SCIEX Projects in the Dynamic Analysis Group, Università della Svizzera italiana

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SCIEX Home Mentor

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SCIEX Projects

- **PEARL**, June 2011 – May 2012
  - Productive and Efficient dynamic Analysis thRough aspect-oriented domain-specific Languages
  - SCIEX Fellow: Lukáš Marek (PhD student)

- **DYNASTY**, July 2012 – December 2012
  - DYNamic Analysis for diSTributed sYstems
  - SCIEX Fellow: Lubomír Bulej (Post-doctoral researcher)

- **WORLD**, May 2013 – October 2014
  - WORkLoad analysis and consolidation for Datacenters
  - SCIEX Fellow: Andrej Podzimek (PhD student)
Research Focus

- Dynamic program analysis
  - Understanding how programs work
  - Designing programs that analyze other programs

- Obstacles in observing programs
  - Runtimes built for performance, not for observability
  - Analysis influences observed program
  - Trade-offs in tool design and development
    - Lack of high-level abstractions
    - Limited expressive power
    - Limited code coverage
    - High overhead

- Contributions
  - High-level, powerful, complete, and efficient analysis
  - Isolation of analysis and observed program
  - Multi-platform analysis (Java, Android)
Framework Overview

Analysis Server

Event Dispatcher

JVM / DVM Context

Analysis

Event Producer

Event Consumer
Results: Software Releases

- Open-source releases of DiSL and ShadowVM
  http://disl.ow2.org/

- Endorsed by the SPEC Research Group
  http://research.spec.org/tools/overview/disl.html
Results: Journals and Magazines

Project results


Follow-up results

Results: Conferences & Symposia

Project results


Follow-up results

Results: Conferences & Symposia

Project results


Results: Peer-reviewed Workshops

Follow-up results


Results: Tool Demonstrations

Project results


Follow-up results

Collaboration Aspects

● Complementary expertise brought by SCIEX Fellows
  ○ Performance analysis and modeling
  ○ Operating systems
  ○ Distributed systems

● New research directions taken by SCIEX Fellows
  ○ Dynamic program analysis
  ○ Workload characterization

● Excellent progress in careers of SCIEX Fellows
  ○ Dr. Lukáš Marek: dissertation defended
  ○ Prof. Lubomír Bulej: assistant professor at Charles Univ.
  ○ Andrej Podzimek: dissertation in progress
Collaboration Aspects

● Frequent research meetings with Prof. Tůma and Prof. Bulej in Lugano and in Prague
  ○ Software design and development
  ○ Maintenance of open-source software releases
  ○ Publications
  ○ Seminar talks

● Joint organization of conferences
  ○ PPPJ ‘16 in Lugano

● ERASMUS agreement between USI and Charles University

● Elected Professorem Hospitem of Charles University