UNIVERSITY OF TWENTE.

Prof. Jan Trlifaj
Research and International Affairs Department
Ke Karlovu 2027/3, 121 16 Praha 2
Czech Republic

FACULTY OF ELECTRICAL ENGINEERING, MATHEMATICS AND COMPUTER SCIENCE

FROM
Prof.dr. Marieke Huisman
m.huisman@utwente.nl

DATE
May 21, 2019

PAGE
1 of 2

CHAIR
Formal Methods and Tools

OUR REFERENCE
EWI19/FMT: hmn/021/hmr

SUBJECT
Recommendation Dr. Jan Kofron

Dear Professor Trlifaj,

It is with great pleasure that I have read the habilitation thesis of Dr. Jan Kofron. In his thesis, Dr. Kofron gives a general overview of the area of software verification, he outlines future directions for research in this area and he presents his various contributions in the area of software verification.

After reading the thesis and studying his CV, I am impressed with the broad range of different contributions that Dr. Kofron has been involved in. The work he presents in his habilitation thesis clearly shows that he is able to develop his own line of research and to have substantial impact in his research.

Chapters 4, 5, 6 and 7 describe Dr. Kofron's work on behaviour protocols. In Chapter 4 he presents a technique to analysis behaviour protocols in a more efficient way, by using a different state space representation (using parse tree automata). In Chapter 5, he then dives further into the analysis of behaviour protocols and how these can be encoded into the Spin model checker. In Chapter 6, he then introduces a new formalism to describe behaviour protocols and he shows how this can be used to model component behaviour specifications in software product lines. Model checking can then be used for the analysis of the behaviour protocols. Finally, Chapter 7 adapts behaviour protocols to make them suitable for reasoning about components that use threads. In particular, some of the thread-based concepts are lifted from the program level to the model level. The theory for such threaded behaviour protocols is developed and suitable analysis techniques are also presented.

Chapter 8 then moves on to software model checking and how its efficiency could be improved. In particular, two dead variable analyses are presented and it is discussed how they can be used to significantly reduce the state space that has to be analysed. It is proven that the model checking result is not affected by reducing the state space using the results of the analysis. The experimental results show that the analyses contribute significantly to the model checking performance.

UNIVERSITY OF TWENTE.

DATE
May 21, 2019

YOUR REFERENCE
EWI19/FMT hmn/021/hmr

PAGE
2 of 2

Chapter 9 and 10 then continue with the development of static analysis techniques for dynamically typed languages. The work focuses on applications written in PHP and a static taint analysis is developed to detect security vulnerabilities in such programs. This work is presented in both a theoretical paper (Chapter 9) and a tool paper (Chapter 10), which shows the practical applicability of the results.

Chapter 11 and 12 finally discuss a technique to improve automated program verification results by developing new, improved abstraction techniques, creating interpolants based on variable assignments. Again this work is presented both in a theoretical paper (Chapter 11) and a tool paper. Moreover, recently Dr. Kofron published a paper in TACAS 2019 where he improved the work on interpolants with a new theory about decomposing interpolants.

Altogether, I believe that this wide range of different results, written with a variety of (international) co-authors are sufficient evidence that Dr. Kofron deserves to be promoted as associate professor. However, I would like to stress that in addition to his pure scientific contributions, Dr. Kofron is also well-known for his contributions to the scientific community. In particular, he was one of the main organisers of ETAPS 2019, the European Joint Conferences on Theory and Practice of Software, which every year brings together over 500 researchers working in the area of software science. Therefore I strongly recommend Dr. Jan Kofron to be promoted to associate professor.

Yours sincerely,

Prof.dr. Marieke Huisman
Chair Formal Methods and Tools