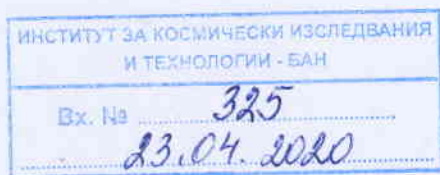


TO: CHAIRMAN OF SCIENTIFIC JURY  
ON COMPETITION FOR ACADEMIC  
POSITION "ASSOCIATE PROFESSOR"  
AT SRTI BAS,  
PROF. DR. RUMEN NEDKOV



## REVIEW

by

Prof. Dr. Mariana Nikolova

National Institute of Geophysics, Geodesy and Geography at BAS, Department "Geography",  
section "Geographic Information Systems",

member of the jury in a competition for the occupation of the academic position "Professor",  
announced in the State Gazette. 98 by 13.12.2019 from the Institute for Space Research and  
Technology-BAS in the field of higher education 4. Natural sciences, mathematics and  
informatics, occupational strand 4.4 Earth sciences, Scientific specialty "Remote sensing of  
the Earth and Planets" for the needs of section "Remote sensing and GIS" with candidate  
Assoc. Prof. Dr. Georgi Zhelev.

The review was written in accordance with the Development of Academic Staff in the  
Republic of Bulgaria Act (DASRBA) and the Regulations for its implementation, Regulations  
on the Terms and Conditions for Acquiring of Academic Degrees and Occupation of  
Academic Positions at the Bulgarian Academy of Sciences, and the Regulations for the  
implementation of the DASRBA in SRTI BAS, pursuant to a decision by a Scientific Jury  
appointed by Order No 14/24.01.2020 of the Director of SRTI BAS and Protocol No. 1 of the  
meeting of the Scientific Jury.

### **Details about the candidate**

Georgi Nikolaev Zhelev is the only candidate in the competition. The documents  
submitted by him are fully compliant with the conditions of the competition and the rules for  
its application. The candidate is graduated from the Geological School at the University of  
Mining and Geology "St. Ivan Rilski" in 1995 as engineer-geologist in exploration of mineral  
resources and master degree as geologist in ore and nonmetallic minerals. He worked for short  
time in the Geological Institute at BAS, and from 2000 he was on permanent job in Institute  
for Space Research and Technology at Bulgarian Academy of Sciences (SRTI – BAS). From  
2003 to 2010 he grew up from a specialist to a chief assistant. In 2013, he defended a PhD in  
scientific specialty "Remote sensing of the Earth and Planets" at SRTI - BAS. In 2015, he

acquired the scientific title of "Associate Professor" in the same institute. The candidate speaks Bulgarian, English and Russian.

From 2010 to now Georgi Zhelev held in succession the following managerial positions in SRTI and BAS: Chairman of the General Assembly of SRTI-BAS from (2010-2011), Head of Laboratory "Field sub-satellite measurements" (2015 – 2020), Member of "Commission for Young Scientists" at the VII-th General Assembly (GA) of BAS (2016 – 2020), Member of the VII GA of BAS (2016 – 2020), Member of Scientific Council of SRTI-BAS and Deputy Director of SRTI-BAS from 2019 until now.

The candidate is the winner of two certificates for contribution to the development of space studies on the occasion of 40th and 50th anniversary of SRTI BAS and the collective prize "Varna 2014" for the implementation of the project "MARINGEOHAZARD-BLACK SEA EARLY WARNING SYSTEM". The candidate is a member of the team received a certificate of Utility model for integrated system for remote determination of agriculture crops in 2019.

### **Scientific-research and scientific-applied activities**

Assoc. Prof. Dr. Georgi Zhelev works exclusively in the field of remote sensing methods, validation of satellite data, Geographic Information Systems (GIS), specialized unmanned capture systems (drones), geology, geomorphology and georisk in the environment. Assoc. prof. Dr. Georgi Zhelev is the author of a scientific monograph on his PhD thesis, 8 studies (two of which are in print), 10 articles published in journals with JCR, SJR or ISI impact-factor, 44 papers published in proceedings of international conferences and 4 in proceedings from national conferences. A list of participations in other scientific forums and seminars with 18 posters and 87 presentations is presented. The candidate also co-authored in 5 reports on the National Geofund at MOEW. The full list of quoted works by Assoc. Prof. Dr. Zhelev includes 34 publications quoted in 104 sources.

The candidate was involved in a total of 12 major international projects (EU, ESA, NATO, etc.), 29 projects further financed under contracts with ministries, institutions and companies from the country, 3 in inter-academic bilateral cooperation and 13 projects financed by a budget subsidy of BAS.

### **Implementation of the National minimum requirements for the occupation of the position "Professor"**

Assoc. Prof. Dr. Georgi Zhelev participates in this competition with 29 publications, of which 5 are accepted for printing with assurances notes for this by the publisher. Of these, he is the only author of 8, of 4 publications the candidate is the first author and the rest are co-authored. There are no declarations for the distribution of the copyright in the articles and therefore we accept it as equivalent between all authors. Separately are presented a list of 6 publications from the competition for the degree "Doctor" and another, with 66 publications, from the competition for acquiring the scientific title "Associate Professor".

In the author's reference on the implementation of the minimum national requirements for the occupation of the academic position "Professor" are presented equivalent to a monographic work 10 publications in editions, which are referenced and indexed in the world-famous databases with scientific information, with indices B4\_1, B4\_2, B4\_3, B4\_

4, B4 \_ 5, B4 \_ 6, B4 \_ 7, B4 \_ 8, B4 \_ 9 and B4 \_ 10. Total per item B the applicant has 106 points.

A book was published on the basis of PhD thesis for the awarding of "Doctor" degree with the title "Research of Vulcanogenic Structures in the Eastern Rhodopes by Remote Sensing methods and GIS" (2013)( G6\_ 1). In addition, two separate scientific publications are presented in editions, which are referenced and indexed in the World databases with scientific information - G7 \_ 1 and G7 \_ 2. Scientific publications in non-referenced journals with scientific review or in edited collective volumes are 16: G8 \_ 1, G8 \_ 2, G8 \_ 3, G8 \_ 4, G8 \_ 5, G8 \_ 6, G8 \_ 7, G8 \_ 8, G8 \_ 9, G8 \_ 10, G8 \_ 11, G8 \_ 12, G8 \_ 13, G8 \_ 14, G8 \_ 15, G8 \_ 16. Totally by item G the applicant has 240 points.

The author's reference for citations shows that 21 publications have 61 citations. According to the author's reference for the implementation of the minimum national requirements, the quotations in the world-famous databases with scientific information or in the monographs and collective volumes are 23 and the quoted works are 4. Quotations in non-referenced journals with scientific review are 4 and the cited publications are 2. Totally for group D, the applicant has 123 points.

According to the report on the scientific and applied activity, the applicant participated in 5 national (E15\_ 1, E15\_ 2, E15\_ 3, E15\_ 4, E15\_ 5) and 5 international scientific projects (E16\_ 1, E16\_ 2, E16\_ 3, E16\_ 4, E16\_ 5). Ass. Prof. Dr. Georgi Zhelev has managed three nationally funded projects (E17\_ 1, e17\_ 2, E19 \_ 1) and has a recognized collective application for a Useful model (3283 U1/27.09.2019), for "Integrated system for remote determination of the state of agriculture crops", ICITE-BAS, 2019, (E23 \_ 1). The indicators from group E have a total of 234 points.

In addition, the author's reference on the created Geoinformation products, comprising seven specialized geo databases created by the applicant, is also presented. On the basis of the submitted documentation on the competition we can confirm that the national requirements for the scientific title "Professor" (Articles 2b, para. 2 and 3, respectively the requirements of article 2b, para. 5) are fulfilled by the applicant.

### **Scientific contributions**

The main contributions from the research and scientific-applied activities of the candidate are related to the development and transfer of remote sensing technologies to Earth observation, Geographic Information Systems (GIS), terrestrial methods for exploration of the natural environment and with the remote and ground monitoring of agricultural crops. In particular, they shall consist of the following:

- A methodology has been developed for evaluating and mapping the status of agricultural crops using multispectral imagery from satellites SPOT5/HRG2\_XS and Sentinel-2a and 2a, from the specialized unmanned aircraft system (UAV) with the Parrot Sequoia camera and verified with ground data. The application of the methodology is for permanent monitoring of the operational monitoring in respect of the observed crops by cartographic products (B4 \_ 6; B4 8; G8 \_ 6; G8 \_ 8; G8; E16\_2; E17\_1; E19\_1; E23 \_ 1 (patent) and geo-information product No 2 on the list).
- The efficiency of the mapping of crops is assessed by using low-and medium-weight satellite imagery. The applied approach confirms that data from Sentinel-2 can be used



effectively to create accurate maps for the type of crops in different agricultural areas in Bulgaria (B4 \_ 1; B4 \_ 5; B4 \_ 7; G8 \_ 2; G8 \_ 5; E16\_4; E16\_5 and geo-informative product No 4 and 5 of the list).

- Regression models are developed for the calculation of biophysical parameters of crops based on a set of vegetation indices using multiband images from satellites Sentinel-2a and 2a and from specialized UAV, and the models are verified with ground data (Q4 4; Q4.9; G8 \_ 8; G8; E16\_2; and geo-Information product Nos 2 and 3 on the list).
- A methodology for the application of satellite and terrestrial data was developed for the investigation of the land cover, geomorphological sites and tectonic processes. There is also a geo-database for model test karst areas on the territory of the country (Q4 \_ 2; Q4 \_ 3; B4 \_ 10; 6 \_ 1; G8 \_ 4; G8 \_ 8; G8 \_ 11; G8 \_ 15; E15 \_ 1; E17\_2; E16\_3 and geo-information product Nos 1 and 7 on the list).
- The possibilities and advantages of remote sensing are used for precise determination of the water-land boundary. Geomorphological and geological characteristics of the Black Sea zone (up to 50 km distance from the coast) are defined on the Republic of Bulgaria through the complex use of satellite multispectral images, digital model of relief and its derivatives. A classification is made and systematized the diversity of the most widely used types of UAVs and scientific equipment for them in the context of their use as a source of remote information for the assessment of land sites (G7 \_ 1; G7 \_ 2; G8 \_ 3; G8 \_ 7; G8 \_ 8; G8; G8; A8 \_ 16; E15\_5 and geo-information product No 6 on the list).

We believe that the scientific and applied contributions from the author's pack are defended convincingly in the scientific publications and applied research of the candidate. Moreover, they are essential for optimizing the application of remote sensing methods and geoinformation technologies for monitoring and management of the environment.

#### **Teaching, review and expert activities**

Assoc. Prof. Dr. Georgi Zhelev teaches "Geoinformation Systems in Ecology" (30 teaching hours) at the New Bulgarian University. He has participated in 5 exam commissions in SRTI and IIT. He has prepared a PhD student in the period 2016-2019, which is forfeit with a right of thesis defence. He took part in nine public events with public lectures, demonstrations, exhibitions, etc. He is also a member of the Expert Commission of the Department "Astronomy, Space research and technology"- BAS. Assoc. Prof. Dr. Georgi Zhelev has performed a constituent and editorial work of six collections of papers from scientific forums. He has prepared two opinions in his capacity as a member of the Scientific Juries in 2016 and 2018.

4

#### **Recommendations**

In view of the applicant's long-standing research experience and his work on a number of major national and international projects, we recommend systematizing the results of his work in a monographic work.

#### **Conclusion**

From the review of the competition materials and the verification made, no violations of the procedure were found. The requirements of the DASRBA and rules of its application, as well as those of their application in SRTI have been complied.

The minimum requirements for the occupation of the academic position "Professor" in accordance with the Regulations for acquisition of scientific degrees and occupation of academic positions in BAS, respectively of the requirements of art. 2b of the DASRBA had been fulfilled. According to the presented report for implementation of the minimum requirements and the inspection carried out, Dr. Georgi Zhelev has a total of **753** points for the required to occupy the post in BAS 640, exceeding the mandatory minimum for each of the groups of indicators B, G, D and E. The presented scientific production for participation in the competition is in sufficient volume, at a high scientific level, contains scientific and applied contributions and does not include publications presenting the result of his doctoral thesis or other from the previous competition for the position "Associate Professor".


In addition to sufficient research and educational activities, the applicant has substantial management experience in the field of science and participation in bodies of management of BAS and SRTI, participation in expert bodies in the field of science and higher Education, reviewer and editorial work, participation in examination commissions, organizing and programme committees of scientific forums, public lectures and other public appearances.

**Based on these conclusions and the compliance of the competition documents with the requirements of the DASRBA, I give a positive assessment of the scientific works presented for the competition and I recommend the Scientific Jury to select Assoc. Prof. Dr. Georgi Zhelev for the academic position "Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, occupational strand 4.4 Earth sciences, Scientific specialty "Remote Sensing of the Earth and the Planets" for the needs of section "Remote Sensing and GIS" at the Institute for Space Research and Technologies – BAS.**

16.04.2020.

Sofia

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