Referee report

for the academic position of "Professor" in the professional field 4.6 Informatics and Computer Science, major in "Informatics (Artificial Intelligence)", announced in State newspaper no. 41 / 21.05.2019 with the sole candidate, namely, Assoc. Prof. Dr. Gennady Pavlovich Agre

Reviewer: Prof. Ivan Tomov Dimov -
Institute of Information and Communication Technologies, Bulgarian Academy of Sciences

The following documents were submitted to the reviewer:

1. European CV
2. Copy of diploma for educational and scientific degree "doctor"
3. Certificate of internship in the specialty
4. List of scientific publications of Assoc. Agra participates presented for the competition, which do not repeat the ones submitted for the acquisition of educational and scientific degree "Doctor" and for the occupation of the academic position "Associate Professor".
5. ANNEX 1: List of publications of Assoc. Prof. Gennady Agre, post-habilitation (1997 - 2019), indexed at least in Google Scholar
6. List of the 5 most cited articles in Scopus by Assoc. Gennady Agre, indexed in Scopus
7. ANNEX 2. Abstracts of the publications of Assoc. Prof. Dr. Gennady Agre presented at the competition - in Bulgarian
8. ANNEX 3. Abstracts of the publications of Assoc. Prof. Dr. Gennady Agre presented at the competition - in English
9. Copies of 29 scientific publications with which Assoc. Agre participated in the competition
10. Reference for the fulfillment of the minimum national requirements under Article. 26, para. 2 and 3 and the requirements of IICT-BAS under Art. 26, para. 5, drawn up on the basis of documents submitted to the competition
11. Reference for original scientific and applied scientific contributions
12. Declaration that there is no proven plagiarism in the scientific works of Assoc. Prof. Gennady Agre
13. Declarations from the heads of scientific projects for participation in them by Assoc. Agre (7 issues)

1. General characteristics of the scientific results

The candidate, Assoc. Prof. Dr. Gennady Agre, participates in the competition for Professor of Publications, whose list includes 29 scientific papers. Of the 29 entries submitted for the competition, 1 publication [16] is in IF magazine (Q2) - "highly cited paper" in WoS, 20 publications [1, 2, 3, 8, 11, 12, 13, 14, 15, 17, 18, 19, 21, 22, 23, 25, 26, 27, 28, 29] are in journals or series with SJR rank, 6 publications [6, 7, 9, 10, 20, 24] are in conference proceedings, indexed in Scopus / WoS and 2 publications [4, 5] - book chapters published in international academic publishers.
Following his habilitation in 1997, the applicant has a total of 56 publications, of which 3 publications [1, 6, 47] in IF journals, 23 publications [10, 19, 21, 22, 33, 34, 45, 37, 38, 40, 41, 42, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56] in magazines or series with SJR, 10 publications [5, 12, 13, 14, 18, 32, 36, 39, 43, 54] in proceedings of conferences indexed in Scopus / WoS and 2 publications [26, 30] - book chapters published in international academic publishers. This is an impressive scientific activity. It is very good impression that Assoc. Agre has chosen a much smaller part of all his publications to participate in the competition and thus achieved a good focus on his scientific contributions to the subject of the competition.

The applicant's materials documented 315 citations of only 5 of his works in Scopus / WoS. This data indicates a very good international recognition of the applicant.

In this sense, the scientific problems considered and the problems solved by him, in the presented scientific publications, are within the professional direction 4.6 Informatics and Computer Sciences, specialty "Informatics (Artificial Intelligence)", announced in SG no. 41 / 21.05.2019

2. Contributions contained in submitted works for review

The obtained results can be characterized as creation, research and realization of modern semantic services, training and extraction of knowledge from databases.

Results can be structured provisionally in the following three directions:

1. Semantic Internet services,
2. Technologically supported training and
3. Machine-learning and data-mining.

In the first scientific area, Semantic Internet Services (SIS), new applications based on Internet services have been created and explored through the application of semantic technologies. By providing formal descriptions with well-defined semantics, SIS is a new step toward addressing such fundamental problems as service design, such as service discovery, choreography, and

orchestration. I believe that in this direction, the main and most significant achievements of Assoc. Agra are the following:

- *Creating a conceptual architecture of the integrated INFRAWEBS environment for semantic engineering of Internet services [2,4,5].*

- Development and implementation of an original, data-driven approach for dynamically composing WSMO-based semantic Internet services [4,5,24].

This is a fully automated functional approach for dynamically composing the semantic services described in the WSDL language, which is implemented in practice.

- *Development and Implementation of INFRAWEBS Designer - an ontology-based, graphically integrated environment for constructing descriptions of WSMO-based SMRs and goals* [1,3].

This system, intended for providers of semantic services and applications, is extremely friendly and requires no prior knowledge of the WSML language.

In the second scientific area, the results obtained are related to the research project No. D-002-189 SINUS: Semantic Technologies for Internet Services and Technologically Supported Training (2009-2012), funded by the NSF. The main achievements, in my opinion, are related to the application of semantic technologies in technologically supported training. They can be formulated as follows:

- *Development and implementation of a semantic technology based environment for the development of TPO applications in the humanities;*
- *Development and implementation of an original approach for the use of heterogeneous digital libraries (DBs); the approach allows for more semantic access to the information objects stored in them by using additional descriptive (ontological) attributes defined in the additional specialized ontologies.*
- *A leading system has been developed (with the participation of Prof. Darina Dicheva) of classification indicators for assessing the degree of gamification in existing TPO applications. The system was used to analyze published empirical studies of applications of gamification in education.*

The major contributions to the third scientific area, Machine Learning and Data Patterns, include developing new and improving existing machine-learning (MS) algorithms through instance-based learning [23, 27] and applications various methods from MS to solving problems in such subject areas as archeology [19], image analysis [20, 21], training data analysis [25, 26], dietetics [22,23] and natural language processing [28, 29].

The publications [22, 23] reflect the work on research project No. 04-152 "Expert Advisory System for Healthy and Dietary Nutrition", funded by the National Innovation Fund (2007-2010), in which Assoc. Agre was the project leader. The publications [25, 26] are the result of the work of a team carried out in the framework of a European project under the 7th Framework Program AComIn - Advanced Computing for Innovation (2012-2016), identified by the European Commission as one of the most successful projects at H-2020.

3. Publications and citations of publications participating in the competition

The relevance and importance of scientific and applied contributions are indisputable. They follow from the fact that the majority of publications are in reputable specialized publications with impact factor and SJR rank.

Gennady Agre has documented 315 citations of his work in Scopus / WoS, testifying to his international recognition.

Of the publications submitted for the competition, 3 are individual and the rest are collective. However, let me point out that it is natural to work in teams in the field of competition. At the same time, the candidate's personal involvement in the joint publications is beyond doubt. In each of the collaborations, the applicant makes the necessary substantial contribution.

4. Educational activity and participation in projects

The teaching activity of the applicant is very good. He declares this activity in the following courses:

- Machine Learning (45 hours of lectures + 15 hours of exercises) - Master's Program in Artificial Intelligence, Faculty of Mathematics and Informatics, Sofia University (2002 - 2019).

- Data extraction (30 hours of lectures + 30 hours of exercises) - Master's Program in Artificial Intelligence, Faculty of Mathematics and Informatics, Sofia University (2003 - 2019).

- Case-based reasoning. (30 hours of lectures + 30 hours of exercises) - Faculty of Mathematics and Informatics, Sofia University (1998 - 2002).

- Case-based reasoning. (30 hours of lectures + 30 hours of exercises) - New Bulgarian University (1998 - 2000).

Prof. Gennady Agre was the head of 17 successfully defended graduates. He also supervised three PhD students, all of which were defended.

The applicant participates in 10 international projects and 5 national scientific projects. He has impressive organizational work as a member of the Program Committees of International Scientific Conferences (14 in number). He is the organizer of 3 international conferences. I would like to acknowledge his active participation in the governing bodies of BAS, as well as

in expert bodies in the field of science and higher education. He has an important role in editorial boards of magazines and series.

5. Comments and recommendations

I have no comments or recommendations for Gennady Agra. It is worth noting his precise style and high criteria in the preparation of the competition documents.

6. **CONCLUSION**. Based on the aforementioned, it is clear that the candidate for the announced competition Assoc. Prof. Dr. Gennady Agre fully complies with the requirements of the ZRASRB, the Rules for the implementation of the ZRASRB, the Rules for the conditions and procedures for acquiring academic degrees and for occupying academic positions in BAS, as well as the Rules for the Specific Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences. The scientific results achieved give me reason to propose the selection of the candidate Assoc. Prof. Dr. Gennady Agre as a professor at IICT-BAS in the professional field 4.6 Informatics and Computer Sciences, major in Informatics (Artificial Intelligence).

   Therefore my conclusion for taking the academic position of the Professor "Prof." announced by Assoc. Prof. Dr. Gennady Agre is POSITIVE.

08/31/2019
Sofia

Signature:

/ Prof. Ivan Dimov /