

OPINION

on the competition for the academic position „Professor“

Area of higher education:	4.0 Natural sciences, mathematics and computer science
Professional field:	4.6. Informatics and Computer Science (Informatics/Modern technologies for preservation, accessibility and protection of scientific and cultural heritage)
Announced in:	State Gazette, issue 102 of 1/12/2020
Candidate:	Assoc. Prof. PhD Galina Todorova Bogdanova
Reviewer:	Prof. D.Sc. George Totkov

1. Background and CV of the applicant

The review was prepared on the basis of Order No. 11/29.1.2021 г. of the Director of Institute of Mathematics and Informatics (IMI), Acad. Veselin Drenski, which approves the Scientific Jury for the open procedure for occupying an academic position of „Professor” in the area of higher education 4.0 Natural sciences, mathematics and computer science, professional field 4.6 Informatics and Computer Science in SG, issue 102 of 1.12.2020.

For the participation in the competition for the academic position of „Professor“, only Assos. Prof. Galina Todorova Bogdanova Ph.D. submitted documents.

Assoc. Prof. G. Bogdanova was born in 1957. In 1981 she graduated with a Master’s degree from Technical University – Sofia. In 2000 she defended her PhD thesis in the field of the competition on „Limits for optimal codes”. Since 1989 she has been an mathematicians and researcher at the IMI, and since 2002 – „Associate Professor“.

2. General description of the submitted materials

Assoc. Prof. G. Bogdanova has presented the required documents and materials on paper and electronic media.

From the Report for fulfilment of the national minimum requirements and the List of scientific production it is evident that Assoc. Prof. G. Bogdanova participates in the competition as coauthor of 25 publications in the field, from which 2 chapters of monographies and 11 – with SJR or IF. All of the presented publications are in English and do not repeat those presented for the acquisition of the educational and scientific degree PhD and those for the acquisition of the academic position „Associate Professor“.

3. General characteristics of the research and pedagogical activity of the candidate

Assoc. Prof. Dr. G. Bogdanova is distinguished by rich public and promotional activities in the field of cultural and historical heritage and its digitalization. I will especially mention her activity as an editor of scientific collections, compiler of dictionaries and reference books, organizer of exhibitions in the country and abroad, as well as her participation in the creation of digital collections and interactive presentations of cultural and historical sites. Her activity of creating museum collections, scientific collections, exhibitions, archives and organizing various cultural events is definitely of an important public nature.

Assoc. Prof. G. Bogdanova has been a lecturer in specialized courses and seminars, conducted by universities, municipal and cultural institutions on topics such as Multimedia and computer animation; Interdisciplinary methods for preservation, presentation and digitization of cultural, historical and scientific heritage; SEO methodology / evaluation of websites for web accessibility for people with disabilities; Standards, criteria and methodology for evaluating public websites for web accessibility for people with disabilities; Digital accessibility and methods for training people with special educational needs; Methodology for testing and evaluating web accessibility; Interdisciplinary methods for digital conversion and presentation of the cultural-historical and scientific heritage; Improvement of the digital accessibility in the museum objects for people with special needs; Technologies for improvement of the accessibility in education of students with special needs.

From the presented general list of publications, it is evident that Assoc. Prof. G. Bogdanova is an author or co-author of 122 publications.

Assoc. Prof. G. Bogdanova has participated in 13 projects – 3 international and 10 (ten) national – all in the field of competition.

4. Main contributions

Assoc. Prof. G. Bogdanova conducts research in thematic areas such as Information processing and protection, Modern methods and technologies for protection, digital transformation and presentation of scientific and cultural heritage, Tools, platforms and adaptation of the interdisciplinary methodologies and integrated approaches, Approaches, methods and standards for ensuring accessibility and training for people with special needs.

Her main contributions in these areas can be summarized as follows:

- **research of theoretical and fundamental nature:**
 - encryption and protection of information, incl. development of algorithms and programs for construction and classification of linear and nonlinear codes with certain properties;
 - presentation of semantic knowledge in the field of cultural and historical heritage;
 - standards and metadata for storage of digital media and media resources;
- **virtual models** for:
 - preservation, digitalization and presentation of the scientific and cultural-historical heritage (including national folklore heritage, bells, works of Kolyu Ficheto, Balkan Wars, cultural tourism, etc.);
 - organization, management, protection and presentation of specialized digital archives and repositories;
 - collection, processing, analysis and storage of medical data;
 - socially oriented digital ecosystems for accessibility;
 - serious educational games for people with special needs;
- **developed requirements, standards and manuals for digitalization**, incl.:
 - annotation schemes and metadata for artifacts;
 - criteria and guidelines for providing accessible web environments for people with special needs;
 - availability of educational software environments and learning materials;
- **proposed methods and techniques** for:
 - construction, classification and research of optimal codes of a given class with fixed parameters;
 - construction of equidistant codes on an alphabet of arbitrary size q ;
 - finding all maximum equidistant codes with distances 3 and 4;
 - protection of interactive systems and archives from unauthorized access, incl. watermark error correction schemes;
 - compression of audio information;
 - digitalization, indexing and protection of digital objects, especially for the needs of people with visual impairments;
 - management and development of semantic knowledge for Holter monitoring system in the field of healthcare;
- **classifications made** of:
 - the optimal ternary constant composition codes and finding the number of non-equivalent codes for $3 \leq d \leq n \leq 10$;
 - methods, tools and services for management and protection of digital resources and repositories, as well as the techniques for their creation;
 - software services provided by cultural program application interfaces (APIs);
- **implemented software tools and systems, and performed experiments** for:
 - research and training in coding theory (including QPlus system);
 - protection of specific digital archives and repositories for cultural and historical sites;
 - design of multimedia archives of national and international importance;
 - study for accessibility of sites of public institutions, etc.

Of the 25 scientific publications submitted for the competition (which are indexed in world-renowned databases with scientific information Web of Science, SCOPUS and MathSci). Associated Professor G. Bogdanova is with one co-author in 5 publications, with 2 – in 15 publications, and with 3 – in 5 publications. I

accept (due to lack of separation protocols) that her contribution is equivalent to that of the other co-authors. For the enclosed scientific works of Assoc. Prof. G. Bogdanova there is no data and evidence of plagiarism, as well this is declared by the candidate.

On this basis, the candidate has achieved 764 points of the minimum national requirements for professional field 4.6. Computer Science and Informatics: 50 points by indicator A., 100 points (at a minimum of 100) by Indicator B, 324 points (at a minimum of 200) by Indicator Г, 140 points (at a minimum of 100) by indicator Д, 150 points (by minimum 100) by indicator E.

There are 37 citations of 4 scientific articles, indexed in world-famous databases of scientific information. There is also a General list of 145 citations of works by Assoc. Prof. G. Bogdanova in the SCOPUS database.

The analysis of the above data shows that publications are cited by researchers in the field. This pre-determines the significance of the above contributions. Given the scientific value of the publications, their international and national publicity, and the significant number of citations abroad, it can be concluded that the scientific works of Assoc. Prof. G. Bogdanova meet the requirements of the Academic Staff Development Act of Republic of Bulgaria (ASDARB) to acquire an academic position „ Professor“.

5. Critical remarks and recommendations

Regarding the teaching activity of the candidate, more intensive activity is expected in the work with students, and especially with graduates in the field (in the materials for the competition there is no data for defended graduates with scientific supervisor Assoc. Prof. G. Bogdanova). There are data for 4 defended PhD students with research supervisor Assoc. Prof. Bogdanova.

Associated Professor G. Bogdanova has also presented a general list of her scientific publications (from 1990 to date), which contains 122 works. The candidate is not an independent author of group Г6 publications. The latter gives grounds for a recommendation – to focus on independent and in-depth research in the field.

6. The personal impressions and opinion of the reviewer

I have not direct personal impressions of the candidate for the academic position of "Professor". I confirm that the data on the significance and representativeness of the scientific achievements and results presented by the Assoc. Prof. G. Bogdanova (in the form of points for individual indicators listed above), exceed the minimum national requirements – a prerequisite for holding the academic position of "Professor" in the professional field 4.6. Informatics and Computer Science.

7. Conclusion

After getting acquainted with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ASDARB, the Regulations of its application, the Regulations for the conditions and the procedure for acquiring scientific degrees and for holding academic positions at IMI.

Assoc. Prof. G. Bogdanova satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

After getting acquainted with the materials and scientific papers presented in the competition, analysis of their significance and the scientific, scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment of the applicant and recommend the Scientific Jury to propose to the Scientific Council of IMI to elect Associated Professor Galina Bogdanova to the academic position of „ Professor“ in the area of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.6. Informatics and Computer Science.

24.3.2021

Reviewer:

(Prof. D.Sc. G. Totkov)