

# Proceedings Combined 19th International Workshop on Expressiveness in Concurrency and 9th Workshop on Structured Operational Semantics (EXPRESS/SOS 2012), Newcastle upon Tyne, UK, September 3, 2012

**Citation for published version (APA):**

Luttik, B., & Reniers, M. A. (Eds.) (2012). *Proceedings Combined 19th International Workshop on Expressiveness in Concurrency and 9th Workshop on Structured Operational Semantics (EXPRESS/SOS 2012), Newcastle upon Tyne, UK, September 3, 2012*. (Electronic Proceedings in Theoretical Computer Science; Vol. 89). EPTCS. <https://doi.org/10.4204/EPTCS.89>

**DOI:**

[10.4204/EPTCS.89](https://doi.org/10.4204/EPTCS.89)

**Document status and date:**

Published: 01/01/2012

**Document Version:**

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

**Please check the document version of this publication:**

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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Published: 12th August 2012

DOI: 10.4204/EPTCS.89

ISSN: 2075-2180

# EPTCS 89

## Proceedings Combined 19th International Workshop on Expressiveness in Concurrency and 9th Workshop on Structured Operational Semantics

Newcastle upon Tyne, UK, September 3, 2012

Edited by: Bas Luttik and Michel A. Reniers

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Bas Luttik and Michel A. Reniers

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## Preface

This volume contains the proceedings of the Combined 19th International Workshop on Expressiveness in Concurrency and the 9th Workshop on Structural Operational Semantics (EXPRESS/SOS 2012) which was

held on September 3, 2012 in Newcastle upon Tyne, United Kingdom, as an affiliated workshop of CONCUR 2012, the 23th International Conference on Concurrency Theory.

The EXPRESS workshops aim at bringing together researchers interested in the expressiveness of various formal systems and semantic notions, particularly in the field of concurrency. Their focus has traditionally been on the comparison between programming concepts (such as concurrent, functional, imperative, logic and object-oriented programming) and between mathematical models of computation (such as process algebras, Petri nets, event structures, modal logics, and rewrite systems) on the basis of their relative expressive power. The EXPRESS workshop series has run successfully since 1994 and over the years this focus has become broadly construed.

The SOS workshops aim at being a forum for researchers, students and practitioners interested in new developments, and directions for future investigation, in the field of structural operational semantics. One of the specific goals of the SOS workshop series is to establish synergies between the concurrency and programming language communities working on the theory and practice of SOS. Reports on applications of SOS to other fields are also most welcome, including: modelling and analysis of biological systems, security of computer systems programming, modelling and analysis of embedded systems, specification of middleware and coordination languages, programming language semantics and implementation, static analysis software and hardware verification, and semantics for domain-specific languages and model-based engineering.

In 2012, the EXPRESS and SOS communities organized a combined EXPRESS/SOS 2012 workshop on the formal semantics of systems and programming concepts, and on the expressiveness of mathematical models of computation. We received seventeen submissions out of which the programme committee selected ten for presentation at the workshop. These proceedings contain these selected contributions. The workshop also had an invited presentation:

*Applying automata and games to simply typed lambda calculus,*  
by Colin Stirling (University of Edinburgh, United Kingdom).

We would like to thank the authors of the submitted papers, the invited speaker, the members of the programme committee, and their subreviewers for their contribution to both the meeting and this volume. We also thank the CONCUR 2012 organizing committee for hosting EXPRESS/SOS 2012. Finally, we would like to thank our EPTCS editor Rob van Glabbeek for publishing these proceedings and his help during the preparation.

Bas Luttik and Michel A. Reniers,  
Eindhoven, August 2012.

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# **Applying automata and games to simply typed lambda calculus**

**Colin Stirling** (*University of Edinburgh, United Kingdom*)

The application of automata and games to verification of concurrent systems is now well established. In this talk we consider how automata and games can be used to solve decision problems in simply typed lambda calculus.

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