



IWST 2023: International Workshop on Smalltalk Technologies

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Abstract

The *International Workshop on Smalltalk Technologies (IWST)* is traditionally organized within the *European Smalltalk User Group (ESUG)* conference. Its goal is to create a forum around contributions and experiences on building or using technologies related to Smalltalk and its derivatives. IWST welcomes papers on any aspect of Smalltalk, from the theoretical as well as practical perspective, including research and industrial papers. IWST 2023 has received 13 submissions that passed through a 2-round reviewing process. After the first round, 10 papers were directly accepted while 3 papers were conditionally accepted. The second review round confirmed that all the papers were improved according to the reviewers' suggestions and, finally, all 13 papers were accepted for presentation and publication in the IWST 2023 Proceedings. After all, the three best papers received awards under the sponsorship of *Lam Research Corporation*.

Keywords

EUSG: European Smalltalk User Group, IWST: International Workshop on Smalltalk Technologies

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CEUR Workshop Proceedings (CEUR-WS.org)

1. Preface

This volume contains papers presented at IWST 2023: International Workshop on Smalltalk Technologies. IWST 2023 was held from the 29th to the 31st of August, 2023, in Lyon, France.

IWST 2023 continues the tradition of a successful series of events co-located with the European Smalltalk User Group (ESUG) conferences focused on contributions and experiences in building and using Smalltalk Technologies. Its aim is to gather developers and users of Smalltalk-related technologies around the presentation, discussion, and dissemination of the latest scientific and practical achievements in the form of research or industrial papers. The workshop welcomes position papers, papers describing work in progress, tool demonstration papers, technical and industrial reports, and papers designed to provoke debate and inspire future collaborations and contributions.

The IWST 2023 workshop consisted of four technical sessions with contributions reviewed and selected by an international program committee. IWST 2023 has received 13 submissions. All presented and published papers were at least triple-reviewed and passed through a 2-round reviewing process. After the first round, 10 papers were directly accepted while 3 papers were conditionally accepted. The second review round confirmed that all the papers were improved according to the reviewers' suggestions and, finally, all 13 papers (see Section 2) were accepted for presentation and publication in the IWST 2023 Proceedings. After all, the three best papers received the best paper awards (Section 2.1).

We are grateful to all PC members (Section 3.2) for submitting careful and timely opinions on the papers. Our special thanks are also addressed to the ESUG board for co-locating and co-organizing IWST with the ESUG conference, while we thank the IUT Lumiere Lyon, France for hosting and organizing both events. Finally, a special thanks goes to the Lam Research Corporation for sponsoring the best paper awards.

2. Workshop Program

The workshop accepted 12 full papers and a short paper. Three full papers were awarded based on the reviewing scores and audience voting.

2.1. Awarded papers

We congratulate to winners of the first, second, and third prizes in the competition for the best paper award at the IST 2023, respectively:

I **Garbage Collector Tuning in Pathological Allocation Pattern Applications** by *Nahuel Palumbo, Sebastian Jordan Montaño, Guillermo Polito, Pablo Tesone and Stéphane Ducasse*

The first prize winners present a methodology to identify the causes of Garbage Collector (GC) overhead in Pharo applications for tuning GC parameters. They describe the GC inside the PharoVM (Pharo Virtual Machine) and its parameters, looking at how their variations change the allocation behavior. They were able to analyze, identify, and understand the GC performance issues present in one real application and suggest specific GC tuning actions. Using the suggested parameter values, they improved its performance by up to 12x and reduced GC overhead by up to 3.8x.

II **Exploring GitHub Actions through EGAD: An Experience Report** by *Pablo Valenzuela, Alexandre Bergel, Timo Kehrer and Oscar Nierstrasz*

The second awarded paper presents an experience developing and using the Explorable GitHub Action Domain Model (EGAD), a moldable domain-specific tool implemented on Glamorous Toolkit (GT) to depict and analyze detailed GA workflow data. It shares valuable insights focusing on three key areas: (i) composing stories to develop domain models, (ii) conducting research by navigating custom views, and (iii) supporting the onboarding of researchers on GT.

III **PharoJS: Transpiling Pharo Classes to JS - ECMAScript 5 versus ECMAScript 6** by *Noury Bouraqadi and Dave Mason*

The third prize goes to the paper that describes the changes that have been made to PharoJS to switch from ECMAScript 5 standard (ES5) to ECMAScript 6 (ES6). Here, PharoJS is an open-source infrastructure that allows applications to be developed and tested in Pharo Smalltalk, but to ultimately run on a JavaScript (JS) interpreter. One of the major features provided by ES6 is a set of new constructs to explicitly support class-based programming. The paper describes the consequences of adopting ES6, on generated code, and the positive impact on all performance metrics.

2.2. Regular papers

- **SmallEvoTest: Genetically Created Unit Tests for Smalltalk** is a **short paper** by *Alexandre Bergel, Alison Fernandez Blanco, Juan Pablo Sandoval Alcocer and Geraldine Galindo Gutierrez* introduces an approach aimed at automatically generating fully executable unit tests suitable for dynamically typed programming languages. The approach is tuned for dynamically-typed and class-based programming languages and it is implemented in the Pharo programming language. To address the absence of static type annotations, the approach utilizes a just-in-time example-collecting technique and employs a genetic algorithm to drive the evolution of the unit tests.
- **Migration process from monolithic to micro frontend architecture in mobile applications** by *Quentin Capdepon, Nicolas Hlad, Abdelhak-Djamel Seriai and Moustapha Derras*
This paper introduces a plan for migrating monolithic mobile applications to Micro FrontEnd (MFE) architectures using the model-driven engineering (MDE) approach. The Dart meta-model is based on Famix and the architecture migration is conducted on this model using Moose. Alongside the process description, the authors expose the identification challenges, limitations, and future work needed to achieve it. Therefore, this paper mainly discusses possible solutions regarding the feasibility of our migration process.
- **A Unit Test Metamodel for Test Generation** by *Gabriel Darbord, Anne Etien, Nicolas Anquetil, Benoît Verhaeghe and Mustapha Derras* presents a unit test meta-model that enables the generation of unit tests. The meta-model provides a language-agnostic abstraction that enables automated transformation and code generation. The authors use the Famix family of models and tools from the Moose platform to build our meta-model and for code analysis.
- **Analyzing Dart Language with Pharo: Report and early results** by *Nicolas Hlad,*

Benoit Verhaeghe and Mustapha Derras

In this paper, authors share their experience regarding the usage of Pharo 10 to support the analysis of Dart2.10 and present their early work on a set of open-source tools. Their tools cover the parsing of Dart with SmaCC, the visualization of its AST with Roassal, and its meta-model analysis with Moose and Famix.

- **Pattern matching in Pharo** by *Aless Hosry, Nicolas Anquetil, Stéphane Ducasse and Vincent Aranega* presents the syntax of two pattern matchers: RBParseTreeSearcher offered by Pharo IDE and Refactoring Framework and MoTion recently introduced by authors and compares them on their expressiveness and time efficiency.

- **Improving Performance Through Object Lifetime Profiling: the DataFrame Case** by *Sebastian Jordan Montaña, Nahuel Palumbo, Guillermo Polito, Stéphane Ducasse and Pablo Tesone*

Authors have developed an open-source lifetime profiler. The current implementation does not require Virtual Machine modification and it is based on ephemerons and method proxies. They profiled DataFrame and observed a significant number of objects that lived a long time. This information is used to tune the garbage collector parameters and we got up to 6.8× of performance improvements.

- **Threaded-Execution and CPS Provide Smooth Switching Among Execution Modes** by *Dave Mason* discusses using a combination of Continuation-Passing-Style for native code in combination with a Threaded-Execution model to address this tension and provide the best of all worlds.

- **Sequence: Pipeline modelling in Pharo** by *Dmitry Matveev* introduces Sequence: a Pharo package for rapid pipeline execution modelling. Built on the powers of Smalltalk and the Pharo interactive environment, Sequence offers a compact syntax to express pipelines and their properties, a sophisticated simulation engine, and Roassal-based visualization for interactive trace inspection.

- **Pharo DataFrame: Past, Present, and Future** by *Larisa Safina, Oleksandr Zaitsev, Cyril Ferlicot-Delbecque and Papa Ibrahima Sow*

In this paper, the authors present the Pharo DataFrame library, show examples of its usage, and compare its API to that of pandas. They give an overview of the changes that have been made since DataFrame v1.0, discuss the limitations of the current implementation, and present the roadmap for the future.

- **Pharo: a reflective language – A first systematic analysis of reflective APIs** by *Iona Thomas, Stéphane Ducasse, Pablo Tesone and Guillermo Polito*

The authors analyze the reflective operations used in Pharo 11. They classify the current reflective operations in different families. Also, we identify a set of issues raised by the use of reflective operations. Such an analysis of reflective operations in Pharo is important to support the revision of the reflective layer and its potential redesign.

3. Workshop organization

The papers have been reviewed by an international Program Committee (PC) and selected by PC chairs.

3.1. Program chairs

Stéphane Ducasse, Inria Lille, France, and
Gordana Rakić, University of Novi Sad, Serbia

3.2. Program committee

Nour Agouf, Inria Lille, France,
Vincent Blondeau, Lifeware, Switzerland,
Zoran Budimac, University of Novi Sad, Serbia,
Cedrick Béler, Ecole Nationale d'Ingenieurs de Tarbes, Hautes-Pyrenees, France,
Nicolas Cardozo, Universidad de los Andes, Bogota, Colombia,
Céline Deknop, Universite catholique de Louvain (UCL), Belgium,
Michele Lanza, Software Institute, Universita della Svizzera italiana, Lugano, Switzerland,
Eric Lepors, Thales DMS, France,
Dave Mason, Ryerson University, Toronto, Canada,
Kim Mens, Universite catholique de Louvain (UCL), Belgium,
Ana-Maria Oprescu, University of Amsterdam, Neatherlands,
Jean Privat, University of Quebec in Montreal, Canada,
Pooja Rani, University of Bern, Switzerland,
Larisa Safina, Inria Lille, France,
Joao Saraiva, University of Minho, Portugal,
Benoît Verhaeghe, Berger-Levrault, Lyon, France, and
Oleksandr Zaytsev, Cirad, UMR SENS, France

3.3. Technical Editor

Ivan Pribela, University of Novi Sad, Serbia

3.4. Organizing and hosting

IUT Lumière Lyon, France

3.5. Sponsoring

ESUG: European Smalltalk User Group (organisation), and
Lam Research Corporation (awards)