



## Meta-Theory of Algebraic Process Theories

School of Computer Science, Reykjavik University

### Two PhD studentships

Applications are invited for two PhD studentships at the School of Computer Science, Reykjavik University. The positions are part of a three-year research project funded by Rannis (the Icelandic Fund for Research), under the direction of Luca Aceto and Anna Ingólfssdóttir.

#### **Aim of the project**

Algebraic process theories, also known as “process algebras”, are prototype specification languages for reactive systems—that is, for devices that compute by reacting to stimuli from their environment. The main strength of such theories lies in the equational (calculational) style of reasoning they support. For each process theory, several natural questions immediately arise pertaining to the (non-)existence of (finite or recursive) sets of laws that allow one to prove by “substituting equals for equals” all of the valid equalities between process descriptions (closed or open terms) over fragments of the process theory at hand. Currently, answering such questions is only possible via delicate, error-prone and lengthy proofs.

The aim of the project is to contribute further advances to the study of the meta-theory of algebraic theories of processes. The main goals of the project are

- to establish a generic framework for answering questions pertaining to the existence of equational axiomatizations of behavioural semantics over process algebras affording certain desirable properties, such as being finite or recursive, and
- to apply the proposed general theory to solve some of the main open problems in the study of the equational logic of processes.

#### **Research environment**

The research within the project will be carried out in close collaboration with our long-term co-workers Wan Fokkink (VU Amsterdam), Bas Luttik (TU Eindhoven), MohammadReza Mousavi (TU Eindhoven) and Michel Reniers (TU Eindhoven).

The successful candidates will benefit from, and contribute to, the research environment at the Icelandic Centre of Excellence in Theoretical Computer Science (ICE-TCS). ICE-TCS has currently 14 permanent members, seven postdoctoral researchers and one Ph.D. student. For more information about ICE-TCS, its members and its activities, see <http://www.icetcs.ru.is/>.

## **Qualification requirements**

Applicants for the PhD studentships should have a good MSc degree in Computer Science, Mathematics or closely related fields, and have a strong background in discrete mathematics and formal systems. Some previous knowledge of topics from at least one of concurrency theory, process calculi and structural operational semantics is not a prerequisite, but would be desirable.

## **Remuneration**

PhD position: 265,000 ISK (roughly 1,550 euros) per month before taxes, for three years, starting as early as possible and no later than October 2010.

## **Application details**

By Friday, 26 February 2010, interested applicants should send their CV, including a list of publications where applicable, in PDF to the addresses below, together with a transcript of their academic record, a statement outlining their suitability for the project and the names of two referees.

### **Luca Aceto**

email: [luca@ru.is](mailto:luca@ru.is)

### **Anna Ingolfsdottir**

email: [annai@ru.is](mailto:annai@ru.is)

We will start reviewing applications as soon as they arrive, and will continue to accept applications until the positions are filled. However, we strongly encourage interested applicants to send in their applications as soon as possible.