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Education

- 2010 **PhD Degree in Computer Science**, University Paris-Sud
Subject: *n-Synchronous Model to Program Kahn Process Networks with Bounded Memory*
Jury: Gérard Berry (president), Nicolas Halbwachs and Robert de Simone (reviewers),
Louis Mandel and Marc Pouzet (advisors), Jean-Paul Allouche, Marc Duranton
- 2005 **Parisian Master of Research in Computer Science (MPRI)**
Courses: *Programming Languages Principles and Formalisms, Rewriting, Lambda Calculus, Synchronous Systems, Abstract Interpretation, Proof Assistants, Linear Logic, ...*
- 2005 **Magistère d'Informatique (MIAIF)**, University Paris 6
Generalist computer science training course, selective entry

Work Experiences

- 2005-2010 **Research Assistant** at INRIA/LRI (Proval Team), University Paris-Sud
- 2005-2010 **Teaching Assistant** at University Paris-Sud
Imperative Programming, Graphical Interfaces Programming, Algorithmics, ...
- 2005 **Master internship** at LIP6, University Paris 6
Subject : *Locally asynchronous and globally synchronous model for high-performance video applications*, supervised by M.Pouzet (6 months)
- 2004 **Second year internship** at Trivium, software editor, Paris.
Subject : *Adaptation of See-K software to IBM's technologies* (5 months)
- 2003 **First year internship** at LIP6, in team SPI, on the *Lucid Synchronone* language, supervised by M. Pouzet (1.5 month).

Research

I am interested in models and languages to program stream processing applications with real-time constraints, such as multimedia applications. They manipulate infinite data flows, on which they apply successive operations.

These systems can be represented by Kahn Process Networks. In this model, computation nodes are executed concurrently and communicate through unbounded buffers. It has the advantage of being deterministic and yet allowing to express the intrinsic parallelism of applications. Nevertheless, it does not guarantee that the system is deadlock free and that it can be executed with bounded memory.

Dataflow Synchronous Languages are a simple framework to program Kahn Process Networks without buffers. They offer strong guarantees on memory bounds and absence of deadlocks. The downside of these guarantees is a lack of flexibility in the composition of flows: communication must be done synchronously, that is without buffers.

The n-synchronous model is an extension of the synchronous model that relaxes the synchronous constraint in a controlled way. It allows a more flexible composition while preserving static guarantees given by synchronous languages. In my thesis, I present a n-synchronous language and I focus on the analysis which statically checks that a program can be executed with bounded buffers and automatically computes those sizes.

International Conferences

Lucy-n: a n-synchronous extension of Lustre

Louis Mandel, Florence Plateau, and Marc Pouzet. In International Conference on Mathematics of Program Construction (**MPC 10**), Québec, Canada, June 2010

Abstraction of Clocks in Synchronous Data-flow Systems

Albert Cohen, Louis Mandel, Florence Plateau, and Marc Pouzet. In ASIAN Symposium on Programming Languages and Systems (**APLAS 08**), Bangalore, India, December 2008

N-Synchronous Kahn Networks : a relaxed model of synchrony for real-time systems

Albert Cohen, Marc Duranton, Christine Eisenbeis, Claire Pagetti, Florence Plateau and Marc Pouzet. In ACM International Conference on Principles of Programming Languages (**POPL 06**), Charleston, South Carolina, USA, January 2006

Synchronizing Periodic Clocks

Albert Cohen, Marc Duranton, Christine Eisenbeis, Claire Pagetti, Florence Plateau and Marc Pouzet. In ACM International Conference on Embedded Software (**EMSOFT 05**), Jersey city, New Jersey, USA, September 2005 (short paper)

International Workshops

Clock typing of n-synchronous programs

Louis Mandel, Florence Plateau and Marc Pouzet.
In Designing Correct Circuits (**DCC 10**), Paphos, Cyprus, March 2010

Relaxing synchronous composition with clock abstraction

Louis Mandel, Florence Plateau and Marc Pouzet.
In Hardware Design using Functional languages (**HFL 09**), York, UK, Mars 2009

Interactive programming of reactive systems

Louis Mandel and Florence Plateau. In Model-driven High-level Programming of Embedded Systems (**SLA++P 08**), Budapest, Hungary, April 2008

NB: A full list of publications is available on my web site

Contracts

Action d'envergure INRIA Synchronics
ACI ALIDECS

Complementary Information

Community Service

- 2006-2008 Creation and animation of an activity for the **French Science Festival**
Subject: Logic and Computer Science
Audience : children and people at large
- 2007 Contribution to the **INRIA Alphabet Book about Computer Science**.
Title: *L'informatique de A à Z*
Audience : children and people at large
- 2007 In charge of the mensual **phd students seminary** of Proval research team

Languages

French : mother tongue English : read, written, spoken Portuguese : read, spoken