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REVIEW

by contest for an academic position

"professor"

in a professional direction 4.6. "Informatics and computer science"

(Software technologies - network programming, cloud technologies and

web technologies),

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

Faculty of Mathematics and Informatics (FMI),

announced in SG no. 48 of 28.06.2022 and on the FMI and SU websites

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The review was prepared by: Prof. Ph.D. Hristo Augustov Kabakchiev, in my capacity as a member of the scientific jury under 4.6. "Informatics and Computer Sciences" competition according to Order No. RD 38-519/25.08.2022. of the Rector of Sofia University.

Only one candidate submitted documents for participation in the announced contest: Assoc. Dr. Milen Yordanov Petrov, cat. ST, FMI, SU.

I. General description of the presented materials

1. Application data

In the announced in SG no. 48 of 28.06.2022 contest for a professor in the Department of "Software Technologies", FMI, SU "St. Cl. Ohridski", one candidate participated - associate professor, Dr. Milen Yordanov Petrov. From the candidate's reference, regarding his scientific output, it follows: he has published a total of over 85 publications, of which they are indexed in: Scopus - 19, Web of Science -16, in ACM -5, in SpringerLink -4, in IEEE eXplore -4 .

Papers on the competition for the scientific title "Professor" - a total of 14 papers, together with one monographic paper, mainly published in international conferences and journals in our country and abroad.

Regarding publications, according to the arrangement of the reviewer, including all works submitted for review:

• articles in specialized international journals, such as: INTERNATIONAL JOURNAL OF CIRCUITS, SYSTEMS AND SIGNAL PROCESSING, LECTURE NOTES in NETWORK and SYSTEMS - 3 issues, published in Springer (visible with SJR) 2020, 2021, 2022 in works [10, 9, 13];

• reports in proceedings of renowned international specialized conferences abroad or in our country, published by publishing houses in magazines or volumes, libraries, most IEEE publishers, (visible with SJR) :– 2 items. - in works [3, 11,];

• reports in proceedings of renowned international specialized conferences abroad or in our country (without SJR):– 8 items - in proceedings [2,4,5,6,7,8,12,14];

Therefore, the publications submitted for review, almost half of them are numbered [3, 9, 10, 11, 13] published by publishers in journals or volumes, libraries visible with SJR: which ranges from 0.182; 0.151; 0.158; 0.23; 0.151.

Other documents supporting the applicant's achievements are also presented. In order to clarify the coverage of the additional scientific and teaching requirements of FMI, SU for the candidates, I accept for information in the scientific field: the participation of the candidate in: international and our scientific projects; participation in program and organizational committees of scientific events and conferences, expert activity in international and national organizations, membership in professional and scientific organizations.

2. Professional and biographical data for the candidate.

The candidate graduated from Sofia Mathematical High School (SMG), "Paisiy Hilendarski" 1986-1991, semi-high school Institute of Mechanical Engineering and Electrical Engineering (PIME) majoring in electronic engineering and microelectronics, at TU - Sofia, 1991-1994. He continued his studies at TU - Sofia, Faculty of Computer Systems and Management (FCSU), Specialization: Computer Systems, in 1994-1999. He is finishing his studies in doctoral studies in 2010 at SU FMI, with the research topic "Interoperability between evaluation systems in modern e-learning".

He began his work in the Scientific Research Sector (NIS) of SU "St. Kliment Ohridski" in 2001-2006. it was late 2006 selected is an assistant in the Department of Information Technologies and since 2007 he has been moving to the Department of Software Technologies, at FMI of SU. He was selected consecutively in 2011-2012, as a senior and chief assistant, and in 2012 he was elected associate professor. He is currently deputy. dean of the FMI for educational activities in OCS "Master".

3.General characteristics of the scientific works and achievements of the candidate

In general, the candidate associate professor Milen Petrov can be characterized scientometrically with his H indexes, that are in: Scopus - 3; Web-of-Science: - 2; Google Scholar: - 6; as well as published 85 works, of which they are indexed: 16 in Web of Science, 19 in Scopus, 5 in ACM, 4 in SpringerLink, 4 in IEEE eXplore.

He has published one monograph, one book chapter, 14 articles in scientific journals, 65 are in proceedings of scientific conferences. All the works of the candidate are in scientific direction 4.6. "Informatics and computer science".

According to the list of contributions of the candidate, under the scientific results presented by him on the competition for a professorship, published in a monograph and 13 articles, can be characterized by work in three main directions: technology-assisted education; security of personal data and applications; optimization of traffic information.

The reviewer is convinced that the main scientific and scientific-applied contributions of the candidate are the product of the practical use of information technologies, such as cloud, network and web, in solving specific tasks on various scientific projects, national and university of FMI at SU.

After familiarizing yourself with the applicant's reference for the fulfillment of the minimum national requirements under Art. 2b from ZRASRBM, for scientific field 4. Natural sciences, mathematics and informatics, professional direction 4.6 Informatics and computer sciences, the reviewer claims that they are almost double covered, out of the required total of 550 points for a professor, the candidate submitted for the competition - 806 points. According to the individual indicators, the reference looks like this: total group of indicators D 294 compared to - 200 necessary, group D 112, compared to 100, group E – 250 compared to 100.

According to the thus presented list of the candidate's publications, it follows that they were not used in his previous procedures, for doctor and associate professor.

The reviewer is not aware of any evidence of plagiarism in the scientific papers submitted for the competition.

4. Characteristics and assessment of the candidate's teaching activity

Candidate as assistant (then senior and chief assistant) from 2006 to 2012. led laboratory exercises in 2 compulsory disciplines in 1 and 2course, specialization "Software Engineering".

During the academic year 2016/2017 led laboratory exercises in the "Bachelor" OCS in the specialty Mathematics and Informatics.

In the master's programs (ZIKSM and RSMT) he led lectures and exercises on the discipline "Network programming of Java" for (30+0+30) hours elective, and introduced a new discipline from 2012 "Internet Programming and Web Technologies". Since 2012 until now it is the holder of the discipline "World-Wide Web", subsequently transformed into "Web technologies", which is mandatory for OCS "Bachelor" for specialization "Software Engineering" and "Computer Science". For the academic years 2014/2015 and 2015/2016 it was holder of the course on the mandatory discipline "XML technologies for the Semantic Web" of the Special Software Engineering (Bachelors).

The candidate was developed in 2019. and has introduced the new elective course "Application-program interfaces for working with cloud architectures with Amazon Web Services (AWS)" for the Master's degree program at the MP "ZIKSM", which is also selectable and for OCS "Bachelor", all courses are 30 hours of lectures. In the period 2016-2022, he led lectures and exercises for 30 hours, in English, to foreign students under the Erasmus+ program in the following disciplines: "Web Technologies and Architectures", "Advanced Web Programming", "Network Programming with Java", "Object -oriented programming", "Highly Secure Software".

Associate Professor Milen Petrov is the head of the master's program "ZIKSM" from 2014 in FMI of SU. From 2017 until now, he has been the deputy dean at the FMI with the department of educational activities, OKS "Master".

Associate Professor Milen Petrov was an academic mentor for the "Student Practices" project of the OP "Development of Human Resources", for 10 people. He was the supervisor of 114 successfully defended master's theses, in seven master's programs at FMI. He is a scientific supervisor was to four doctoral students, one of whom successfully defended his thesis, two PhD students were dismissed entitled to protection dissertation in 2022, and one is a current Ph.D.

From the one presented in the competition reference for the future classroom workload of Prof. Milen Petrov can be seen that after the successful completion of the competition, he will have the necessary auditorium occupancy according to the requirements of the law.

From everything said above, it is evident the great variety of lectures and workload carried out by Associate Professor M. Petrov in the field of the competition, as well as his well-deserved position of professor at FMI, in the department of ST.

5**. Content analysis of the applicant's scientific and applied scientific achievements contained in the materials for participation in the contest**

The analysis of scientific and scientific applied works, as well as the presented monographic work shows that he continues to develop his skills and obtain new scientific results, using the scientific approaches learned in the work on the dissertation, and further developed his works for associate professor and professor, applied to other tasks in the field of the competition, such as: selection or development of known, heuristic synthesis of new, approaches, methods and methodologies used for the development of modern systems for technology-assisted learning, security of personal data and applications, optimization of traffic information represent the novelty of the solved tasks in a scientific and scientific-applied aspect.

I note the most important scientific achievements of the candidate with character: new *methods and approaches* in solving the selected tasks:

• a methodology allowing the development of customized extensible software architectures, adaptable to educational content, with the possibility of application in e-learning in work with number [1], allowing: research classification and use of various software technologies and tools;

• an approach to combine the different types of applications based on: cloud, network and web technologies, in work number [1];

• approach to storing and processing personal data of learners, using specific anonymization and sharing of data with external systems, in learning management systems (LMS), in paper number [4];

• an approach to the analysis of large datasets produced by modern platforms for e-learning and educational games, in paper number [5].

The most important scientific-applied achievements of the candidate with character: application of *scientific achievements in practice* in solving the selected tasks, I note:

• an automated process of creating and maintaining cloud resources has been implemented, necessary for the smooth operation of an application in the cloud for the course "Application-program interfaces for working with cloud architectures with Amazon Web Services (AWS)" at FMI of SU (in [1]).

• study of different software components of a software system, network technology system, two web-based systems and two cloud solutions, in paper number [1].

• a software architecture for the recommendation of learning content and course activities based on a prediction algorithm, using machine learning to analyze data and discover knowledge needed by the learner and the teacher, in work numbers [6] and [10];

• a method for collecting, storing and maintaining personal information in LMS systems, called Anonymized Privacy Model, which is independent, from LMS systems, using layers: integration (called Privacy Compliance Layer), data anonymization and for analysis and reporting, in work number [12].

• a software architecture approach for peer learning, evaluated against certain configuration criteria, was implemented in paper number [14].

From all that has been said above, the significance of the contributions is clear. Considering their wide national and international publicity, and the number of citations according to the procedure presented 14 in Scopus, indicated below in item 6, undoubtedly correspond to the minimum national requirements under art. 2b, par. .2 and 3, of ZRAS of the Republic of Bulgaria and exceed them, for the acquisition of the academic position "Professor" in FMI in SU, as well as the regulations of PURPNSZAD in SU.

6. Reflection of the candidate's results in the works of other authors. Numerical indicators - citations, impact factor, etc

The candidate has submitted a general report of his citations, with two sections. According to it, the total number of noticed 85 citations of his 24 works from the general list.

In the list in section I, are presented noticed in referenced and indexed in Web of Science and/or Scopus: in Scopus there are - 22, with most citations being from foreign authors 18 nos..

In section II of the list, makes a good impression to the reviewer, that most citations are from foreign authors, 57 items, as well as that the number of citations for individual works, for example, article [2] is more: 25 items. and all by foreign authors.

In the reviewer's opinion, this number of citations sufficiently evenly distributed over the time of publication means only one thing, that the candidate is working on current and important tasks for the scientific field, in the field of the contest.

7. Author contributions to collective publications.

Of the reviewed works - 14 pieces, 2 are independent, the rest are co-authored, with the monographic work - 1 piece printed in Cyrillic, and the remaining 13 pieces. are in Latin. The candidate is first co-author in - 4 publications, second in - 5, third in - 5.

In all co-authored publications, I value the candidate's contributions as equal.

The submitted materials and my personal observations confirm that the candidate has his place or signature in the joint publications with his colleagues as the main co-author.

8. Critical notes and recommendations

In general, the reviewer has the following critical comments and recommendations on the reference and contribution applicant's works:

• the formulations of his main scientific contributions are descriptive in nature the results obtained, and do not clearly reflect the class of the solved scientific task, it is better if the summary is shorter;

• I recommend the candidate to publish the obtained original scientific results in renowned specialized journals and conferences with a high rating in the future.

I should note that after I asked the applicant to reformulate his scientific contributions in summary, he sent me a revised and improved version, which I used as the basis of the contributions in the review.

9. Personal impressions for the candidate

I know the candidate from our joint work in the department until 2014, as well as from our joint work on organizing the ZIKSM master's program subsequently. I was not familiar with his research work in detail until this review. I see from the documents that he is gradually building his scientific school of 4 doctoral students, 1 defended, 1 current and 2 dismissed with the right to defend, realizing through it his wide range of interests. I think, from all that has been said above, that there will be another new worthy professor known at home and abroad in the ST department.

10. Conclusion on the application

After I got acquainted with the presented in the contest materials and scientific works and based on the analysis of their significance and the scientific and scientific-applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ZRASRB,

the Regulations for its application and the relevant Regulations of SU "St. Kliment Ohridski" for the candidate to occupy the academic position of "professor" in the scientific field 4. Natural sciences, mathematics and informatics, and professional direction of the competition 4.6. "Informatics and computer sciences" (Software technologies - network programming, cloud technologies and web technologies).

In particular, the candidate satisfies the minimum national requirements in the professional direction and no plagiarism has been found in the scientific works submitted for the competition.

I give my positive assessment to the application.

II. GENERAL CONCLUSION

Based on the above, I recommend the scientific jury to propose to the competent authority for the selection of the Faculty of Mathematics and Informatics at SU "St. Kliment Ohridski" to choose Assoc. Ph.D. **Milen Yordanov Petrov** to occupy the academic position of "professor" in professional direction 4.6. "Informatics and computer sciences" (Software technologies - network programming, cloud technologies and web technologies).

21.10.2022...   Prepared the review:

Prof. D.Sc. Hristo Kabakchiev