Preface for the special issue on domains

B E R N H A R D   R E U S[†], A C H I M   J U N G[‡], K L A U S   K E I M E L[§] and
T H O M A S   S T R E I C H E R[§]

[†]*University of Sussex, School of Informatics, Brighton BN1 9QJ, U.K.*
[‡]*University of Birmingham, School of Computer Science, Birmingham B15 2TT, U.K.*
[§]*TU Darmstadt, Fachbereich Mathematik, Schloßgartenstraße 7, 64289 Darmstadt, Germany*

This special issue of *Mathematical Structures in Computer Science* contains six papers from the *Workshop on Domains IX* held at the University of Sussex (Brighton), on 22–24 September 2008. This was the ninth event in the long tradition of Domains workshops, which started in Darmstadt in 1994. Since then, workshops have been organised in Braunschweig (1996), Munich (1997), Siegen (1998), Darmstadt again (1999, 2004), Birmingham (2002) and Novosibirsk (2007).

The workshop in 2008 was, like its predecessors, open to all areas of domain theory, but explicitly invited contributions relating to denotational semantics. Among the registered participants were Ph.D. students as well as leading researchers in mathematics and computer science. The programme consisted of 32 talks covering most aspects of domain theory including: *Lattices and Metric Spaces*; *Computability*; *Categories*; *Real Number Computation*; *Probability and Powerdomains*; *Topology*; *Sequentiality, Concurrency and Non-determinism*; *Possible World Semantics*; *Semantics of Name Abstraction*; and *Logic*.

The papers in this special issue provide a cross-section of the topics listed above. Ulrich Berger, Jens Blanck and Petter K. Køber study the topological properties of the space of representable compact sets and isolate conditions under which all compact subsets are representable. Martín Escardó and Paulo Oliva explain bar induction in terms of sequential games as a generalisation of backward induction making elegant use of topological domain theory. Jean Goubault-Larrecq uncovers a hidden symmetry in powerdomains while investigating a beautiful family of dualities that extends de Groot duality to various domains of non-deterministic, probabilistic and mixed choice. Martin Hyland advocates a generalisation of domain theory from posets to categories, and from this, amongst other insights, he provides a more conceptual proof of the cartesian closedness of algebraic lattices. Mateusz Kostanek and Paweł Waszkiewicz generalise the existence proof of bilimits in the category of directed-complete posets and Scott-continuous maps to categories enriched in a Girard quantale. Finally, Alexander Kurz and Daniela Petrişan investigate how to do universal algebra over nominal sets by exploiting the fact that the category of nominal sets is the full reflective subcategory of a presheaf category, and then prove Birkhoff theorems to demonstrate the viability of their approach.

The papers by Jean Goubault-Larrecq and Martin Hyland are extended versions of their invited lectures – other invited talks were presented by Klaus Keimel, Gordon Plotkin and Dana Scott.

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Bernhard Reus (University of Sussex)
Achim Jung (University of Birmingham)
Klaus Keimel (TU Darmstadt)
Thomas Streicher (TU Darmstadt)

Special Issue editors