

## R E V I E W

**Regarding:** Competition for occupation of the academic position of *Professor* in higher education field 4. *Natural Sciences, Mathematics and Informatics*, professional direction 4.4. *Earth Sciences*, scientific specialty *Physical Geography, Landscape Studies and GIS*, as promulgated in the State Gazette, issue 21 of 13.03.2020, for the needs of the Geography Department of the National Institute of Geophysics, Geodesy and Geography of the Bulgarian Academy of Sciences (NIGGG–BAS), with only one Applicant, Assoc. Prof. Dr. Stoyan Nedkov.

**Reviewer:** Dr. Eugenia Roumenina, Professor at the Remote Sensing and GIS Department of the Space Research and Technology Institute of the Bulgarian Academy of Sciences (SRTI–BAS) in higher education field 4. *Natural Sciences, Mathematics and Informatics*, professional direction 4.4. *Earth Sciences*, scientific speciality *Remote Sensing*.

### **General presentation of the procedure**

The competition for occupation of the academic position of *Professor* was announced by the National Institute of Geophysics, Geodesy and Geography of the Bulgarian Academy of Sciences (NIGGG–BAS) in the State Gazette, issue 21 of 13.03.2020, and on the web site of the Institute: <http://www.niggg.bas.bg> with two-month term as of the date of its promulgation. The procedure was suspended on the same date (13.03.2020), according to § 24 of the Transitional and Conclusive Provisions of the Measures and Actions during State of Emergency Act declared by decision of the National Assembly of the Republic of Bulgaria of March 13, 2020 (§ 24. The terms established in the *Development of the Academic Staff in the Republic of Bulgaria Act* (DASRBA) and the *Higher Education Act which started running prior to this Act's taking effect shall stop running until the cancellation date of the state of emergency*). The procedure was resumed and organized on 14.05.2020 according to Order РД-01-262 of 14.05.2020 of the Minister of Health and Order I-62/10.03.2020 of the President of BAS.

The Review was prepared while implementing Order No.01-98/03.07.2020 of the Director of NIGGG–BAS, a decision on the procedure of the Scientific Jury (Protocol No.1/27.07.2020), and in accordance with the requirements of the DASRBA, the Enforcement Rules of the DASRBA and the Rules on the Terms and Conditions for Acquisition of Scientific Ranks and Occupation of Academic Positions in BAS and NIGGG–BAS.

Within the lawful two-month term for participation in the competition, only one Applicant has regularly filed his documents – Assoc. Prof. Dr. Stoyan Nedkov. He has been admitted to participate in the competition by a Committee specially appointed for the purpose by the Director of NIGGG–BAS in accordance with the Rules on the Terms and Conditions for Acquisition of Scientific Ranks and Occupation of Academic Positions in BAS. At its first session, the Scientific Jury decided unanimously that the materials submitted by the Applicant satisfy the relevant minimal national requirements and admitted Assoc. Prof. Dr. Stoyan Nedkov to assessment. This provides grounds to me to qualify the competition as one complying with all requirements of the *Development of the Academic Staff in the Republic of Bulgaria Act* and its Enforcement Rules.

The documents submitted by the Applicant by which he participates in the competition provide to make the following conclusions:

### **Assoc. Prof. Dr. Stoyan Nedkov satisfies the requirements for the announced competition:**

1. The Applicant has been occupying the academic position of *Associate Professor* for over 10 successive years at NIGGG–BAS and *St. Kliment Ohridski* University of Sofia, Department of Geology and Geography. Currently, he occupies this position at NIGGG–BAS. He holds certificate of *II rank Senior Researcher* (currently *Associate Professor*) issued by the *Higher Attesting Committee* (HAC) at the Council of Ministers of the Republic of Bulgaria in scientific

specialty *Physical Geography and Landscape Studies*, issued on 24.04.2009. This specialty falls entirely within the scope of the announced competition.

2. The Applicant's total length of service in the speciality of the announced competition is over 15 years.
3. The Applicant holds Diploma of the Educational and Scientific Degree (ESD) *Doctor* in scientific specialty *Physical Geography and Landscape Studies* issued by the HAC. The ESD *Doctor* has been acquired in 2003. The Doctoral Thesis is on the topic „Structure and Dynamics of Low-Mountain Landscapes in the Western Part of Central Bulgaria“. It falls entirely within the scope of the announced competition (Group A).
4. The Applicant has significant professional experience in the field of the announced competition. He has completed successfully three courses for operation with geographic information systems (GIS). These are: 1) AGWA (Automated Geospatial Watershed Assessment Tool) operation training course organized by the US Environmental Protection Agency (EPA); 2) Remote training course in Open Geographic Information Systems (OpenGIS) organized by the University of West Hungary, College of Geoinformatics, and 3) Remote GIS–ESRI training and education course which includes Migrating from ArcView 3.x to ArcGIS Desktop, Creating, Editing, and Managing Geodatabases for ArcGIS Desktop (for ArcGIS 9.0–9.1) and Learning ArcGIS Desktop (for ArcGIS 9.0–9.1). These courses boost materially his qualification both with respect to improvement and application of modern GIS technologies in landscape studies, as well as with respect to conducting lecturer's activity related with them.
5. Assoc. Prof. Dr. S. Nedkov has administrative experience, too. He has been Head of the Geographic Information Systems (GIS) Department, as well as of the Geography Department at NIGGG–BAS. Currently, he is Scientific Secretary of the same Institute. He has also been President of the Board of Directors of the Bulgarian Geographical Society between 2014 and 2018. He has been Leader of six national and international projects.
6. Assoc. Prof. Dr. S. Nedkov has been registered with the National Information and Documentation Centre (NIDC), where a list is kept of the publication with which he applied in the competition for *II Rank Senior Researcher*. During the implemented check-up, they were not included in the documents with which he applies for occupation of the academic position of *Professor*.
7. Assoc. Prof. Dr. S. Nedkov is author or co-author of 95 scientific works. During the period 1998–2020 these have been cited over 1 130 times. The check-up made on 15.09.2020 in the scientific information databases Scopus, Web of Science, and Google Scholar revealed that his h-index is 9, 6, 12, accordingly.
8. The references presented by Assoc. Prof. Dr. S. Nedkov for participation in the competition pertain entirely to his subject field and they display very good scientific metrics parameters. To participate in the competition, he has submitted 55 scientific works, allocated to indicator groups B and Γ, as follows: group B - 20 publications and group Γ – 35 publications. Of these, 25 have been published in leading dedicated issues, which are peer-reviewed and indexed in worldwide scientific information databases (Web of Science, and Scopus), whereas 4 of them fall within class Q1 (one of them ranking topmost), 2 – within class Q3, and 2 – within class Q4. Assoc. Prof. Dr. S. Nedkov is co-author of 3 collective monographs issued by Springer, Springer Geograph, and TerArt, accordingly. The total impact factor (IF) of his publications is 21.686 which evidences of their high quality. They have been cited (group Д) 554 times mostly in publications of foreign authors in scientific issues peer-reviewed and indexed in Scopus, Web of Science, and ERIH+. The evaluation of the Applicant's publications cited by the foreign authors evidence of their undoubted scientific value and positive effect on the development of the

subject field of the competition. Table 1 displays the quantitative assessment of the publications, information, and documents submitted by the Applicant in accordance with the minimal requirements for occupation of the academic position of *Professor* according to the Rules of NIGGG–BAS. In these Rules, the points under indicator groups  $\Gamma$  and  $\Delta$  have been augmented by 20% with respect to the minimal national requirements. As seen from Table 1, Assoc. Prof. Dr. S. Nedkov surpasses significantly the minimal requirements of the NIGGG–BAS as per the individual indicator groups. On the overall, he has 3 212 points more than the required minimum. I have not identified any „plagiarism” in the publications submitted by the Applicant.

**Table 1.** Quantitative evaluation of the documents submitted by Assoc. Prof. Dr. S. Nedkov in accordance with the minimal points by indicator groups, as required for occupation of the academic position of *Professor* according to the Rules of NIGGG–BAS.

Indicator group	Content	Satisfied by Assoc. Prof. Dr. S. Nedkov	Rules of NIGGG–BAS
<b>A</b>	<i>Indicator 1.</i> Dissertation Thesis for awarding the ESD <i>Doctor</i>	<b>50</b>	50
<b>B</b>	<i>Indicator 4.</i> Scientific publications (no less than 10) in editions which are peer-reviewed and indexed in worldwide scientific information databases	<b>316</b>	100
<b><math>\Gamma</math></b>	<i>Indicator 7.</i> Scientific publications in editions which are peer-reviewed and indexed in worldwide scientific information databases	61	220
	<i>Indicator 8.</i> Scientific publications in non- peer-reviewed journals with scientific reviewing or in edited collective volumes	255	
	<i>Total number of points for indicators 7 and 8</i>	<b>316</b>	
<b><math>\Delta</math></b>	<i>Indicator 10.</i> Citing or reviews in scientific editions peer-reviewed and indexed in worldwide scientific information databases or in monographs and collective volumes	<b>2770</b>	120
<b>E</b>	<i>Indicator 14.</i> Leadership of a Doctoral Student who has defended successfully his PhD Thesis	120	150
	<i>Indicator 15.</i> Participation in a national research or educational project	40	
	<i>Indicator 16.</i> Participation in an international research or educational project	100	
	<i>Indicator 17.</i> Leadership of a national research or educational project	60	
	<i>Indicator 18.</i> Leadership of an international research or educational project	80	
	<i>Sum of the indicators from 14 to 18</i>	<b>400</b>	
<b>Total</b>	Total number of points for indicator groups A, B, $\Gamma$ , $\Delta$ , and E	<b>3852</b>	<b>640</b>

The documents submitted under the competition reveal, with respect to indicator group E and additionally outside it, that Assoc. Prof. Dr. S. Nedkov has significant contribution to the lecturer's, research and application, and editorial activity related with the specialty Physical Geography, Landscape Science, and GIS: 1) He has been Leader of three Doctoral Students who have defended successfully their PhD Theses; 2) He has developed and is leading three

dedicated courses for Doctoral Students in the field of Geoinformation Technologies at the Educational Centre of BAS; 3) He is author of three Master courses and two Bachelor courses, which he has led at the St. Kliment Ohridski University of Sofia, Department of Geology and Geography, Chair of Cartography and GIS during the period 2013–2015. Since 2020 he is author and lecturer of two Bachelor courses at the St. St. Cyril and Methodius University of Veliko Tarnovo in the field of Landscape Science, Preservation of the Environment, and Landscape Planning; 4) He is Leader of 3 and has participated in 4 national research projects financed by the Ministry of Education and Science (MES) of the Republic of Bulgaria, the Sofproekt – Urban Planning Municipal Enterprise, the Bulgarian National Science Fund (BNSF) at MES, the Standing Committee for Protection of the Population during Natural Disasters, Averages and Catastrophes (SCPPNDAC) at the Council of Ministers and the Ministry of Environment and Water (MEW) of the Republic of Bulgaria. He is Leader of 2 and participant in 4 international projects financed by the European Committee: the Programmes „Horizon 2020“, the Seventh Framework Programme and COST, the Bulgarian-Swiss Research Programme at MES, the German Science Fund, the NATO/CCMS Programme; 5) He is member of the international editorial boards of 2 research journals: One Ecosystem, Plos One, and Chief Editor of the Journal of the Bulgarian Geographical Society. He also participates as guest editor in 4 international research issues.

9. Assoc. Prof. Dr. S. Nedkov is member of 4 scientific organizations: he is member of the Steering Committee of the Ecosystem Services Partnership (ESP), the International Association of Landscape Ecology (IALE), the Bulgarian Geographical Society, and the Bulgarian Cartographic Association.
10. The research activity of Assoc. Prof. Dr. S. Nedkov is mostly related with working with foreign and Bulgarian scientists and teams, on account of its interdisciplinary nature. The documents submitted under the competition are not accompanied by allocation protocols for equity participation of the authors which makes me believe that the contributions are common according to art. 8(1) of the *Copyright and Related Rights Act*. The Applicant has 7 sole author publications and he is the first or second author of 60% of the collective works.

### **Major scientific contributions of the Applicant**

The scientific profile of Assoc. Prof. Dr. S. Nedkov is one of an internationally recognized leading scientist in the field of Physical Geography, Landscape Studies and GIS, as seen from the submitted documents under the competition. His rich professional, theoretical and practical experience, as well as his joint work with international and national teams of scientists provides him the possibility to apply innovative interdisciplinary approach in his scientific activity related with the object field of the announced competition. The contributions of the Applicant have been clearly formulated in the *Author's Reference on the Contributory Nature of the Publications* enclosed with the documents under the competition and I accept them unreservedly. These pertain mainly to three thematic directions:

- 1) *Development and improvement of the methodology of landscape studies and the application of the landscape concept for mapping ecosystem services.* A methodological approach has been designed which develops further the methodology for landscape classification and gives proof of the relationship between landscape structure and ecosystem services. An original nine-step approach has been proposed for mapping ecosystems and evaluation of the services they provide at various spatial levels as part of the methodological framework developed by the MAES (Mapping and Assessment of Ecosystems and their Services) Working Group of the European Commission, and methodological directions for its application at national level for the various regions of study have been developed. Jointly with three German scientists, an application-friendly concept for mapping ecosystem services has been developed, based on information about landscapes, earth cover, and quality assessment metrics (B4\_3). It has been published in

journal IF 4.307 of the Q1 class and has been applied and cited multiple times by foreign authors. The concept has been applied for assessment and mapping both of several individual ecosystem services, as well as of a set of services for different territories. Jointly with two foreign scientists, the Applicant has developed the methodological basics for mapping of ecosystem services as a component of the sustainable management of environment. Their application has been demonstrated at scientific fora, as a result of which 34 special issues of scientific journals summarized in editorial papers with Assoc. Prof. Dr. S. Nedkov as co-author have been drawn. One of them has been published in journal IF 4.307 of the Q1 class and it is on top of the ranking list of Web of Science.

In this direction, Assoc. Prof. Dr. S. Nedkov has: 22 publications, 15 of which have been peer-reviewed journals and indexed in *Web of Science and Scopus* (B4\_1, B4\_3, B4\_5, B4\_7, B4\_8, B4\_9, B4\_10, B4\_11, B4\_14, B4\_15, B4\_16, B4\_18, Г7\_2, Г7\_4, Г7\_5, Г8\_1, Г8\_17, Г8\_18, Г8\_19, Г8\_26, Г8\_27, Г8\_30). Nine of them have been cited 326 times.

- 2) *Application of geoinformation technologies for sustainable management of the environment and information provision of research and managerial activities with GIS-based information and cartographic products.* A methodological approach for modelling and mapping of the ecosystem service „regulation of water flows and protection from floods“ has been developed. It provides to identify and map both the regions which generate such type of services, as well as the regions where a need for their consumption is available. It is based on the application of GIS-based tools for hydrological modelling and spatial analyses in combination with methods for evaluation of landscape capacity and its functions to retain water from vegetation and soil. The approach has been approbated for the basin of the Malki Iskar river above the town of Etropole, it has been published in (B4\_2) in journal ISI IF:3.19 of the Q1 class, and it has been applied and cited multiple times by foreign authors. During the recent years, it has been developed further by the Applicant and has been applied on various regions at home and abroad. GIS-based approaches, databases and cartographic products have also been developed to assist the study of the risk of dangerous natural phenomena with respect to various human activity aspects. A geospatial approach has been implemented to map and evaluate the ecosystem services provided by urbanized national-level ecosystems in relation with the activities under an application of the EU Biodiversity Strategy and the MAES initiative. The approach combines methods for evaluation and mapping of 21 services organized in 7 GIS-based modules, distributed in 3 tiers. It is based both on previous researches of the Applicant, as well as on the experience of the interdisciplinary team of Bulgarian scientist established by him. The approach has been published in (B4\_19) in scientific journal IF 0.567 of the Q3 (Scopus) class with leading author Assoc. Prof. Dr. S. Nedkov.

In this direction, Assoc. Prof. Dr. S. Nedkov has a total of: 16 publications, 7 of which have been peer-reviewed journals and indexed in *Web of Science and Scopus* (B4\_2, B4\_6, B4\_13, B4\_19, B4\_20, Г7\_1, Г7\_3, Г8\_8, Г8\_13, Г8\_15, Г8\_16, Г8\_21, Г8\_22, Г8\_25, Г8\_28, Г8\_29). Five of them have been cited 220 times.

- 3) *Physicogeographic studies of the risk of dangerous natural phenomena on the territory of the country, analysis and assessment of the ecological and paleogeographic status of high-mountain territories.* An original approach has been developed to assess the influence of the climatic changes related with increase of the quantity and intensity of torrential rains on river outflow in case of river high water. It provides to determine the phases of change of river outflow as a result of the increasing amount of the precipitations and to identify the critical points associated with danger of floods. A number of theoretical and practical and applied aspects related with the assessment of the danger and risk of floods and the application of outflow analysis models in case of river high water have been studied. Jointly with Prof. Dr. M. Nikolova, the Applicant has

developed a methodological approach for differentiation of the territory of the country with respect to the risk natural calamities present to cultural and historical heritage, and application of GIS for regionalisation of territories with high concentration of dangerous natural phenomena and archaeological objects. Various aspects of the risk of natural disasters and the application of geoinformation technologies during the conducting of spatial analyses and development of assessment models and maps have been studied. With his expertise, Assoc. Prof. Dr. S. Nedkov has also participated in 2 research projects. One of them develops a monitoring system for high-mountain ecosystems and assessment of their ecological status and the other one conducts studies of the glacial and periglacial relief in relation with the clarification of the paleogeographic development of high-mountain territories.

In this direction, Assoc. Prof. Dr. S. Nedkov has a total of: 17 publications, 3 of which have been peer-reviewed journals and indexed in *Web of Science and Scopus* (**B4\_4**, **B4\_12**, B4\_17, Г8\_2, Г8\_3, Г8\_4, Г8\_5, Г8\_6, Г8\_7, Г8\_9, Г8\_10, Г8\_11, Г8\_12, Г8\_14, Г8\_20, Г8\_23, Г8\_24) . Two of them have been cited 9 times.

The three directions in which Assoc. Prof. Dr. S. Nedkov has material scientific contributions are developed successfully in the Geography Department of NIGGG–BAS, for which the competition has been announced. The publication activity of the Applicant and his participation in international and national projects show that he works successfully in teams and is capable of leading them with the competence which is required of the academic position for which he applies.

I have no joint publications with Assoc. Prof. Dr. S. Nedkov, nor have participated in any projects where he was leader or participant.

### **Final conclusion**

Based on the above conclusions for the Applicant in the competition for occupying the position of **Professor**, I issue the following opinion:

The materials submitted by Assoc. Prof. Dr. S. Nedkov satisfy completely and exceed greatly the recommended requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Rules of NIGGG–BAS for its application in occupying the academic position of *Professor*.

I give unreserved positive assessment of the submitted materials with respect to the scientific and research activity and pedagogical activity of the Applicant which features high professional level. I believe that, as leading researcher in the field of the scientific specialty *Physical Geography, Landscape Studies, and GIS*, he will contribute to the development of the Geography Department and NIGGG–BAS.

With deep conviction I recommend to the Honoured Scientific Jury to propose to the Scientific Council of NIGGG–BAS for **Assoc. Prof. Dr. S. Nedkov to occupy the academic position of Professor** in higher education field 4. *Natural Sciences, Mathematics and Informatics*, professional direction 4.4. *Earth Sciences*, scientific speciality *Physical Geography, Landscape Studies, and GIS*, in the Geography Department of NIGGG–BAS.

Reviewer: .....

(Prof. Dr. E. Roumenina)