Preface for the Special Issue on Domain Theory

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This issue contains six papers from the *Workshop on Domains IX* held at the University of Sussex (Brighton), September 22-24th, 2008. It has been the ninth event in the long tradition of Domains workshops that 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 PhD students as well as leading researchers in the field, mathematicians and computer scientists alike, 32 of which gave talks covering most aspects of domain theory including *Lattices and Metric Spaces*, *Computability*, *Categories*, *Real Number Computation*, *Probability and Powerdomains*, *Topology*, *Sequentiality*, *Concurrency and Nondeterminism*, *Possible World Semantics*, *Semantics of Name Abstraction*, and *Logic*.

The papers in this volume 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 generalisation of backward induction making elegant use of topological domain theory. Jean Gaboult-Larrecq uncovers a hidden symmetry in powerdomains 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 obtaining from this, amongst other insights, 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 Petrisan investigate how to do universal algebra over nominal sets exploiting that the category of nominal sets is the full reflective subcategory of a presheaf category and prove Birkhoff theorems to demonstrate the viability of their approach.

The papers by Jean Gaboult-Larrecq and Martin Hyland are extended versions of their

invited lectures. Other invited talks were presented by Klaus Keimel, Gordon Plotkin and Dana Scott.

We are grateful to our sponsors, the London Mathematical Society, and the EPSRC who contributed to the costs of organising the meeting with generous grants. We would also like to thank the editor-in-chief, Giuseppe Longo, for inviting us to act as guest editors for this special issue. Last but not least, we are indebted to all our anonymous referees for their thorough work and for helping us to get this special issue out in time.

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