



ABCDE



## Scientific Report

First name / Family name

Zoé Drey

Nationality

French

Name of the *Host Organisation*

IMDEA

First Name / family name  
of the *Scientific Coordinator*

Manuel Hermenegildo

Period of the fellowship

17/10/2011 to 16/10/2012

## **I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP**

The initial research project proposed by Manuel Hermenegildo was to explore the use of the extension power of a logic programming language called Ciao for deriving methods and mechanisms for domain-specific language development, starting on the definition of an object-oriented extension of Ciao.

My research activity was structured in two main parts:

It first did a thorough study of the logic programming approach, which was not part of my scientific background. During that time, I also acquired general knowledge in using program verification tools (abstract interpretation - Ciao preprocessor).

I then explored ways to leverage the extension mechanism of Ciao used to define domain-specific notations, in order to rapidly implement tools such as domain-specific debuggers or analyzers. This issue was particularly challenging since it addresses a problem concerning the language communities (the one of my group at IMDEA), as well as the software engineering ones (the core topic of my Ph.D. work).

A first step towards this objective has been achieved, for I proposed a method to guide the development of a domain-specific debugger for any kind of syntactic language extension, with a low programming overhead. This method has been applied to three language extensions of Ciao, CLP (constraint logic programming), the functional notation, and DCG (definite clause grammar). This result could be obtained thanks to the modularity of the Ciao language. We plan to further explore this track and renew a collaboration at mid-term, in order to adapt these results to program verification.

## **II – PUBLICATION(S) DURING YOUR FELLOWSHIP**

Z. Drey, C.Consel.

Taxonomy-driven prototyping of pervasive computing applications : a novice-programmer visual language and an evaluation.

In JVLC'2012 : Journal of Visual Languages and Computing, Elsevier.

Z. Drey, J. Morales, M. Hermenegildo.

Reversible language extensions and their application in debugging.

In CICLOPS'2012 : International Colloquium on Implementation of Constraint and Logic Programming Systems (ICLP Workshop)

Z. Drey, J. Morales, M. Hermenegildo, M. Carro.

Reversible language extensions and their application in debugging.

In PADL'2013 : Fifteenth International Symposium on Practical Aspects of Declarative Languages.

## **III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES**

Attended workshop during my fellowship : CICLOPS'2012, and ICLP'2012 (only as an attendee), located in Budapest, Hungary.

Attended seminars : I attended a range of seminars proposed each week within the IMDEA site. They were mainly related to programming languages techniques (e.g. compilation, code coverage) and verification (e.g. model checking, abstract interpretation).

#### **IV – RESEARCH EXCHANGE PROGRAMME (REP)**

I did a three-day visit in December 2012 at the INRIA institute in Bordeaux, in the PHOENIX group lead by Charles Consel (charles.consel@inria.fr). We worked on a journal article, which has been accepted during my fellowship (June 2012), as mentioned in section III.