Evaluation Board Decision on the Nomination for Appointment to Professor

Masaryk University	
Faculty	Faculty of Informatics
Procedure field	Informatics
Applicant	doc. RNDr. Jan Strejček, Ph.D.
Applicant's home unit, institution	Faculty of Informatics, Masaryk University
Board members	
Chair	prof. RNDr. Petr Hliněný, Ph.D. *Faculty of Informatics, Masaryk University*
Members	prof. RNDr. Radim Bělohlávek, DSc. *Palacký University Olomouc* Prof. Dr. Armin Biere *University of Freiburg, Germany* prof. RNDr. Václav Matyáš, M.Sc., Ph.D. *Faculty of Informatics, Masaryk University* Prof. Jiří Srba, Ph.D. *Aalborg University, Denmark*

Evaluation of the applicant's scholarly/artistic qualifications

The main research areas of the applicant, doc. RNDr. Jan Strejček, Ph.D., are *Formal methods in computer science and their application to analysis and verification of programs and systems*. His ORCID record is https://orcid.org/0000-0001-5873-403X.

He started his scientific career 20 years ago in a more theoretical area studying infinite-state systems and automata over infinite words. Over the years, he gradually moved from this theoretical area towards research with natural practical applications in the mentioned fields of analysis and verification. The applicant lists the following three main research directions in which he is currently active:

1. Linear temporal logic and automata over infinite words

2. Automatic analysis and verification of computer programs

3. SMT-solving based on binary decision diagrams

In the listed directions, he combines theoretical research of algorithms for problems occuring in the areas with their practical implementations (algorithm engineering and coding). In this research he collaborates also with numerous students at FI MU.

In the international research community, Jan Strejček is perhaps best known and regarded as the founder and the leading developer of the Symbiotic tool for analysis of sequential computer programs written in the programming language C [http://staticafi.github.io/symbiotic/]. See the last section of this evaluation for more details. This highly successful project is being developed by a local group at FI led by Strejček and formed mostly of undergraduate and doctoral students. He and his students also develop other sophisticated software tools for, e.g., software testing and SMT solving.

During his about 20 years long scientific career, Jan Strejček published ***9 journal papers*** (Jimp) listed in the WoS database, 6 other journal papers, and ***51 papers in refereed conference proceedings***. These numbers are already updated according to the current state (on March 7, 2022) in the recognized publication databases (WoS, Scopus, DBLP), and hence they are slightly larger than the numbers in materials submitted by the applicant. The committee would like to emphasise that in computer science, there is an internationally recognized CORE ranking of CS conferences. Publications in top-ranked conferences, such as CORE A* and A, are considered of comparable significance, if not of higher significance, and prestige as publications in top journals. In this ranking, *4 of applicant's proceedings papers are of rank A** (conference CAV, and A* can be seen as equivalent to D1 in scientific journals), and *24 proceedings papers are of rank A* (equivalent to Q1). Furthermore, 12 proceedings papers are of rank B, which is also considered (as Q2) a high-quality publication.

Altogether, one may summarise that while the publication numbers are moderate, the publications are definitely of very high quality on the international scale, and they fulfil the requirements of the Professor appointment procedure at MU. Note also that in the areas in which the applicant publishes, author names are sorted alphabetically, and that is the reason why Jan Strejček is often listed as the last author.

Applicant's publications, based on the submitted material, record ***521 non-self citations, among which 332 are also recorded in WoS or Scopus***. The Board has found (as of March 7, 2022) in total ***238 citations without self-citations in WoS***, and an *h-index of 9* there. At the same time, in Scopus, there have been 405 citations recorded without self-citations of the applicant, 350 citations without self-citations of all co-authors, and h-index of 12. In Google Scholar [https://scholar.google.cz/citations?user=2Bdz-iAAAAAJ], there have been 1006 citations in total, and an h-index of 18. From the publication and citation chart of Jan Strejček (taken from WoS on March 7, 2022), one can see an increase in applicant's research activity since around 2012, followed by a sharp increase in citations, both related to his move towards more applied research in analysis and practical verification, and to his founding of the very successful Symbiotic project. Nowadays, the citation numbers largely exceed the requirements of the Professor appointment procedure at MU.

During his scientific career, Jan Strejček was the principal investigator of the postdoctoral GAČR project GP201/08/P375 in 2008-10 and of the MŠMT project 7AMB14FR016 in 2014-15. He has also been the co-principal investigator of the TAČR project TH04010192 (with Honeywell) and of the GAČR standard project GA19-24397S (with FIT BUT), both in the years 2019-21.

The high scientific qualification of Jan Strejček is also confirmed in the attached recommendation letters. Prof. **Javier Esparza** of TU Munich writes:

… Academically, Strejček is considered a top expert on temporal logics and automata, and a very strong researcher on the more general areas of Automata Theory, Logic, and Formal Methods. … His work has an excellent balance between theory and applications, and his work on tool development is very impressive. …

Prof. **Dirk Beyer** of LMU Munich writes:

… What makes his profile really interesting and unique, for somebody with contributions in theory, is that he not only develops theoretical contributions, but always implements them in software tools to make the new knowledge available to others. This is extremely important for stimulating technology transfer. …

All these facts and recommendations clearly show that Jan Strejček is a mature scientist in his research field of formal methods and verification, with a great future career potential, and fully ready to be promoted to a Full Professor level in the field of Informatics.

Conclusion: The applicant's scholarly/artistic capabilities **meet** the requirements expected of applicants participating in a professor appointment procedure in the field of Informatics.

Evaluation of the applicant's pedagogical experience

The pedagogical activity of Jan Strejček at the Faculty of Informatics (FI) of Masaryk University is outstanding. He has been continuously employed at FI since 2006 (right after returning from a one-year postdoc position abroad), and he obtained Habilitation there in 2013.

Every year since 2006 till 2019, he lectured the “mass” course IB102 Automata and Grammars, with around 400 students at the Bachelor level. With change of our study programmes, he is now the lecturer of a similarly “mass” course IB107 Computability and Complexity from 2020. In addition to the “mass” course, he has been lecturing smaller courses IB112 Math Foundations for 9 semesters at the Bachelor level, and IA159 Formal Verification Methods for 13 semesters at the Master level (each with around 10-20 students annually). He has also been the tutor of numerous class exercises every semester, for the courses including IB102, IB107, IB002, IB005, IA006, IA008. The teaching skills of Jan Strejček are highly valued by both the faculty and the students. For his excellent teaching performance, he also received *MU Rector's Award for outstanding pedagogy* in 2017.

Jan Strejček is the author or a co-author of several teaching aids for the courses including IB005, IB102, IB112, and IB107. Among these, we can mention an exercise collection for the course IB107 co-authored with L. Brim, a collection of computer exercises and aids for IB005+IB102 co-authored with other tutors, and his own video lectures of the course IB107 from the year 2020. He has not authored any course textbook, though.

Jan Strejček is an excellent students’ supervisor, too. Over the 16 years of his teaching career, he successfully supervised 40 Bachelor theses and 23 Master theses, which averages to about 4 theses per year. This is a great performance. Jan Strejček has been the supervisor of two already graduated doctoral students: RNDr. František Blahoudek, Ph.D., graduated in 2018 with dissertation Automata for Formal Methods: Little Steps Towards Perfection, and RNDr. Martin Jonáš, Ph.D., graduated in 2019 with dissertation Satisfiability of Quantified Bit-Vector Formulas: Theory and Practice. His third doctoral student, RNDr. Marek Chalupa, is about to graduate in Spring 2022. In addition to that, Jan Strejček was a consultant of three other graduated doctoral students, namely of RNDr. Tomáš Babiak, Ph.D., graduated in 2017 with dissertation Translation of Linear Temporal Logic to Omega-Automata, Mgr. Jiří Slabý, Ph.D., graduated in 2014 with dissertation Automatic Bug-finding Techniques for Large Software Projects, and Mgr. Marek Trtík, Ph.D., graduated in 2014 with dissertation Symbolic Execution and Program Loops.

Jan Strejček is also very active in the academic life of the faculty. He is a member of the Academic Senate of FI MU, and in the past (2015-2017), he was a Chair of the Academic Senate of FI MU and a member of the Academic Senate of MU. He was a Chair of the Disciplinary committee of FI in 2012-2018. He is a member of the Board of the master study programme Theoretical computer science at FI. Overall, he is an excellent and very valuable member of the academic staff of FI MU.

Conclusion: The applicant's pedagogical capabilities **meet** the requirements expected of applicants participating in a professor appointment procedure in the field of Informatics.

Evaluation of the applicant as a respected and recognized scholarly or artistic figure in a given field

The scientific achievements and the numbers of citations (coming from all over the world) mentioned in the first section clearly show that Jan Strejček is an internationally respected and recognized scholarly figure in the field. His main recent scientific achievements are related to the locally-developed Symbiotic project, but the Board acknowledges also his past international collaboration with some of the leading experts in

the field, such as with Ahmed Bouajjani, Javier Esparza, Laura Bozzelli, and Christel Baier, and current ongoing collaboration with Alexandre Duret-Lutz and Joachim Klein.

In regard to the international standing and recognition, the Board also recognizes that Jan Strejček is being invited to Program Committees of top international conferences, namely of TACAS (4 times) and of VMCAI (once). Jan Strejček has also been awarded the Best paper at ICTAC 2019.

Submitted recommendation letters of Prof. Beyer and Prof. Esparza, some of the world leading experts in the discipline, clearly and unanimously confirm that the applicant Jan Strejček is an *internationally highly recognized scientist* in the CS field of Formal Methods and Verification, and they recommend him to be promoted to a Full Professor without any hesitation. The Board has carefully evaluated the submitted materials, public information about applicant's scientific achievements (that is, common publication and citation databases), and academic records of Masaryk University concerning the applicant, and has come to the same conclusion about *very high scholarly qualities of the applicant*.

In addition to the mentioned facts and the recommendation letters, the Board would like to support its conclusion with the following two strong points:

* Doc. Strejček's long-developed software tool Symbiotic [http://staticafi.github.io/symbiotic/] clearly confirms his abilities and commitment to systematic scientific work and team leadership at the highest international level. This tool is highly regarded in the community, and its strength has just recently been proved in the annual world competition of such tools called SV-COMP 2021, where Symbiotic won the gold medal in MemSafety and SoftwareSystems categories and took the 4th place in the meta category Overall [https://sv-comp.sosy-lab.org/2021/results/] (and it is worth to add that Symbiotic has been the top one in the MemSafety category already in the years 2018-2020). Last but not least, while leading this project, Jan Strejček educated numerous young students to do scientific work.

* Prof. Beyer writes in the conclusion section of his recommendation letter: *In summary, I would like to strongly and without any reservation recommend Jan Strejček for the appointment as a professor. I can only congratulate the faculty and university for having hired him. The breadth of his research, his expertise in several different areas, and his competence and skills in teaching, make him without doubt a valuable faculty member at Masaryk University. In the German system, he would be considered eligible for W3 professor position.*

Conclusion: The applicant **is** a respected and recognized scholarly figure in his/her field. The applicant **has** made a significant contribution to the development of his/her field. The applicant **constitutes** a leading figure in his/her field of scholarship or research.

Evaluation Board Decision on the Nomination for Appointment to Professor

Secret vote results

Voting took place: electronically

Number of board members		5
Number of votes cast		5
of which	in favour	5
	against	0

Board decision

Based on the outcome of the secret vote and following an evaluation of the applicant's scholarly or artistic qualifications, pedagogical experience and role as a respected and recognized scholarly or artistic figure, the board hereby submits a proposal to the Scientific Board of the Faculty of Informatics of Masaryk University to **appoint the applicant professor** of Informatics.

In Brno on 30.03.2022

prof. RNDr. Petr Hliněný, Ph.D. .....