Preface

This book is based on material presented at the international summer school on Applied Semantics that took place in Caminha, Portugal, in September 2000. We aim to present some recent developments in programming language research, both in semantic theory and in implementation, in a series of graduate-level lectures.

The school was sponsored by the ESPRIT Working Group 26142 on Applied Semantics (APPSEM), which operated between April 1998 and March 2002. The purpose of this working group was to bring together leading reseachers, both in semantic theory and in implementation, with the specific aim of improving the communication between theoreticians and practitioners.

The activities of APPSEM were structured into nine interdisciplinary themes:

A: Semantics for object-oriented programming
B: Program structuring
C: Integration of functional languages and proof assistants
D: Verification methods
E: Automatic program transformation
F: Games, sequentiality, and abstract machines
G: Types and type inference in programming
H: Semantics-based optimization
I: Domain theory and real number computation

These themes were identified as promising for profitable interaction between semantic theory and practice, and were chosen to contribute to the following general topics:

- description of existing programming language features;
- design of new programming language features;
- implementation and analysis of programming languages;
- transformation and generation of programs;
- verification of programs.

The chapters in this volume give examples of recent developments covering a broad range of topics of interest to APPSEM.

We wish to thank the European Union for the funding which made the school possible. Generous additional support was also provided by Adega Cooperativa de Monção, Câmara Municipal de Caminha, Centre International de Mathématiques Pures et Appliquées (CIMPA), Fundação para a Ciência e Tecnologia, Instituto de Inovação Educacional, Project FACS- PraxisXXI/EEI/14172/1998, Microsoft Research, Região de Turismo do Alto Minho, and Sociedade Interbancária de Serviços (SIBS).

We are also very grateful to the members of the organizing committee for their excellent organization of the school and their choice of a beautiful venue; to the

scientific committee for planning the scientific programme; to the second readers for their helpful reviews of the chapters of this volume; and to the lecturers and participants who made the summer school such a stimulating event.

May 2002

Gilles Barthe
Peter Dybjer
Luís Pinto
João Saraiva

Organization

The summer school was organized by INRIA (Institut National de Recherche en Informatique et en Automatique), France and the University of Minho, Portugal.

Scientific Committee

Gilles Barthe, INRIA Sophia Antipolis
Peter Dybjer, Chalmers University
John Hughes, Chalmers University
Eugenio Moggi, Genova University
Simon Peyton-Jones, Microsoft Research
José Manuel Valença, Minho University
Glynn Winskel, BRICS

Organizing Committee

José Bacelar Almeida, Minho University
Gilles Barthe, INRIA Sophia Antipolis
Maria João Frade, Minho University
Luís Pinto, Minho University
Carla Oliveira, Minho University
João Saraiva, Minho University
Simão Sousa, INRIA Sophia Antipolis

Second Readers

Thorsten Altenkirch, Nottingham University
Gilles Barthe, INRIA Sophia Antipolis
Gérard Boudol, INRIA Sophia Antipolis
Peter Dybjer, Chalmers University
Martin Escardo, Birmingham University
Jörgen Gustavsson, Chalmers University
Daniel Hirschkoff, ENS Lyon
Achim Jung, Birmingham University
Luigi Liquori, LORIA - INRIA Lorraine
Eugenio Moggi, Genoa University
Jorge Sousa Pinto, Minho University
Thomas Streicher, Darmstadt Technical University
Peter Thiemann, Freiburg University
Tarmo Uustalu, Tallinn Technical University