

REVIEW

Regarding: Competition for the academic position of *Associate Professor* in Professional field 4.4. *Earth Sciences*, scientific specialty *Seismology and Internal Structure of the Earth*, as promulgated in the State Gazette, issue 86 of 15.10.2021, for the needs of the Department of Seismology and Seismic Engineering at the National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences (NIGGG-BAS).

Reviewer: Prof. D.Sc. Stefan Sotirov Dimovski, Head of the Department of Applied Geophysics, University of Mining and Geology "St. Ivan Rilski", Sofia

The review was prepared on the basis of a decision on the procedure of the Scientific Jury (Protocol № 1/21.12.2021), implementing Order № 01-263 of 12.11.2021 of the Director of NIGGG-BAS.

The only one Applicant in the competition Assist. Professor Dr. Plamena Georgieva Raykova - Tsankova is on permanent employment contract in the Department of Seismology and Seismic Engineering at NIGGG-BAS. The set of documents and materials submitted by her is in full compliance with the formal requirements of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulations for its implementation, the Regulations on the Terms and Conditions for Acquisition of Scientific Ranks and Occupation of Academic Positions in BAS, and the Regulations for the DASRBA implementation in NIGGG-BAS. There are no omissions in the administrative procedure conducted so far.

Biography information

Plamena Raykova - Tsankova was born in Dobrich, Bulgaria. She graduated from the Faculty of Physics of Sofia University "St. Kliment Ohridski", where she earned a Bachelor's degree in Astrophysics, Meteorology and Geophysics (2011) and a Master's degree in the same specialty, Master's program in Geophysics (2013). Since 2013 she has been a PhD student at NIGGG-BAS and in 2017 she acquired PhD degree in Seismology and Internal Structure of the Earth. Since 2009 Plamena Raykova - Tsankova has been working in the Department of Seismology at NIGGG - BAS, successively holding the positions of geophysicist, seismologist and assistant. Since the beginning of 2018 she has been appointed to the academic position of Assistant Professor in the Department of Seismology and Seismic Engineering at NIGGG-BAS. In 2017 she was among the winners in the competitions for awards of BAS for young scientists "Prof. Marin Drinov" and for the youngest scientists "Acad. Ivan Evstratiev Geshov" by receiving one of the awards for the youngest scientists in Area 6 – Climate changes, risks and natural resources.

General characteristics of the research activity of the Applicant

Publishing activity

The presented summary reference for the publication activity of Assist. Professor Dr. Plamena Raykova - Tsankova contains 48 scientific works. The list includes two collective monographs, 16 publications in peer-reviewed issues, indexed in Scopus and 30 publications in non-refereed, peer-reviewed journals, edited collective volumes and proceedings of scientific conferences. Out of these 30 publications (16

in English and 14 in Bulgarian), the Applicant is sole author of 5 of them and first author of another 4 collective works.

Bibliographic citations of Applicant's publications

The presented by Assist. Professor Dr. Plamena Raykova - Tsankova summary reference for observed bibliographic citations is evidence of the scientific interest in 11 of the publications with her participation. The number of citations noticed by the Applicant is 21, 15 of which are in publications in peer-reviewed issues, indexed in WoS and Scopus.

Participation in research projects

From the submitted set of documents is evident that the Applicant has participated in 17 research or educational projects, including 2 projects financed by the Bulgarian National Science Fund (BNSF) and other national funds, 2 projects financed in Bulgaria under the EU Operational Programs, 4 projects financed by ministries and other state institutions, 3 projects, financed from the state budget for the purpose of development of the scientific activity in BAS and 6 projects and contracts financed by companies.

General eligibility criteria

The eligibility criteria under Art. 24 of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), Art. 53 of the Regulations on the Terms and Conditions for Acquiring of Academic Degrees and Occupation of Academic Positions in BAS, and Art. 54 of the Regulations for the DASRBA implementation in NIGGG-BAS include:

The applicants must hold a PhD degree

The Applicant has a PhD degree in Professional field 4.4. Earth Sciences, scientific specialty Seismology and Internal Structure of the Earth (PhD diploma № 000892 / 05.06.2017). The PhD thesis defended by the Applicant is entitled "Characteristics of for-aftershock and swarm type seismicity on the territory of Bulgaria and the surrounding area".

The applicants must have at least 5 years of experience in the specialty and must have occupied the academic position of Assistant Professor for at least two years.

According to the information provided, Plamena Raykova - Tsankova has been an employee of NIGGG-BAS since March 23, 2009, and on January 23, 2018 she was appointed to the academic position of Assistant Professor in the Department of Seismology and Seismic Engineering at NIGGG-BAS.

The applicants must have published a monograph or an equivalent number of publications (not less than 10) in peer-reviewed and indexed in world-renowned scientific information databases editions, while the publications themselves do not replicate those submitted for the obtaining of the PhD degree.

Assist. Professor Dr. Plamena Raykova - Tsankova has presented 10 publications in peer-reviewed issues, indexed in the world-renowned scientific information database Scopus.

The applicants must comply with the mandatory minimum requirements under Art. 1a, Paragraph 2 of the Regulations for the DASRBA implementation in NIGGG-BAS for occupation of the academic position of Associate Professor.

In order to acquire the academic position of Associate Professor, the Applicant is subjected to higher requirements (in comparison with the minimum national requirements) introduced by Article 2, Paragraph 4.3 of the Regulations on the Terms and Conditions for Acquiring of Academic Degrees and Occupation of Academic Positions at the Bulgarian Academy of Sciences and Annex № 1 thereto.

The analysis of the provided by Assist. Professor Dr. Plamena Raykova - Tsankova reference for compliance with the minimum requirements for occupation of the academic position of Associate Professor provide reasons to draw the following conclusions:

- Group of indicators A

As already mentioned, the Applicant has a PhD degree in Professional field 4.4. Earth Sciences, scientific specialty Seismology and Internal Structure of the Earth, for which is awarded **50 points**.

- Group of indicators C

The Applicant presents 10 scientific publications in peer-reviewed issues, indexed in Scopus. All ten publications are co-authored, and in each of them the number of members of the author's team is correctly reported. According to this group of indicators the Applicant collects **115.02 points**.

- Group of indicators D

The Applicant presents 31 scientific works, which fully correspond to the professional field and the scientific specialty in which the competition was promulgated. The list includes 3 publications in peer-reviewed issues, indexed in Scopus, 26 publications in non-refereed, peer-reviewed journals, edited collective volumes and proceedings of scientific conferences, one collective monograph, which is not presented as a major habilitation thesis, as well as four published chapters in a collective monograph. Of the 29 publications presented, 18 are in English and the remaining 11 in Bulgarian. Out of the 26 publications in non-refereed, peer-reviewed journals, edited collective volumes and proceedings of scientific conferences, the Applicant is sole author of 4 of them and first author of another 4 collective works. According to this group of indicators the Applicant collects **221.24 points**.

- Group of indicators E

The presented by Assist. Professor Dr. Plamena Raykova - Tsankova reference for compliance with group of indicators E reflects the scientific interest in 6 of the publications with her participation. The number of citations declared by the candidate is 15 – 9 of them are in peer-reviewed issues, indexed in WoS and Scopus, 3 are citations in non-refereed, peer-reviewed, edited collective volumes and 3 are citations in non-refereed, peer-reviewed journals. According to this group of indicators the Applicant collects **60 points**.

- Group of indicators F

The reference for compliance with group of indicators F submitted by the Applicant declares her participation in two projects. These are (1) the International Research Project Black Sea Earthquake Safety Net(work)-ESNET, funded by the EU under the Joint Operational Program Black Sea Basin and (2) the National Science Program Environmental Protection and Reduction of Risk of Adverse Events and Natural Disasters, Work Package I.10. Assessment of the risk of catastrophic earthquakes

and their consequences. According to this group of indicators the Applicant collects **30 points**.

The summarized data presented in Table 1 show that Assist. Professor Dr. Plamena Raykova - Tsankova satisfies the mandatory minimum national and institutional requirements for occupation of the academic position of Associate Professor.

Table 1. Mandatory minimum national and institutional requirements for occupation of the academic position of Associate Professor

Indicators	Number of points required for occupation of the academic position of Associate Professor	Number of points awarded to the Applicant
Group A	50	50
Group C	100	115.02
Group D	220	221.24
Group E	60	60
Group F	30	30
Total:	460	476.26

Major scientific contributions

The major contributions in the 41 scientific works presented by Assist. Professor Dr. Plamena Raykova - Tsankova (13 publications in peer-reviewed issues, indexed in Scopus, 26 publications in non-refereed, peer-reviewed journals, edited collective volumes and proceedings of scientific conferences, one collective monograph, which is not presented as a major habilitation thesis, as well as four published chapters in a collective monograph) are grouped into four thematic areas:

1. Research and analysis of seismicity and seismogenic processes in seismic active zones in Bulgaria and surroundings.
 - Participation in the creation and continuous updating of a catalog of earthquakes (with magnitude $M_w \geq 3.2$) in Bulgaria for the period after 1981;
 - Application of data from the monitoring activity of NOTSSI (National Operational Telemetric System for Seismological Information) in order to study the space-temporal variations of regional seismicity and seismic regime;
 - Establishment of zones with a high level of low to moderate seismic activity, as well as the tendency for time-changing seismic picture of low seismicity;
 - Analysis of historical earthquakes for which information is available and proving spatial correlation between low to moderate seismic activity and strong historical earthquakes.
2. Assessment and analysis of the space-temporal distribution of clusters (foreshocks, aftershocks, swarms) in Bulgaria and surroundings.
3. Research and analysis of the spectral characteristics of different types of seismic sequences.

- Participation in the development of a methodology following the Brune model;
 - Generation of displacement spectra for P- and S-waves, using records from different stations, in order to determine some characteristics of the earthquake source (seismic moment M_0 , stress drop $\Delta\sigma$, source radius and moment magnitude M_W).
4. Study of the possibilities for obtaining an objective assessment of the seismic risk (seismic hazard).
- Participation in the development of a methodology for analysis, assessment and mapping of the seismic risk in Bulgaria;
 - Participation in the seismic hazard assessment for Bulgaria, through the development in GIS environment of a model of the significant seismic sources, based on geological-geophysical and seismological information. The seismic parameters of each element of the model have been assessed and seismic hazard maps in term of expected maximum acceleration have been computed for different return periods (95, 475 and 1000 years);
 - Development of earthquake scenarios for the cities of Ruse, Blagoevgrad and Veliko Tarnovo, based on the observed maximum macroseismic effects of strong historical earthquakes.

The major contributions of the Applicant are directly related to the scientific field of the competition. They are primarily a result of the development of research projects and are expressed in the implementation of optimal approaches and methodologies for studying specific tasks.

Critical notes and recommendations

I do not notice substantial faults in the research activity of the Applicant to make any significant critical notes. I have two recommendations oriented towards her future activity. The first one is related to the necessity to enhance the way in which methodological concepts are presented and conclusions are formulated in the Applicant's reference on the major scientific contributions. The second recommendation is to increase the share of sole-author publications as well as of those in which she is lead author.

Personal impressions

I do not personally know Assist. Professor Dr. Plamena Raykova - Tsankova and my assessment is based solely on the impression formed on the set of documents and materials submitted by the Applicant. It gives me reason to consider her as an ambitious young scientist with experience in monitoring seismicity in Bulgaria and surroundings, with knowledge and lasting interests in the field of statistical methods in seismology, spectral analysis of seismic events, and assessment of seismic hazard.

Conclusion

The materials submitted by the Applicant satisfy completely the requirements of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulations for its implementation, the Regulations on the Terms and Conditions for Acquisition of Scientific Ranks and Occupation of Academic Positions in BAS, and the Regulations for the DASRBA implementation in NIGGG-BAS.

I give a positive assessment of the Applicant's scientific and professional activity and recommend to the members of the Honoured Scientific Jury to propose to the Scientific Council of the National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences (NIGGG-BAS) for Assist. Professor Dr. Plamena Georgieva Raykova - Tsankova to occupy the academic position of Associate Professor in Professional field 4.4. Earth Sciences, scientific specialty Seismology and Internal Structure of the Earth in the Department of Seismology and Seismic Engineering at NIGGG-BAS.

Sofia,
February 07, 2022

Reviewer:

/Prof. D.Sc. Stefan Dimovski/