

Felice Cardone — Short CV

Felice Cardone was born in Torino in 1960. He has got a degree in Philosophy in 1983, and a PhD in Computer Science in 1990. He has been an Assistant Professor (Ricercatore) first at Dipartimento di Scienze dell'Informazione, Università degli Studi di Milano, and then at Dipartimento di Informatica, Sistemistica e Comunicazione, Università degli Studi di Milano-Bicocca. He is currently Associate Professor (Professore Associato Confermato) at the Università di Torino, Dipartimento di Informatica.

His research interests have focussed on mathematical structures for the semantics of programming languages, and on semantical aspects of type systems, especially those that include recursive types. He has also studied the conceptual aspects and the historical development of type theories and lambda-calculus. In more detail, he has recently been concerned with the following themes.

Properties of infinite objects: Several functional programming languages, notably Haskell, allow circular definitions of “infinite” data structures like, e.g., the streams:

```
ones = 1 : ones
nats = from(0)
      where from(n) = n : from(n+1)
```

The types of such data structures are circular as well, for example `ones` has type `[Integer]`, where `[Integer]`, the type of finite lists and streams of integers, is recursively defined by the equation:

$$[\text{Integer}] = [] \mid \text{Integer} : [\text{Integer}].$$

In order to prove properties of these circular definitions and of the objects they define, it is common to use coinduction and the fact that such objects are elements of final coalgebras. He has been investigating alternative techniques related to the Approximation Lemma to prove properties of streams and other infinite objects, exploiting the sheaf-like structure that arises from an explicit stratification of infinite objects into tiers.

Recursive types: Felice Cardone started his research on recursive types in 1986; most of it has been carried out in collaboration with Mario Coppo, of the University of Torino. He investigated the application of coalgebraic techniques to recursive types. He also studied the global structure of recursive types as an iterative algebraic theory (the latter is a by now fairly standard approach to cyclic structures invented by Elgot in the late 1960's). A comprehensive treatment of several approaches to the syntax and semantics of recursive types, written with Mario Coppo, is planned to appear in 2012 for Cambridge University Press in a volume edited by Barendregt, Dekkers and Statman.

Foundational and philosophical aspects of computer science: Felice Cardone also has a strong interest for foundations and philosophical issues in informatics as a science (as opposed to engineering). Among such issues, along the years he pursued the following, with varying degrees of involvement:

1. foundations of classical computability theory, especially the Church-Turing Thesis from an epistemological point of view;
2. foundations of complexity theory – in particular the identification of polytime with feasible computation (the so called Edmonds-Cobham-Cook-Karp thesis) and the relations of this with ultrafinitism as a philosophy of mathematics;
3. abstract theory of computation that arises from the theory of domains, especially the domains associated with event structures;
4. the theory of computation that arises from the ideas of Carl Adam Petri and Anatol W. Holt;
5. historical and conceptual development of lambda-calculus and combinatory logic, especially in connection with the applications of these in theoretical computer science.