

Trustworthy Constraint Programming and Optimisation

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Introduction

- Constraint programming and optimisation technologies **automously make decisions affecting lives and livelihoods**, but the software is buggy.
- **I can fix this** by bringing together skills in algorithm engineering, empirical algorithmics, and theory, as well as communication and outreach.
- Proof logging will give us a new way of **guaranteeing that solver results are correct**.

Major Aims and Objectives

- Develop the world's first **trustworthy constraint programming and optimisation solver**.
- Use proof logging to help with explainability and empirical performance analysis.
- Make proof logging technology the new “socially acceptable” standard.

Impact

- Constraint programming is an **enabling technology**.
 - My existing research has been used in biochemistry, epidemiology, hardware design, social network analysis, robotics, computer vision, mathematics, ...
- Make proof logging available **by ticking one box**.
- Open source solver, using the MiniZinc high level modelling language.

Future Career Plans

- Develop a **sustainable** team.
 - Around three people (PhD students / postdocs).
 - Travel and collaborations.
 - Funding (LKAS, EPSRC, industry).
 - Publications and impact studies.
- Develop **algorithm engineering** as its own discipline.