Dnr	Efternamn, Förnamn	Bidragsform
2013-4977	Kovacs, Laura Chalmers tekniska högskola Institutionen för data-och informationsteknik Programvaruteknik	Projektbidrag - Unga forskare

Projekttitel
GenPro: Generera och bevisa programegenskaper via symboleliminering

Ämnesområde/målområde	Beredningsgrupp
Nat-Tek generellt	Datavetenskap (NT-2)

Novelty and originality 5
(1=Poor, 2=Weak, 3=Good, 4=Very good, 5=Very good to excellent, 6=Excellent, 7=Outstanding)

Novelty and originality
The project concerns tools and methods for software verification, and more precisely, how to automatically derive loop variants from software source code. The project will extend the applicant´s own original prior work with the ability to generate invariants that involve quantifiers, which makes the approach useful for a much larger class of software.
The work is a novel extension of the invariant generation method developed by the applicant herself. The novelty is that generated invariants may involve quantifiers, which makes this method useful for loops that manipulate arrays, lists, trees and other data structures, not just atomic data.

Novelty and originality

Scientific quality of the project 6
(1=Poor, 2=Weak, 3=Good, 4=Very good, 5=Very good to excellent, 6=Excellent, 7=Outstanding)

Scientific quality of the project
The goals, theories and methods proposed are scientifically sound, theoretically well-founded and algorithmically plausible, and the planned activities and expected outcomes are described concretely and precisely.

Scientific quality of the project

Merits of the applicant(s) 6
(1=Poor, 2=Weak, 3=Good, 4=Very good, 5=Very good to excellent, 6=Excellent, 7=Outstanding)

Merits of the applicant(s)
The applicant (PhD 2007) has a strong background in logical methods and algorithms in program verification, and invented the successful symbol elimination method for automatic discovery of invariants. She has worked with top researchers at Linz, TU Wien, ETHZ, EPFL and Microsoft Research and has many relevant publications in strong venues. The applicant has developed or contributed to several open source software systems, including the Vampire theorem prover, which has more than 1000 verified downloads in 2010-2011 (according to the application).

Merits of the applicant(s)

Feasibility 3
(1=Not feasible, 2=Partly feasible, 3=Feasible)

Feasibility
Given the applicant´s qualifications, prior contributions to the area, and the concrete and detailed work packages and milestones, the proposed research is (challenging but) feasible.

Feasibility

Overall grade for the application's scientific quality 6
(1=Poor, 2=Weak, 3=Good, 4=Very good, 5=Very good to excellent, 6=Excellent, 7=Outstanding)

Motivation for the overall assessment of the application's scientific quality
The project has high potential for academic results as well as practical impact, the applicant is strong and has good industrial relations, and the resulting methods will be

implemented in the state-of-the-art first order theorem prover Vampire to which the applicant is actively contributing. The project is very well defined and promising preliminary results have been obtained already.
This is a solid proposal with a clear methodology and it likely to give lasting contributions to the field of theorem proving: It should produce techniques that can be used to improve theorems provers in general.

Motivation for the overall assessment of the application's scientific quality

Other remarks, special conditions (if any)
The Computer Science panel evaluated 58 applications in the junior project category. Each application was read by three panel members and a preliminary ranking of the applications was made. The top 60% of these (approximately) were discussed at the evaluation meeting. The applicants of the remaining applications have been informed that their application was not further discussed (in the text of the review above). At the time of writing it is estimated that the budget for 2013 will enable VR to fund at least the top 5 junior projects.