

Cadabra: new directions in symbolic computer algebra

3.5 year doctoral research student position leading to a PhD in Maths

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Project description

The *Cadabra* software is a new approach to symbolic computer algebra. Originally developed to solve problems in high-energy particle and gravitational physics, it is now attracting increasing attention from other disciplines which deal with aspects of tensor field theory. The system was written from the ground up with the intention of exploring new ideas in computer algebra, in order to help areas of applied mathematics for which suitable tools have so far been inadequate.

The system is open source, built on a C++ graph-manipulating core accessible through a Python layer in a notebook interface, and in addition makes use of other open maths libraries such as SymPy, xPerm, LiE and Maxima. More information and links to papers using the software can be found at <http://cadabra.science>.

With increasing attention and interest from disciplines such as earth sciences, machine learning and condensed matter physics, we are now looking for an enthusiastic student who is interested in working on this highly multi-disciplinary computer algebra project. The aim is to enlarge the capabilities of the system and bring it to an ever widening user base. Your task will be to do research on new algorithms and take responsibility for concrete implementations, based on the user feedback which we have collected over the last few years. There are several possibilities to collaborate with people in some of the fields listed above, either in the Department of Mathematical Sciences or outside of it.

Prerequisites

Applicants need to have graduated with at least a 2.1 or equivalent in physics, maths, chemistry, engineering, computer science or related field. You need to be able to demonstrate experience with writing software in C++ and/or Python, e.g. in the form of contributions to open source projects. You should have a strong multi-disciplinary interest.

Funding and application

This project is directly funded by Durham University for 3.5 years. If you are interested in applying, in the first instance contact kasper.peeters@durham.ac.uk with a CV and a letter detailing your reasons for applying for the project and giving details of relevant experience. Promising applicants will be asked to apply via the University's online application system early 2017.

Deadline and starting date

Informal applications should be made by February 15th. The project will start in October 2017.