ELLIIT
Distinguished Lecture

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School of Information Technology

A component-based approach to semantics

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Modularity is a key property for scaling up semantics to the definition of major programming languages. This talk presents a highly modular component-based approach to semantics, developed and tested by the PLanCompS project [www.plancomps.org].

A component-based semantics of a programming language involves a collection of so-called fundamental programming constructs, or 'funcons'. The definition of each funcon is an independent module, intended to be used as an off-the-shelf component. The semantics of a language is defined by specifying a translation from programs to funcons, which is generally much simpler than specifying the semantics of the language constructs directly. New funcons can be defined when needed, although it is expected that many funcons will be widely reused in definitions of different languages. After completing further case studies, the PLanCompS project intends to publish an initial collection of validated funcon definitions in an open access digital library.

Peter Mosses is Professor Emeritus at Swansea University, UK. He is currently on an extended research visit to the Programming Languages Group at TU Delft in the Netherlands.

His research in semantics stretches back to Christopher Strachey's Programming Research Group at Oxford University in the early 1970s, where he contributed to the development of denotational semantics, and implemented SIS, a system for running programs based on their semantics. He was based at Aarhus University, Denmark, from 1976 until 2005, when he moved back to the UK to take up the post of Professor of Computer Science at Swansea.

The main focus of his research has been on pragmatic aspects of formal specifications, especially modularity, which led to the development of action semantics, MSOS (a modular variant of structural operational semantics) and component-based semantics. He was also the initial coordinator of CoFI, the Common Framework Initiative, which designed the algebraic specification language CASL. From 2011 to 2015, he led the PLanCompS research project on programming language components and specifications.

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