

# Synthesis, Verification, and Analysis of Rich Models (SVARM)

## FLOC 2010 Workshop Proposal

Workshop affiliated with: IJCAR 2010 and CAV 2010

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## 1. Tentative Call for Papers

*Workshop on Synthesis, Verification, and Analysis of Rich Models (SVARM 2010)*

- Part of [FLoC 2010](#)

### Organizers

- [Paul Jackson](#) (University of Edinburgh, UK)
- [Viktor Kuncak](#) (EPFL, Switzerland)
- [Tomáš Vojnar](#) (Brno Univ. of Technology, Czech Republic)

### (Subset of) Program and Steering Committee

- [Roderick Bloem](#) (TU Graz, Austria)
- [Armin Biere](#) (Johannes Kepler University, Linz, Austria)
- [Maria Paola Bonacina](#) (Università degli Studi di Verona, Italy)
- [Enric Rodríguez Carbonell](#) (TU Catalonia, Spain)
- [Silvia Ghilezan](#) (University of Novi Sad, Serbia)
- [Ian Horrocks](#) (University of Oxford, UK)
- [Paul Jackson](#) (University of Edinburgh, UK)
- [Predrag Janicic](#) (University of Belgrade, Serbia)
- [Viktor Kuncak](#) (EPFL, Switzerland)
- [Marius Minea](#) (Politehnica University of Timișoara, Romania)
- [Ilkka Niemelä](#) (Helsinki University of Technology, Finland)
- [Tobias Nipkow](#) (TU Munich, Germany)
- [Alexander Rabinovich](#) (Tel-Aviv University, Israel)
- [Stefan Ratschan](#) (Academy of Sciences, Czech Republic)
- [Andrey Rybalchenko](#) (MPI-SWS, Germany)
- [Cesar Sanchez](#) (IMDEA-Software, Spain)
- [Natasha Sharygina](#) (University of Lugano, Switzerland)
- [Tomáš Vojnar](#) (Brno Univ. of Technology, Czech Republic)

### Web Site

<http://richmodels.org/SVARM>

## 2. Scientific Justification

### 2.1 Motivation

Researchers have recently developed a number of useful tools for automated analysis of *particular* classes of *models* of computer systems:

- software vendors are using static analyses supported by automated theorem provers and constraint solvers to prevent software crashes;
- hardware manufacturers are using SAT solvers, model checkers, and theorem provers to identify and correct errors that could have enormous financial consequences;
- description logic reasoners analyze relationships between tens of thousands of terms in medical ontologies and verify their consistency;
- aircraft manufacturers and space agencies are using analysis tools based on abstract interpretation to eliminate errors in aircraft control software.

Despite these successes, today's automated analysis methods are not widespread in engineering practice. Among the factors contributing to this state of affairs are the limitations of the tools themselves: insufficient *automation*, specialized *input formats*, and no support for high-level *synthesis*. Another factor is the lack of *standards* of quality that would ease tool interoperability and give formally certified computer system a competitive advantage over systems without formal assurance guarantees.

**Objective.** The workshop explores directions and techniques for making automated reasoning (including analysis and synthesis) applicable to a wider range of problems, as well as making them easier to use by researchers, software developers, hardware designers, and information system users and developers.

### 2.2 Example Topics of Interest

- **Standardization of expressive languages.** Formats to represent systems, formulas, proofs, counterexamples. Translation between specification languages. Benchmarks and competitions for automated reasoning, verification, analysis, synthesis.
- **Decision procedures:** Decision procedures for new classes of constraints. SAT and SMT implementation and certification. Encoding synthesis and analysis problems into SMT. Description logics and scalable reasoning about knowledge bases.
- **Transition system analysis:** Abstraction-based approaches and refinement for verification of infinite-state systems. Constraint-based program analysis. Data-flow analysis for complex domains. Extracting transition systems from programming languages and bytecodes.
- **High-level synthesis:** New algorithms for synthesis from high-level specifications. Extending decision procedures to perform synthesis tasks. Connections between invariant generation and code synthesis.

### 3. Organization

#### 3.1 Contact information of the workshop organizers

Full contact for [Viktor Kuncak](#):

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See also the title page for email contacts.

Click on PDF links of names for home pages of researchers.

#### 3.2 Proposed Sponsoring Conference

Both IJCAR 2010 and CAV 2010 agreed to sponsor the workshop, based on discussions with workshop chairs for these conferences.

[Paul Jackson](#) is already involved in FLoC organization.

[Viktor Kuncak](#) is the acting Chair of the COST Action IC0901.

[Tomáš Vojnar](#) is the Workshop Chair for CAV 2010.

#### 3.3 Estimate of the Audience Size

Researchers from 33 research groups will be provided EU funding to attend this event, see the Section “*Relationship to the COST Action IC0901*” below. The workshop will be open for participation to everyone who registers. We set the estimate at 40 people, but may physically experience substantially more people at certain invited talks.

#### 3.4 Proposed Format and Agenda

The following will be main types of activities:

- A substantial number of invited talks that will review new results and give systematic overview of more established ones.
- Brief announcement (5-15min) of recent results.
- Demo session for tools for analysis and synthesis of systems.

#### 3.5 Potential Invited Speakers

We will solicit invited speakers from the list of people listed at <http://richmodels.org>, as well as a number of (so far primarily US-based) researchers that we have been in contact in the context of this initiative.

#### 3.6 Procedures for Selecting Papers and Participants

A substantial number (up to 33 research groups) will be invited and be provided funding to attend. In addition, anyone who registers will be able to attend.

#### 3.7 Plans for Dissemination

Final papers will be published as a volume of CEUR Workshop Proceedings (<http://ceur-ws.org>), freely available online. The paper authors will retain full copyright for their papers.

#### 3.8 Duration and Preferred Period

The duration of the workshop is **two days**.

Because the workshop is affiliated with IJCAR and CAV, and because workshop duration is 2 days, **post-conference**, July 20-21 is the preferred time for the workshop.

#### 3.9 Special Technical or AV needs

We only have usual workshop/conference needs:

- standard LCD projector
- sufficiently large conference room (actual audience may be unpredictable at times at an event of size of FLOC)
- demos would be more appropriate for simultaneous demos in open space area, and could be collocated with other such activities at conferences and workshops; 20 or more power plugs are needed for such simultaneous demo sessions.
- demos and some talks may require Internet connection.

#### 3.10 Relationship to the COST Action IC0901

The event is organized as part of the Work Group meeting of the ESF COST Action IC0901 “Rich Model Toolkit—An Infrastructure for Reliable Computer Systems”. The information about this activity is at <http://richmodels.org>. The connection to the COST action provides a solid way for the workshop to bootstrap. The Action will last for 4 years, but the workshop is expected to continue.

Relevant consequences of the fact that the workshop is simultaneously a work-group meeting of the COST Action are:

- a substantial number of established researchers will be provided travel funds to attend the workshop under the COST funding scheme; this will also increase their likelihood of attending FLoC;
- a substantial number of invited talks are expected by these researchers as part of the workshop.

#### 3.11 Further Information

Please contact [Paul Jackson](#), [Viktor Kuncak](#), and [Tomáš Vojnar](#) for further information, and consult the workshop web site <http://richmodels.org/SVARM>.