Report on SICSA Visit by Professor Mark Wallace to St Andrews, Glasgow, Dundee and Edinburgh.

Mark Wallace has been a leading researcher in the areas of constraints and optimisation for over 20 years. His visit, organised by Prof Ian Gent at the University of St Andrews, provided the opportunity to compare the advanced constraint modelling system Essence, whose main developers are at St Andrews, with the modelling system MiniZinc, whose main developers work with Mark at Monash University. Mark has also been involved in the commercialisation of constraint programming, including Parc Technologies (bought by Cisco Systems) and Opturion, of which he was the first CEO.

On June 10th and 11th Mark visited the group of Roberto Rossi at the University of Edinburgh Business School, and gave two talks. His first talk was on "Modelling and Solving of Stochastic Programs", describing how MiniZinc can be used to model problem with uncertainty, and presenting a novel algorithm which handles a very broad class of problems efficiently.   His second talk was on "MIP Modelling made Manageable" which describes how modelling in a high level language (such as MiniZinc) can yield high quality models suitable for mixed integer programming solvers (such as the commercial packages Gurobi and IBM Cplex). Indeed such high level models are sometimes mapped to better models than the ones naturally written by mathematical programmers.

On June 17th Mark's next visit was to Karen Petrie at the University of Dundee where his presentation was titled "Constraints and the 4th Industrial Revolution". This talk described how constraints technology contributes to and benefits from the 4th industrial revolution, but the talk also went through the complex and sometimes frustrating process of commercialisation.

The following day Mark visited Patrick Prosser at the University of Glasgow, where he also talked about Constraints and the 4th Industrial Revolution. The group discussed whether there could be an algorithm-independent modelling language: which is indeed the aim of Essence and of MiniZinc's big brother, Zinc. Discussions also took place with Kerem Akartunali at the University of Strathclyde.

Finally, back at St Andrews, Mark gave two more presentations, on MIP Modelling made Manageable and "On the Effectiveness of Local Search", which investigated why many metaheuristic algorithms deploy local search as a core component.

Mark attended the regular group meetings at St Andrews, and contributed some novel ideas.

Overall we were delighted by the visit and it was very useful in furthering collaborations in these areas, both across Scotland and between international groups in Scotland and Australia interested in similar research questions.

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