

SICSA Grant Final Report

Practical Types Residential Workshop

<http://staff.computing.dundee.ac.uk/katya/practical-types/>

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Workshop Details. The “Practical Types” mini-theme held a residential networking and training event at The Burn, Brechin; between 4-6 June 2014. The focus of the event was to explore ways in which the use of types in functional programming languages could be made more practical. The event was jointly organised by the universities of Dundee, St Andrews and Strathclyde; but the list of attendees included participants from the Universities of Edinburgh, Stirling; and industry (Well-Typed LLP).

Purpose of the workshop. Scottish researchers have been at the forefront of advances in type theory and its application. This 3-day residential workshop aimed to bring together researchers from across SICSA who are interested in issues of how to make types practical. Topics of interest included, but were not limited to:

- use of types for describing and reasoning about functional/extra-functional properties
- type-based static analyses, including amortised analysis
- types and concurrency, including session types
- types and safety/security
- proof carrying code
- application of categorical concepts in practical type settings
- types and generic programming
- type checking and type inference, including efficiency and other concerns
- static versus dynamic typing, including gradual typing
- design of typed languages

The workshop was advertised via numerous professional mailing lists, including SICSA themes mailing lists. The workshop was also publicised at <http://staff.computing.dundee.ac.uk/katya/practical-types/>. The program included open-format discussions alongside the following formal talks:

1. Fredrik Nordvall Forsberg (U.Strathclyde) Title: Inductive-inductive definitions in Martin-Lf Type Theory.
2. Marco Gaboardi (U.Dundee) Title: Type checking linear dependent types for sensitivity.
3. Neil Ghani (U.Strathclyde). Title: Logical Relations - Fibrationally.
4. Kevin Hammond (U.St Andrews). Title: Dependent Types for Parallelism.
5. Katya Komendantskaya (U.Dundee). Title: Coalgebraic Logic Programming for Type Inference.
6. Clemens Kupke (U.Strathclyde). Title: Coalgebra and game-semantics.
7. Sam Lindley (U.Edinburgh). Title: Effect Handlers for Idioms and Arrows.
8. Timothy Revell (U.Strathclyde) Title: Fibrational Units of Measure.

More Figures: The meeting had two days of programme (1 full day and two half-days), 9 lectures/talks; and several informal discussion sessions. There were 21 participants (among which – 8 PhD students), from Universities of Dundee, Edinburgh, St Andrews Strathclyde, Stirling as well as from Well-Typed LLP. We used £1500 support offered by SICSA to partially cover the residential costs of all participants; the bill from the Burn has been sent to SICSA by the School of Computing, University of Dundee.

Results and achievements. The workshop played a crucial role in starting joint in-depth research discussions among PhD students, early career researchers, and more senior academics from the participating universities. The talks had a free-schedule, that allowed to hold longer discussions and question/answer sessions. In that respect, it was unlike standard-style formal workshop. It transpired that each of the participating research groups has its own unique identity, however, the discovered range of mutual research interests inspired us to think about continuing this initial discussion with a series of further training events for PhD students and early career researchers. For this aim, we created a forum page:
<https://plus.google.com/u/0/b/103531595284048628662/103531595284048628662/about>.

In the long term, we envisage to build upon these activities, and acquire further financial support for joint PhD supervision. In particular, the workshop has already resulted in work on the following proposals:

1. Carnegie Trust Collaborative Research Grant, deadline January 2015;
2. European Training Network grant, deadline June 2015;