# REVIEW REPORT

## on Scientific Work for Participation in a Competition for the Academic Position of 'Associate Professor' in 5.7. 'Architecture, Civil Engineering and Geodesy' Professional Field, 'General, Higher and Applied Geodesy' Specialty, Published in State Gazette issue 70 of 07.08.2020 with candidate Krasimira Kuneva Kirilova Dr. Eng.

## Scientific Jury Member: Prof. Mihail Petkov Iliev D.Eng.Sc

### 1. Scientific Work Accepted for Review

The candidate participates in the competition with 13 scientific publications (1 monograph and 12 scientific articles), all of which I have accepted for review.

### 2. General Characteristics of the Applicant's Scientific and Applied Research Activities

The scientific work of Chief Asst. Prof. Krasimira Kuneva Kirilova PhD submitted for participation in the present competition includes 1 monograph and 12 scientific articles and papers. 5 of the publications are in Bulgarian and 8 are in English. 9 of these are single-authored (monograph and 8 publications) and 4 are produced in collaboration with another author. In three of the collaborative publications the candidate is the lead author. The publications are presented as follows:

- 3 articles in foreign scientific journals;
- 2 publications in editions of an International scientific journal referenced online;
- 5 in a peer-reviewed yearbook of 'Konstantin Preslavsky' University of Shumen.

- 2 articles in 'Geodesy, Cartography and Land Management Journal', edition of the Union of Surveyors and Land Managers in Bulgaria.

All publications are in editions having ISSN identifier.

The applicant's research and practical work is in the following areas:

- exploration of earth's gravitational field by satellite gradiometry, including analysis of satellite gradiometry (SG) methods and systems and "satellite-satellite" tracking systems (SST) [M], [2], [11];
- methodology for development of a local model of geoid (quasigeoid) in extreme regions and a calculation algorithm for the construction of the geometric model of geoid in mountainous and high mountainous regions for the territory of the Republic of Bulgaria [3], [4], [7], [8];
- analysis and assessment of anomalous dimensions characterizing the difference between the actual and normal gravitational field on Earth [5], [6];
- development of a digital topographic model on the territory of South-western Bulgaria - Rila Mountain enabling faster analysis and comparability of results when applied in practice [9].
- Analysis and assessment of the accuracy of global geopotental models in view of selecting the most appropriate one for the relevant geographical area [10].
- new differential dynamic methods of space geodesy and assessment of the possibility for application of their results in particular regions of Bulgaria [11], [12].

The materials submitted for review indicate that, as of the date of writing this report, the publications of Krasimira Kirilova PhD have been cited 17 times.

### 3. Assessment of the Applicant's Pedagogical Preparedness and Activities

From 2014 to 2018 Krasimira Kuneva Kirilova PhD worked as Assistant Professor with the Department of Geodesy, Faculty of Technical Sciences of

'Konstantin Preslavsky' University of Shumen. In 2019, after a one-year interruption, the applicant resumed her work at the same department and was elected as Chief Assistant Professor. She has delivered courses and lectures to students from the 'Geodesy' programme at the University of Shumen in the following disciplines: Applied Geodesy, Vertical Planning, Cadastre, Development of Urban Areas, Spatial Planning, Geodesy Practice, etc. The applicant has acted as an advisor for students from the same programme and has supervised them in the preparation and defence of their academic projects.

All in all, it can be concluded that the teaching work and pedagogical activities of Chief Asst. Prof. Krasimira Kirilova PhD are diverse and meaningful.

**4. Key Scientific and Applied Research Contributions**

The key contributions in the applicant's scientific production submitted for review within the present competition could be categorized as follows:

**Contributions in the Monograph**

- Systematization of theoretical and practical work in the field of satellite gravitational gradiometry;
- Synthesis of modified methodologies in the field of satellite gravimetry.

**Contributions in the Publications**

- A method for assessing the effectiveness of gravimetric constructions has been proposed using the method of least squares [12.1];
- Information on space gravity missions is systematized and possibilities for their application are reviewed [12.2], [12.11];
- A methodology for developing a local model of the geoid (quasigeoid) in extreme regions has been proposed and an algorithm for calculating the geometric model of geoid in mountainous and high mountainous regions for the territory of the Republic of Bulgaria has been introduced [12.3];

- An assessment of the accuracy of global geopotual models and recommendations for their application have been made [12.4];
- The anomalous dimensions characterizing the difference between the actual and normal gravitational field on Earth are analysed and assessed [12.5];
- Present local geodynamic processes in the fault zones on the territory of Bulgaria have been analysed and assessed [6];
- A model of the geoid in mountainous areas with highly intersected relief is defined with proper accuracy and representativeness to serve as a height reference area, as well as a basis for delivery of more precise local geoid models [12.7];
- The optimal option for practical modelling of the local geoid (quasigeoid) in the area limited within the boundaries of $41^0 52'06'' N < \varphi < 42^0 21'22'' N$ and $23^0 01'11'' E < \lambda < 24^0 01'05'' E$ has been analysed and assessed [12.8];
- A digital topographic model (DTM) has been developed and a more reliable assessment of the accuracy of local geoid modelling for the territory of Rila Mountain has been made [12.9], [12.10], [12.12].

**Upon a complex assessment I would define the applicant's contributions as applied research and practical and would evaluate these as enhancing existing knowledge and technical systems, formulation of new classifications, methods and algorithms, obtaining and proving supporting facts.**

## 5. Assessment of the Authorship of the Applicant's Contributions

The candidate participates in the competition with 13 scientific publications, i.e. 1 monograph and 12 scientific articles. 9 of the scientific publications are single-authored and 4 are produced in collaboration with another author. In three of the collaborative publications Krasimira Kirilova PhD is the lead author. No appendix has been presented for assignment of authorship in the collaborative work and I have therefore assumed equal authorship for all contributors listed. In

consideration of the above, having analyzed the scientific publications submitted for review, I have no doubt for the authorship of the contributions of Krasimira Kuneva Kirilova PhD outlined in point 4 of the present review report.

**6. Critical Remarks and Recommendations**

Based on the analysis of the work submitted for review within the present competition, I would make the following remarks and recommendations to the prospective work of Krasimira Kuneva Kirilova PhD:

1. The number of the applicant's publications for participation in this contest is rather small;
2. It is recommended that the candidate focus her efforts on publishing textbooks and study guides for her students;
3. It is recommended that the applicant intensify her work with local and international students, PhD students, and young scientists in order to build a team with the capacity to obtain more meaningful results and to participate in national and international research projects and programmes.

**7. Personal Impressions and Reviewer's Opinion on the Remaining Aspects of the Applicant's Activity**

I have not met the candidate and I have not worked with her but I have worked with her colleagues who have provided positive feedback about her, her teaching and research work. Based on my communication with Dr. Kirilova during the preparation of the present review report, I came under the impression that she is a very well-organized and diligent young person. Based on this, on the compliance of the materials for participation in the competition with the minimum scientometric requirements outlined in the Act on Academic Staff Development in the Republic of Bulgaria, as well as on the opinion of Dr. Kirilova's colleagues at the University of Shumen, I can reasonably conclude that I have formed an adequate and objective opinion about the candidate and her overall work.

It is deemed that the quality of the scientific work and the professional realization of Krasimira Kuneva Kirilova PhD are in line with the requirements of the Act on Academic Staff Development in the Republic of Bulgaria, its

Implementing Regulations and the requirements of 'Konstantin Preslavsky' University of Shumen for taking the academic position of 'Associate Professor'.

**8. Nourishing a Creative Environment for Transferring the Applicant's Experience and Knowledge to Younger Colleagues**

Krasimira Kirilova PhD has made a significant contribution to the teaching process of the students from the 'Geodesy' programme of the University of Shumen. Her professional experience will further be relied upon in the future.

**Conclusion**

The materials submitted for review within this competition are sufficient in terms of quality. In terms of quantity, the work presented meets the minimum scientometric requirements for 'Associate Professor' academic position. The analysis of the scientific production for participation in the competition indicates that Krasimira Kuneva Kirilova PhD has carried out sufficient and significant research, teaching work and pedagogical activities. She has published a monograph, articles and papers. The applicant's scientific work has the necessary applied research and practical contributions.

Upon a comprehensive assessment of the results of the applicant's activities, I deem that they meet the requirements for awarding the academic position of 'Associate Professor'.

**In view of the above, I propose that Krasimira Kuneva Kirilova PhD be selected for the academic position of 'Associate Professor' in 5.7. 'Architecture, Construction and Geodesy' professional field, 'General, Higher and Applied Geodesy' specialty at 'Konstantin Preslavsky' University of Shumen.**

**16/10/2020**

**Prof. M. Iliev D. Eng.Sc**