

REVIEW

of the competition

for the academic position "Associate Professor"
at the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences
in the Higher education area 4. Natural sciences, Mathematics and Informatics,
Professional field 4.6. Informatics and Computer Sciences,
Informatics (Human-Computer Interactions)

presented by PhD Vladimir Todorov Dimitrov, professor
at Faculty of Mathematics and Informatics, University of Sofia "St. Kliment Ohridski"

By the order # 322/02.09.2019 of the Director of IMI – BAS, I was appointed a member of the scientific jury of the competition for "associate professor", announced in the State Gazette (issue 53 of 02 July 2019, p. 58). By the decision of the Scientific Jury of the procedure (Minutes No. 1 of 12 September 2019), I was appointed to be a reviewer. Documents for participation in the competition were submitted by Assistant Professor Todorka Gerasimova Alexandrova, Section of Mathematical Foundations of Informatics at IMI – BAS.

1. Brief biographical information

Assistant Professor Todorka Gerasimova Alexandrova, PhD, graduated in 2003 with a Master's Degree in Mathematics from FMI at University of Sofia "St. Kliment Ohridski", specializing in Algebra, and then in 2008 a PhD in Mathematics at the University of Telecommunications, Tokyo, Japan. The topic of the dissertation is "A Study on (t,n) Threshold Secret Sharing Schemes Based on the Generalized Vector Space Construction".

In the period 2002-2005, she was appointed as a mathematician at IMI – BAS. From 2008 to 2010, she was a research assistant at the University of Telecommunications, Tokyo, Japan, and from 2010 to 2018, she was an assistant professor at the same university. From 2018 until now, she is an assistant professor at IMI – BAS.

2. General description of presented materials

According to the procedure determined by the ADAS in RB (Act for the Development of the Academic Staff in the Republic of Bulgaria), the RAADAS in RB (Regulations for the Application of ADAS in RB), the RAADAS in BAS (RAADAS in Bulgarian Academy of Sciences) and the RAADAS in IMI – BAS (RAADAS in Institute of Mathematics and Informatics at Bulgarian Academy of Sciences), the candidate has presented the following materials:

1. Application to the Director of IMI – BAS for admission to the contest.
2. Professional autobiography.
3. Higher education diploma.
4. Diploma in Doctoral degree.
5. List of all publications, inventions and other scientific results.

6. List of publications, inventions and other scientific and applied results for the contest.
7. Self-signed summary of the original scientific contributions in the works deposited for the contest.
8. Abstracts of the publications for participation in the contest in Bulgarian and English.
9. Copies of the works from item 6.
10. List of all citations.
11. List of citations deposited for the participation in the contest.
12. State Gazette announce of the contest.
13. Certificate of work experience on the specialty in accordance with the requirements of Art. 24 para. 1 item 2 of ADAS in RB:
 - Certificate of the conditions satisfaction of Art. 24 para. 1 item 2 (b) by the ADAS in RB;
 - Certificate from IMI – BAS.
14. Other documents:
 - Certificate for lectures;
 - List of students.
15. Declaration by the template for achievement of the minimum national requirements under Art. 2b, para. 2 and 3, and the requirements of art. 2b, para. 5 of ADAS in RB, as well as the minimum requirements of IMI – BAS, to which the necessary evidences are attached (Appendix 2.2).
16. Declaration (Annex 3.2).
17. Declaration of consent for the storage and processing of personal data (Annex 4.2).

All the necessary documents for the competition for "Associate Professor" were submitted in accordance with the requirements of the ADAS in RB, the RAADAS in RB, the RAADAS in BAS and the RAADAS in IMI – BAS.

The diploma for Mathematics awarded by the University of Telecommunications, Tokyo, Japan and its recognition by the IMI – BAS with the corresponding attached document shows that the candidate satisfies the requirements of Art. 24 para. 2. by the ADAS in RB.

From the certificate issued by Waseda University, Tokyo, Japan and the certificate of work experience issued by IMI – BAS, it is clear that the candidate meets the requirements of Art. 24 para. 2. by the ADAS in RB.

3. General characteristics of the applicant's scientific, teaching and applied activities

Minimum requirements

According to the specific requirements of Art. 3, para. (1), item 2 of RAADAS of IMI – BAS, there are 13 publications (4 with IF and 9 with SJR). The verification showed that publications [1], [2] and [16] were in publications with IF, and publications [9] and [11] were with SJR, i.e. at least 5 publications with IF or SJR publications have been submitted for the contest.

The minimum requirements for admission to the contest for „Associate Professor" under Art. 2, para. (2) of the RAADAS of IMI – BAS:

Group of indicators	Indicators	Number of required points	Points
A	1	50	50
B	3-4	100	110
Г	5-10	220	268
Д	11	70	120
E	12-	20	30

For Group B, Indicator 4 was used with publications [1], [2] and [16] from the list of publications submitted for the competition and all three publications were with IF publications such as [1] and [2] were from quart Q2, and [16] from Quartile Q3 for the years of publication. The performed check established the correctness of the submitted data.

Indicator 7 was used for Group Г. Publications [9, 11, 12, 13, 15] are indexed in Scopus and published in SJR editions. Publications [3-8, 10, 17-19, 21-22] are indexed in Scopus and [14, 20] in the ACM Digital Library. The performed check established the correctness of the submitted data.

For Group Д, Indicator 11, publications were used [1, 2, 6, 11, 16, 18, 19, 22]. All are cited in Scopus indexed publications. The performed check established the correctness of the submitted data.

Indicators 14 and 15 were used for group E.

Indicator 14 is used for Project BG05M2OP001-1.002-0002-C01 "Digitization of the economy in an environment of Big Data" 07.2019-11.2023.

Indicator 15 is used for Waseda University Research Project: Achieving Mutual Anonymity and Churn Resilience in Peer - to - Peer Networks using Regenerating Codes, 06.2014-03.2015.

For Group E, further evidences of participation in these projects were provided.

I agree that the candidate meets the minimum requirements of the ADAS in RB, the RAADAS in RB, the RAADAS in BAS and the RAADAS in IMI – BAS for participation in the competition for the academic position "Associate Professor".

Common feature

The total number of publications is 51 - 50 in English and one in Japanese. With IF are 4 entries, and with SJR - 9.

The publications are in the period 2005 - 2018.

The publications in magazines are 10, in series - 7, in conference materials - 31, in technical reports -3.

There is 1 publication alone, with 1 co-author - 8, with 2 co-authors - 13, with 3 co-authors - 22, with 4 co-authors - 4, with 5 co-authors - 2, with 6 co-authors - 1.

The publications in co-authorship (50 in number) are distributed as follows: first co-author in 12 publications, second co-author in 16 publications, third co-author in 13 publications, fourth co-author in 6 publications, fifth co-author in 2 publications, sixth co-author in 1 publication.

At the University of Telecommunications, Tokyo, Japan, the candidate has taught mathematics and computer science, namely: Introduction to Computer Science, Information Security, Linear Algebra,

Discrete Mathematics, Introduction to Probabilities and Statistics, Introduction to Automata, Codes and Shippers, Mathematical Foundations of Computer Science; Seminars on Information Security; Seminars and exercises: The Experiment in Applied Digital Communication and The Experiment in Chain Theory.

The applicant's research activities are mainly in Japan in the fields of data security, cryptography, network security, human-machine interactions, crowdsourcing and social computing, gamification and information security.

She speaks English and Japanese.

The candidate has led during 2014-2015 in Japan the project "Achieving Mutual Anonymity and Churn Resilience in Peer - to - Peer Networks Using Regenerating Codes" from Waseda University Research Grant.

Awards:

- Waseda University Teaching Award, Fall 2016, for the course Introduction to Probability and Statistics;
- Top 10 most outstanding young people in Bulgaria in 2018, category Academic leadership and / or accomplishment.

The candidate has received awards for the best paper on [13], [14] and [19] from the general list of publications.

She is enrolled in the RAS (Register of Academic Staff) as a PhD in "4.5 Mathematics" and as an assistant professor in "4.6 Informatics and Computer Sciences". Presented by publication [47] from the general list of publications - with IF from 2008.

4. Substantive analysis of scientific and applied scientific achievements, according to the materials submitted for participation in the competition

22 publications were submitted for the competition all from the period 2010-2016, i.e. after the defense of the PhD. From them 3 are with IF and 5 with SJR.

Distribution by places of publication is as follows: in magazines - 4, in series - 4, in conference materials - 14.

Submitted publications can be divided into three thematic areas:

- Navigating human behavior by enhancing the real world with information technologies
- Using crowdsourcing for knowledge search and exchange
- Secret sharing schemes' applications

Navigating human behavior by enhancing the real world with information technologies

This topic is covered by publications [1-4, 7-9, 11-15, 17].

Publications [1, 7] analyze the desktop and virtual versions of Trading Card Game (TCG). The downside of the virtual version is the loss of many real-world sensations. A new Augmented TCG (augmented reality

game) is presented; a virtual opponent instead of a real one is being added in the desktop version in order to preserve some of the reality sensations.

In [9, 12], a personalization of the opponent is introduced in Augmented TCG, which enhances the sense reality of the virtual opponent.

In [8], the behavior of people towards different virtual adversaries is examined, depending on the emotional behavioral characteristics embedded in the latter ones.

In [17] are examined three examples of importing of reality in the virtual world. The aim is to support the feeling and behavior of reality in future cyber-physical systems.

In [13, 15] is proposed to add to the virtual elements to existing objects. The idea is to enhance real objects by introducing virtual elements into them.

In [2], a generalized framework for the improvement of objects by the virtual elements is introduced. The framework includes improvement of values of the object in the following aspects: aesthetics, persuasion, emphatics, external motivation, information, economic value and ideology.

In [11] is considered above proposed framework for the purpose of gamification of human activities.

In [3, 4], an approach is proposed to motivate people in a small community. The approach is called Micro - Crowdfunding. The idea is to introduce an incentive (local currency) to support the social environment by 'financing' individual projects.

In [14], a mobile-based persuasion approach is considered, based on child-parent relationships.

Using crowdsourcing for knowledge search and exchange

On this topic, publications presented are [5, 6, 16, 18-20].

The publications [16, 19, 20] present the mobile crowdsourcing platform UbiAsk. The idea is the ubiquitous computing concept to use human-volunteers instead of sensors. The subject of this platform are the problems that arise with the Japanese language for the foreigners (users). Very good results were obtained. Volunteer's motivation is found to be intrinsic and not affected by the projected extrinsic incentives.

In [18] are examined the possibilities of gamification in UbiAsk and Ecoland. The latter application stimulates the reduction of carbon dioxide emissions. The idea of this publication is to introduce game structure and vision into applications of this kind. It should be noted that despite the numerous citations of the publication, at least in UbiAsk the effect of gamification is unsatisfactory.

In [6] again is considered the use of humans as sensors, but for extraction of contextual information. The subject of this study is the MoboQ platform, which has been implemented in China. The concept is that people, as sensors, are much more efficient at retrieving contextual information than computerized platforms with sensors.

Publication [5] addresses the problem of reduced sharing of information with the development of information technology. The idea is to be shared unexpected and unsolicited opinions among different types of social groups.

Secret sharing schemes' applications

Publications that have been included in this topic are [10, 20, 21]. These works are a continuation of the PhD thesis.

Publications [10, 21] are devoted to the realization of anonymity in P2P networks. A method is proposed to achieve it without using PKI. The resulting bilaterally anonymous protocol has been tested and has good characteristics.

Schemes for distribution of the secret to achieve image security are discussed in [22]. The proposed method has been shown to have a number of advantages over other such secret sharing techniques.

5. Reflection of the candidate's results in the works of other authors

Of the 22 entries submitted for the competition, 161 were quoted in publications indexed in Scopus as follows [1] - 2, [2] - 4, [3] - 1, [4] - 5, [6] - 25, [7] - 2, [8] - 1, [10] - 1, [11] - 15, [16] - 10, [18] - 88, [19] - 5, [22] - 2. The following 22 citations in Scopus indexed entries have been declared and verified for the contest as follows [1] - 2, [2] - 2, [6] - 3, [11] - 3, [16] - 2, [18] - 6, [19] - 2, [22] - 1.

6. Contributions of the applicant in the collective publications

The distribution in co-authorship is as follows: with two co-authors - 10, with three co-authors - 10, with four co-authors - 1, with five co-authors - 1. Place in the joint publications is as follows: first - 2, second - 8, third - 7, fourth - 5.

Separation protocols for collective publications are missing.

7. Critical notes and recommendations

The residence of the applicant abroad for many years has influenced the use of the Bulgarian language and the special terminology. There are a number of texts from the references provided in the Bulgarian language, in which the meaning is lost in the inaccurate translations of words, terms and expressions.

8. Personal impressions

I do not know personally assistant professor, PhD Todorka Gerasimova Alexandrova and I have no personal impressions.

9. Conclusion

All regulatory requirements to bring forth the ADAS in RB, the RAADAS in RB, the RAADAS in BAS and the RAADAS in IMI – BAS, candidate meets.

I confidently recommend to the honorable jury to choose assistant professor, PhD Todorka Gerasimova Alexandrova for associate professor at IMI of BAS in higher education area 4. Natural Sciences, Mathematics and Informatics, professional field 4.6. Informatics and Computer Sciences, Informatics (Human-Computer Interaction).

28 October 2019

Sofia

Signature:

(prof., Dr. Vladimir Dimitrov)