REVIEW

on a competition for occupation of the academic rank "Professor"

field of higher education	4. Natural sciences, mathematics and informatics
professional area	4.6. Informatics and Computer science
scientific program	Informatics (Contemporary technologies for preserving, accessibility and protection of scientific and cultural heritage)
announced in	State Gazette no. 102 of 01.12.2020 and on the IMI website
for the needs of	Institute of Mathematics and Informatics (IMI) – BAS The Software Engineering and Information Systems Department

The review was prepared by: Prof. D.Sc. Peter Lubomirov Stanchev from the Institute of Mathematics and Informatics - BAS as a member of the scientific jury of the competition, according to Order № 11 / 29.01.2021 of the Director of IMI.

One applicant submitted documents for participation in the announced competition: **Assoc. Professor Dr Galina Todorova Bogdanova, IMI-BAS**

I. Overall description of the materials presented

1. Data of the application

The application for the competition presents 25 scientific publications and 4 guides, reports, networks, created tools and products, 11 of which are in editions with SJR or IF. The provided publications were published in the 2003-2020 period, after the acquisition of the scientific title of associate professor (in 2002). Guides, reports, networks, tools created and products numbered [26-29] are not reviewed.

As a scientific reviewer, I received all 17 documents submitted for participation in the competition.

2. Data of the applicant

Assoc. professor, Dr. Galina Todorova Bogdanova graduated from the Technical University, Sofia - Engineering and Computer Technology in the field of heat and nuclear energy. She graduated from the National Center for Applied Mathematics with a degree in Applied Mathematics. She obtained an educational and scientific degree of Doctor (Ph.D.) in the specialty 01.01.12 at the Institute of Mathematics and Informatics at BAS, with a dissertation on "Bounds of optimal codes" with scientific supervisor - Prof. D.Sc. Stoyan Kapralov. The candidate has worked at IMI-BAS since 2002 as a mathematician, science associate researcher, senior associate of II degree and associate professor.

3. Overall summary of the scientific work, achievements and accomplishments of the candidate

The presented papers of Assoc. Prof. Dr. Galina Todorova Bogdanova can be divided into the following groups:

A. Scientific studies related to information processing and security - 7 articles;

B. Modern methods and technologies for preservation, digital transformation and presentation of scientific and cultural heritage - 7 articles;

C. Tools, platforms and adaptation of the developed interdisciplinary methodologies and integrated approaches - 4 articles;

D. Scientific approaches, methods and standards for ensuring accessibility and training for people with special needs - 7 articles.

The applied scientific publications are related to the implementation of the following projects:

• AB: “Digital Accessibility for People with Special Needs: Methodology, Conceptual Models and Innovative Ecosystems” via the Bulgarian National Science Fund (BNSF);

• Scientific Research Program "Knowledge Technologies for Creation of Digital Presentation and Significant Repositories of Folklore Heritage” (FolkKnow) via the Bulgarian National Science Fund (BNSF);

• Creation, Annotation and Protection of a Digital Archive "Bulgarian Folklore Heritage" via the Bulgarian National Science Fund (BNSF);

• North+: Documenting, Preserving and Providing Public Access to the Cultural Heritage in Libraries, Museums, Archives and Galleries in North and Central Bulgaria, under the “Cultural Heritage and Contemporary Arts” Program, Measure 2 “Documentation of cultural history” (Norwegian Program);

• Electronic Archive of Documentary Heritage for Balkan Wars (BalkanWars), via the Bulgarian National Science Fund (BNSF);

• Research and Identification of Valuable Bells of the Historic and Culture Heritage of Bulgaria and Development of Audio and Video Archive with Advanced Technologies - BELL, via the Bulgarian National Science Fund (BNSF);

• Digital Repository of Information and Knowledge - Fund BellKnow, by agreement contract of IMI - BAS and Regional Public Library, Veliko Tarnovo Municipality;

• Digitization of Kolyu Ficheto’s Works, with Veliko Tarnovo Municipality;

• Civil Initiative for Web Accessibility in the Public Sector, a program to support NGOs, under the Financial Mechanism of the European Economic Area.

The candidate has 100 points in the C (“B” in Bulgarian) indicators’ group, 324 points – in the D (“Г” in Bulgarian) indicators’ group, 222 points in the group of E (“Д” in Bulgarian) indicators and 440 – in the group of F (“Е” in Bulgarian) indicators. Total number of citations: 281 Number of citation articles in Web of Science and / or Scopus: 14 with citing sources number of: 145; Number of citations in other scientific editions: 44 with citing sources number of: 136.

a) The scientific publications fully correspond to the national requirements (art. 2b, para 2 and 3 of RTCAADOAP) and to all additional requirements of IMI-BAS for taking the academic position of “Professor” in the scientific area and professional field for the competition;
b) The presented scientific publications do not duplicate the presented publications from previous competitions;
c) There is no proven plagiarism in the scientific works of Assoc. Prof. Dr. Galina Todorova Bogdanova.

4. Characteristics and evaluation of the teaching experience, work on projects and other activities

Lectures and courses - over 900 hours of lectures / exercises in the following disciplines: "Databases", "Interdisciplinary methods for preservation, presentation and digitization of cultural, historical and scientific heritage", "Methodology of SEO/ assessment of websites for web accessibility for people with disabilities ”, “Standards, criteria and methodology for assessing the accessibility of software applications for people with disabilities”, “Digital accessibility and methods for training people with special educational needs”, “Informatics ”, “Compression and archiving of information ” , “Modern platforms for Databases”, “Business applications for analysis of economic information”, “Business applications”, "Database Management Systems", "Macros in MS Office Tools", "System Analysis and Design”, "Internet Programming", "Information Technologies", "Graphic Design", "Business Information Systems", "Multimedia and Computer Animation".

Created tools and products:

- Web accessibility guide and online questionnaire
- Web accessibility network
- Methodology and questionnaire for testing and assessment of accessibility.

Other activities of Assoc. Prof., Dr. Galina Todorova Bogdanova:

- Scientific Study Reports at international forums – 34
- Supervision of defended PhD thesis student - 4
- Scientific research and study projects - 4
- Editor of scientific journals and editions - 12
- 6 digital scientific collections and museum collections have been created
- 7 scientific products have been created
- Organising of exhibitions abroad - 4
- Organization of exhibitions in Bulgaria – 25
- Participation in program committees of scientific forums - 53

- Scientific awards - 2
- Participation in councils, commissions and other expert bodies of institutions external to BAS – 9
- Expert reports in assistance of institutions – 29

5. Content analysis of the scientific and scientific-applied achievements of the candidate, according to the reviewed materials applied in the competition

The main scientific, scientific-applied and educational-methodical contributions of Assoc. Prof. Ph.D. Galina Todorova Bogdanova are mainly in the following scientific fields:

A. Researches related to information processing and protection – scientific works with numbers 2, 6, 18, 20, 21, 22, 25

Scientific work [18] presents a developed software system Qplus - for research and training in the field of coding theory. The capabilities of the computer package QPlus have been used in other studies for search and classification of codes, applying the combinatorial and computer methods set in the program to find the number of non-equivalent optimal codes with different parameters. [6] presents a research and study of some classes of nonlinear codes (equidistant codes and constant-weight codes), new constructions of codes are made. Article [21] explores the problem of constructing equidistant codes on an alphabet of arbitrary size q. It also presents some combinatorial constructions and computer-based methods for searching. A systematic study was done in the article and all maximum equidistant codes with distances 3 and 4 were found. Article [22] researches the problem of classification of optimal ternary constant-composition codes was. In some of the cases have application of the combinatorial and computer methods, which are pledged in the program for finding the number of non-equivalent optimal ternary constant-weight codes with different parameters. [6] studies the matter of finding the bounds of the size of ternary equidistant codes. Article [20] has studies related to the processing, analysis and security of the information. In [2] methods for protection of interactive systems and digital archives against unauthorized distribution of digital content are studied. The study also presents an overview of steganographic methods and image protection schemes. The next scientific work - [25], presents methods for developing, analyzing and securing a multimedia archive of folklore objects. An archive fund with folklore materials of the Institute of Ethnology and Institute of Ethnology and Folklore Studies with Ethnographic Museum (IEFSEM) at BAS has been used. This group of scientific works has contributions in the field of coding theory and creation of systems with practical application.

B. Modern methods and technologies for preservation, digital transformation and presentation of scientific and cultural heritage - publications with numbers 5, 7, 15, 17, 19, 23, 24

Article [7] presents the new solutions in the field of digitization and digital presentation of folklore heritage. In [23] some problems and solutions related to the design of specialized data warehouses are presented. The creation and presentation of semantic knowledge in the field of cultural and historical heritage are discussed in [15, 17]. Research on the creation of knowledge

about an object of percussion instrument class (bell) is presented. Article [19] is about methods and techniques used in digitalization and protection of objects in the multimedia folklore archive of the National Center for Intangible Cultural Heritage in IEFSEM. Digital technologies related to the digitalization, creation and indexing of digital resources and aimed at their use for the needs of people with visual impairments have been studied in [24]. The standards for digitization, metadata, storage of digital media and media resources are considered. [5] describes a digital repository of objects in the field of cultural heritage. Digital technologies and their use by people with disabilities have been studied in [24]. This group of publications discusses the technologies for storing and searching archives and accessibility for people with disabilities to them.

C. Tools, platforms and adaptation of the developed interdisciplinary methodologies and integrated approaches - publications with numbers 3, 4, 10, 12

Article [10] researches software services, related to cultural heritage, presentation and search of visualized data. Publication [4] research is about organization of digital resources, and the use of graphical databases as a data management platform. Methods for organizing, management and construction of semantic knowledge for Holter monitoring system in the field of healthcare are presented in article [3]. A web-based information platform in the field of medicine based on cloud technologies is discussed in [12]. The research also presents a model of a platform for collecting, processing, analyzing and storing medical data. This group of publications comprises interdisciplinary researches, related to healthcare and presentation of cultural heritage.

D. Approaches, methods and standards for ensuring accessibility and education of people with special needs - publications with numbers 1, 8, 9, 11, 13, 14, 16

In [1], [8] approaches and methodology for ensuring accessibility of the web environment for people with special needs are presented. In [16] a model for creating a software system that takes into account the needs of people with visual impairments is presented. This model will provide opportunities for easy use of the software system, both by this target group and by people without disabilities. Research on the problems with the accessibility of software environments, teaching materials, serious educational games, etc. are presented in [14]. [9] explores the problems that people with disabilities have in accessing knowledge. Tools and methods have been developed for assessing the accessibility of educational services. [11] explores the common barriers in cyberspace for users with visual impairments. Serious educational games for training in the field of military historical heritage are discussed in [14]. The application of games in the learning process and the impact of educational methods are studied. Scientific publication [13] addresses the issues in developing digital cultural resources for educational application of serious educational games. This group of research publications includes the development of a conceptual model for accessibility modules of a serious educational game, in the field of cultural and historical heritage, targeted to people with visual problems.

6. Critical remarks and recommendations

I recommend Assoc. Prof. Dr. Galina Todorova Bogdanova to expand the use of more software methods in her research work.

7. Personal observations and opinion for the applicant

I have known the candidate for many years. Her scientific research work is of exceptional practical applied value.

8. Assessment of the applicant

After being acquainted with the materials and scientific publications, and on the basis of the analysis of their significance and their scientific and applied scientific contributions, I confirm that the academic achievements of the candidate Assoc. Prof. Dr. Galina Todorova Bogdanova meet the requirements of the ADAPRB, the Regulations for its implementation and the corresponding Regulations of IMI-BAS for the occupation of the academic position of "Professor" in the professional field "Informatics and Computer Science". In particular, the applicant meets the minimum national requirements in the professional field and no plagiarism has been detected in her scientific papers submitted at the competition.

I give a positive assessment of the application of Assoc. Prof. Dr. Galina Todorova Bogdanova.

II. Overall conclusion

Based on the above, I recommend to the scientific jury to vote on a proposal to the Research Council of the Institute of Mathematics and Informatics – BAS to select Assoc. Prof. Dr. Galina Todorova Bogdanova for the academic position of "Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.6. Informatics and computer science, scientific specialty Informatics (Contemporary technologies for preserving, accessibility and protection of scientific and cultural heritage).

15.03.2021 Prepared the review:

Prof. D.Sc. Peter Stanchev