, after introducing formal semantics based on modern type theories, I'll report on the development of universes in the study of type-theoretical semantics. In type theory, a universe is a type of types and, in type-theoretical semantics, they are not only essential in many semantic interpretations, but very useful in facilitating a form of polymorphism (called Π-polymorphism) in semantic constructions. I first explain the notion by means of CN, the universe of (interpretations of) common nouns, and LType, the universe of 'linguistic types' that has been used to deal with coordination. Then, I introduce a new kind of universes - subtype universes, which are particularly useful in several semantic constructions, including those that may be facilitated by bounded quantification. Introducing a universe, one is required to show that the extension still enjoys the nice properties of the original type theory including, for example, logical consistency and normalisation. We show that the extension with subtype universes does preserve these properties.

(The work on subtype universes is jointly done with Harry Maclean.)

Short Biography. Zhaohui Luo is Professor of Computer Science at Royal Holloway, University of London. He is an expert in dependent type theory and its applications and, in the last decade or so, has worked on, among other things, formal semantics in modern type theories, applying type theory to linguistic semantics. He has published extensively on type theory, including 'Computation and Reasoning', a monograph on type theories ECC/UTT that was published by OUP in 1994, and 'Formal Semantics in Modern Type Theories' (a joint book with S. Chatzikyriakidis) that was published by Wiley/ISTE in 2020.

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