

SICSA Grant Final Report

The 20th Automated Reasoning Workshop

*<http://www.computing.dundee.ac.uk/staff/katya/arw13/>
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Workshop Details. The 20th Automated Reasoning Workshop (ARW 2013) was held at the School of Computing, University of Dundee from 11 to 12 April 2013. This was the 20th in this series of annual meetings designed to provide a forum for discussion and dissemination of research progress in Automated Reasoning.

ARW is a single-track workshop with oral and poster presentations. Extended abstracts of all accepted contributions appear in a Proceedings volume and on the web. We had 18 regular talks this year, with topics ranging from Tableaux and Calculi methods, Modal, Temporal, Non-monotonic and Paraconsistent Logics to Model Checking, Constraint Solving, and Machine Learning in Automated Reasoning.

We were very fortunate to have two excellent invited speakers in Manfred Kerber from the University of Birmingham and Josef Urban from the Radboud University. Manfred spoke on “ForMaRE - Formal Mathematical Reasoning in Economics”, whilst Josef discussed “AI over Large Formal Knowledge Bases: The First Decade”. To further facilitate the discussion, their invited talks were followed by special 30 minute *Question-Answer* sessions devoted to topics in their research areas.

We thank Ann Kenny, Sebastian Stein, Mahamadou Niakate and Anne Millar for technical and administrative support. Special thanks go to Janet Hughes and the School of Computing for providing a venue and preparation. As in the previous years, the meeting was supported by the British Logic Colloquium (BLC) and SICSA.

The workshop was publicised via its own Webpage <http://www.computing.dundee.ac.uk/staff/katya/arw13/index.html>; that included the programme, all accepted papers, presentations slides, and video recording of all sessions (the latter was requested by colleagues who could not attend the workshop). The workshop was also advertised via numerous professional mailing lists, including SICSA themes mailing lists, and British Logic Colloquium (BLC) lists. The Proceedings volume was distributed during the workshop, and will be soon archived by the University of Dundee Library.

ARW’13 in Figures: ARW’13 had two days of programme, with two invited talks, two discussion sessions, and 18 regular talks.

34 delegates registered for ARW’13, among which there were 14 full registrations; 11 SICSA student registrations; and 9 other student registrations. Geographical spread of participants: 18 participants were from Scotland, and the rest from outside of Scotland: England (14), Netherlands (1), Poland (1).

Purpose of the workshop. The workshop provided an informal forum for the automated reasoning community to discuss recent work, new ideas and applications, and current trends. It aims to bring together researchers from all areas of automated reasoning in order to foster links among researchers from various disciplines; among theoreticians, implementers and users alike.

Topics included:

- Theorem proving in classical and non-classical logics;
- Interactive theorem proving, logical frameworks, proof assistants, proof planning;
- Reasoning methods:
Saturation-based, instantiation-based, tableau, SAT; Equational reasoning, unification; Constraint satisfaction; Decision procedures, SMT; Combining reasoning systems; Non-monotonic reasoning, commonsense reasoning; Abduction, induction; Model checking, model generation, explanation.
- Formal methods to specifying, deriving, transforming and verifying computer systems, requirements and software;
- Logic-based knowledge representation and reasoning:
Ontology engineering and reasoning; Domain specific reasoning (spatial, temporal, epistemic, agents, etc).
- Logic and functional programming, deductive databases;
- Implementation issues and empirical results, demos;
- Practical experiences and applications of automated reasoning.

Potential Benefits for SICSA Institutions. ARW'13 received a very positive feedback, both during the workshop and afterwards¹ both from academic and student participants. It was a valuable networking and training event for all SICSA PhD students and early career researchers working on areas related to automated reasoning. The workshop was sponsored by SICSA, and therefore we waived the registration fees for all PhD students from SICSA institutions.

Related SICSA Themes. *Modeling and Abstraction.* Automated Reasoning methods are used for modeling, e.g. for the purposes of system formalisation, software verification and analysis of multi-agent systems. One of the two main themes of ARW'13 was Automated reasoning for Economics, with an invited speaker Manfred Kerber (University of Birmingham). There was a special discussion session devoted to this subject.

Complex System Engineering. Automated Reasoning is an integral part of complex systems development, especially in the areas where it is important to check or guarantee (invariant) properties of a complex system. The recent trends in Automated reasoning suggest that re-enforcing automated reasoning with statistical and machine-learning features may be extremely useful when it comes to handling big program developments. The second major theme of ARW'13 was devoted to using statistical methods and machine-learning to data mine complex system behaviour arising in automated proof development. There was an invited talk by Josef Urban (Radboud University) devoted to this topic, followed by a discussion session.

¹Written feedback recieved via email:

Alison Pease, U. Queen Mary: *"Thanks for a really stimulating day yesterday - I really enjoyed the talks and discussion."*

Anthony Lin, University of Oxford: *"Thanks for organizing such a wonderful workshop. I learned a lot of new perspectives from the workshop (esp from the first day)."*

Ursula Martin, U. Queen Mary: *"Thank you very much for organising such a great workshop - and really excellent invited talks."*

Manfred Kerber, University of Birmingham: *"Many thanks for organisign it. I very much enjoyed it, meeting many people I knew, but also meeting people I didn't know yet, and learning a lot of the work currently going on."*

Anthony Young, Kings College London: *"Thank you so much for organising ARW2013. This is my first conference and hence the most memorable!"*