

REVIEW

for the competition for the academic position

„Professor“

In the professional field

4.6 Informatics and Computer Science (Information Technology),

for the needs of the Sofia University "St. Kliment Ohridski",

Faculty of Mathematics and Informatics (FMI of SU),

announced in Newspaper of State No. 48 from 26.05.2020

and on the Internet pages of FMI and SU

The review is written by **Assoc. Prof. Georgi Teoharov Tuparov, PhD, from Department of Informatics of New Bulgarian University** as a member of the Scientific Jury for the competition, established by Order No. ПД 38-344 / 23.07.2020 of the Rector of the Sofia University "St. Kliment Ohridski".

The only applicant who has applied for the position is

Assoc. Prof. Pavel Hristov Boytchev, PhD

from Department of Information Technology at the Faculty of Mathematics and Informatics of the Sofia University "St. Kliment Ohridski"

I. Description of the presented documents

1. Information concerning the documents

The set of documents presented by the applicant is in accordance with the requirements of the Bulgarian law about Academic Development and the accompanying rules of Sofia University.

Assoc. Prof. Pavel Boytchev presented for review 11 scientific works, including eight papers, published in scientific journals and scientific conference proceedings indexed in Web of Science or Scopus, a monograph and two book chapters. A set of additional documents is

presented too: the announcement for the competition in the Newspaper of the State; the statement for application for the academic position; CV; diplomas for MSc, PhD and Associate Professorship; confirmation for the current academic position of the applicant at Sofia University; list of all papers; list of papers for the competition reviewing with abstracts; applicant's extracts from the Sofia University system "Authors"; proofs about covering the minimal scientific requirements of the law for the position; list of citation; a description of the scientific results of the presented papers; proofs for fulfilment of the internal rules of Sofia University about academic position promotion; full text of the papers, presented for review.

The applicant presented list of all his papers – totally 105 titles. The list includes one monograph, 29 papers in scientific journals, 69 papers in the proceedings of scientific conferences, a textbook in information technology for lower secondary schools, two book chapters, and four another papers. After excluding the papers used in the previous procedures or presented for review in the current competition, the list contains 19 papers in scientific journals (four with SJR), 58 papers in scientific conferences proceedings (two with SJR, one in ACM Digital Library and one in IEEE Digital Library), one textbook mentioned before and three other papers.

All documents are well prepared and are easy to work with. The description of the results is comprehensive and reflects the scientific contributions of the applicant.

2. Information for the applicant

Assoc. Prof. Pavel Boytchev graduated in FMI at Sofia University obtaining MSc degree in Informatics in 1996 with specialization "Automated Learning Systems". In 2001, he obtained his PhD in Informatics (Computer Science) in FMI at Sofia University. Between 2001 and 2003, Assoc. Prof. Boytchev was invited researcher at the Schaefer School of Engineering & Science of Stevens Institute of Technology, Hoboken, New Jersey, USA. His area of research was in the field of design and development of educational software. After that in the period 2003 – 2005, Assoc. Prof. Boytchev was on post-doctoral research position and invited researcher at University of Electro-Communications, Chōfu, Tokyo, Japan. During this period, his area of research was "Design and development of research processors".

In 2007, Dr. Boytchev won a competition for the academic position of "Associate Professor" in Informatics (Computer Science) and was appointed to full-time contract at Faculty

of Mathematics and Informatics of the Sofia University, where he still works. In the period 2013-2014, he was the head of the master's program "E-learning", and since 2016 - the head of the department of Information Technology.

3. General characteristic of the scientific works and achievements of the applicant

Assoc. Prof. Pavel Boytchev applied for the competition with 11 scientific works. Eight of them are papers in international scientific journals or conference proceedings. One of these papers is indexed in Web of Science with Impact Factor 0.401 and is in Fourth Quartile. Another seven papers are indexed in Scopus and have SJR. The monograph and book chapters pass the requirements of the Bulgarian law about Academic Development for such kind of scientific works and are accepted for reviewing. All publications (excluding the monograph and book chapters) are co-authored, but for me this is proof of the applicant's skills to work in a team. The citations of the applicant's scientific works provided for participation in the competition are not self-citations and are in scientific publications indexed in Scopus.

Scientific works and citation presented by the applicant for reviewing are not used in the previous procedures for PhD or associate professorship promotion. In addition, I do not find any information about plagiarism in the presented works.

In the table below can be seen that the applicant's scientific works fulfil the minimal national requirements of the Bulgarian law about Academic Development and the accompanying rules of the Sofia University for the promotion in academic position "Professor" in the scientific field of the competition:

| Group | A | Б | В | Г | Д | Е |
|-----------------------------|----|---|-----|-----|-----|-----|
| Minimal points required | 50 | - | 100 | 200 | 100 | 100 |
| Achieved point by applicant | 50 | - | 100 | 276 | 104 | 100 |

4. Characteristics and evaluation of the teaching activity of the applicant

According to the documents provided to me, the teaching activity of Assoc. Prof. Boychev began in 2007 at the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski" and continues to this day. He is the author of the educational content (lectures, demonstrations, exercises, problem solving, used software and documentation to it) of 12 disciplines, and the current disciplines are provided to students in electronic form

through Moodle learning management system. The disciplines taught by the applicant and the developed teaching materials are mainly in the field of information technologies and coincide with the topic of the competition.

Assoc. Prof. Boytchev was the supervisor of two successful PhD students - Temenujka Zafirova-Malcheva and Petar Armianov. Both of them are now in full-time associate professor position at the Faculty of Mathematics and Informatics.

5. Analysis of the scientific achievements of the applicant contained in the documents and publications presented for the competition

As I noted above, with the exception of the monograph and the two book chapters, the scientific publications submitted for participation in the competition are co-authored. Due to the lack of separation protocols for them, I accept that the participation of the applicant in them is equal to other authors, which, however, does not reduce the significance of the results achieved. The scientific and scientific-applied contributions in the submitted for review scientific papers of the applicant, which are in the field of the competition, can be grouped and summarized as follows:

- Models of the programming languages and their implementation (paper 1)

A model of a programming language is developed with reduced set of key words and syntactic constructs. The model of Natural OOP is developed too, where the standard OOP capabilities are extended with conditional and multiple inheritance. A model of a compiler is proposed, which includes itself into the compiled code and thus turns compiled code to be a compiler too, but with advanced functions. Based on these models, the Elica programming language and the corresponding application development environment have been developed. The only compiler of the Logo language so far has been developed - Lhogho, which increases the execution speed more than ten times. A comparative analysis of over 300 versions and dialects of the Logo programming language has been made, on the basis of which a metric has been developed to determine how close two dialects of the language are at the level of language constructions and at the level of a translator. This metric would be a good basis for possible standardization of the Logo language.

- Methodology for developing specialized virtual environments (papers 1, 2, 3, 6, 8, 9, 10, 11)

A methodology has been developed for designing the interface and presenting the learning content in virtual learning environments that are specific to particular disciplines or educational goals. Several specialized virtual environments have been created that provide a programming or interactive interface oriented to a specific discipline. Several interactive applications that present virtual scenes in 3D have been developed and tested.

- Meta-editor models and multicultural ontologies (papers 1, 4 и 5)

A meta-editor model has been created that works with meta-metadata describing metadata, which in turn is used to describe software components for applied games. A model for ontology expansion has been developed, through which a mono or multilingual ontology can be transformed into a multicultural one. Thus, the search with keywords from one culture in the resources of another culture can be done in branches of the ontology of the other culture, which are inaccessible when using only a multilingual ontology. Based on these models, applications for working with meta-metadata, metadata and ontologies have been developed.

- Evaluation models (papers 1, 2, 6 и 7)

Several models of grading of students with different structure of assessment and weight of the components depending on the specifics of particular disciplines have been created. Ways to stimulate students and prevent plagiarism are reported. A model for evaluation through applied games has been developed, based on metrics (average temporal), which is suitable for aggregation of large volumes of intermediate results generated during a game in a grading scale. A model of a serious educational game through a scenario, competence and evaluation layer has also been developed. The created models have been tested in FMI-led disciplines, and some of them have been implemented as components for game assessment in the Meiro virtual learning environment.

- Model of synergy between educational software, university disciplines and their content (paper 1)

A model of synergy between the three separate elements (educational software, university disciplines and their content) has been developed. The model has been successfully developed and tested by the applicant in the university courses led by him in the last ten years.

6. Critical remarks and recommendations

I have no critical remarks and recommendations.

7. Personal impressions for the applicant

I do not know Assoc. Prof. Pavel Boytchev personally.

8. Conclusion for the application

After analysing the scientific works presented by the applicant and evaluation of their significance I confirm that the scientific and scientific-applied contributions are sufficient (as required by the Bulgarian Law about Academic Development and the additional requirements of the Sofia University) for the academic position "Professor" in the scientific field of the competition. The additional documents pass all needed requirements too. In particular, the applicant fulfils the minimal national requirements for the scientific field and there is no plagiarism in the presented works for the competition.

I give my positive evaluation for the application.

II. GENERAL CONCLUSION

I recommend the Scientific Jury to suggest to the Council of the Faculty of Mathematics and Informatics of the Sofia University "St. Kliment Ohridski" to elect Assoc. Prof. Pavel Boytchev, PhD for the academic position "Professor" in the professional field 4.6 Informatics and Computer Science (Information Technology).

September 16, 2020.

Referee:

(Assoc. Professor Georgi Tuparov, PhD)