

## REVIEW

by Prof. Dr. Eng. Martin Banov - Chairman of the Agricultural Academy, Sofia

in connection:

with a competition for the academic position of "Professor", announced in the State Gazette No. 98 of 13.12.2019 by the Institute for Space Research and Technology at the Bulgarian Academy of Sciences (ISRT-BAS). The competition is in the field of higher education 4. Natural sciences, mathematics and informatics, professional field: 4.4 Earth sciences, scientific specialty "Remote sensing of the Earth and the planets", for the needs of the section "Remote sensing and GIS" at the Institute of Space Research and Technology - BAS.

I prepared this review by virtue of:

Order № 14 of 24.01.2020 of the Director of the Institute for Space Research and Technology - BAS and according to a decision of the scientific jury (Minutes № 1 / 17.02.2020). The review complies with the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for its implementation, the Rules of BAS and the Rules of ISRT for the application of LDASRB.

### The only candidate in the competition:

Associate Professor Dr. Georgi Zhelev  
from the Institute for Space Research and Technology - BAS, Section "Remote Sensing and GIS"

#### **1. Brief biographical data**

Associate Professor Dr. Georgi Zhelev was born on November 4, 1969.

In 1995 he graduated as a master geologist in ore and non-ore minerals (Geological Engineer in ore and non-ore minerals) at the University of Mining and Geology "St. Ivan Rilski" - Sofia.

In 2013 he obtained the educational and scientific degree "Doctor" by defending a dissertation on "Study of volcanic structures in the eastern Rhodopes by remote sensing and GIS" at the Institute of Space Research and Technology - BAS.

In the period from 2000 to 2003 the candidate worked as a specialist at the Institute for Space Research and Technology - BAS, and in the period from 2003 to 2015 he was successively a research associate III - I degree and chief assistant at the same institute, section "Remote sensing and GIS".

In 2015 he was elected associate professor at the Institute for Space Research and Technology - BAS, Section "Remote Sensing and GIS".

In the biography of Assoc. Prof. Zhelev it is necessary to note that he has consistently held a number of responsible positions at the Institute, such as: Deputy

Director; member of the Scientific Council; member of the General Assembly of BAS; member of the "Commission for Young Scientists" at the General Assembly of BAS; Head of the Laboratory "Field Satellite Measurements"; Chairman of the General Assembly of the Institute.

Associate Professor Georgi Zhelev uses Russian and English at a good level.

## **2. General description of the presented materials**

The scientific and scientific-applied activity of Assoc. Prof. Zhelev is presented in a total of 185 publications, which are in the form of monographs, books, articles in scientific journals, reports from international and national scientific forums and posters. From the mentioned materials, Assoc. Prof. Georgi Zhelev participated in the competition with a total of 51 pieces publications, posters and reports, which can be classified as follows:

In publications that are referenced and indexed in world-famous databases with scientific information - 12 pcs.

In unreferred journals with scientific review or in edited collective volumes - 16

Reports of an international or national forum with foreign participation (conference / congress) - 16

Poster of an international or national forum - 7

In the scientific publications listed in this way, Assoc. Prof. Zhelev is the first author of 17 of them, the second author is 5 of them and in the rest it is in the next place.

For the collective publications there is no information about the personal participation of the candidate, therefore I accept it as equal to the other authors.

## **3. Reflection of the candidate's scientific publications in the literature**

The scientific works of the candidate have been cited a total of 104 times and in the period after his habilitation the number of citations amounts to 27.

From the set of materials submitted to me for review, it is clear that the documentation is complete, clearly arranged, and all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria have been met.

The scientific papers have been published in authoritative periodical scientific journals, in scientific proceedings of international symposia and conferences, by national scientific forums with international participation and by national scientific forums.

The review of the materials presented by Assoc. Prof. Georgi Zhelev shows that they meet the relevant minimum national requirements and those of ISRT-BAS for holding the academic position of "professor".

#### **4. General characteristics of the candidate's activity**

##### **4.1. Scientific and scientific-applied activity**

Associate Professor Zhelev is a leader and participant in a total of 12 research and practical projects. Attached to the documentation, a complete list of projects shows that the applicant has been the leader of two national research projects, lasting one and three years, respectively, on the basis of which BGN 20,000 were raised for the Institute. Apart from that, he is a participant in ten other scientific and educational projects, five of which are international. In the implementation of these projects Assoc. Prof. Zhelev was an active participant, which is confirmed by the submitted reports.

Associate Professor Zhelev is part of the team that registered a utility model with Reg.№ 3283 U1 / 27.09.2019 - "Integrated system for remote determination of the condition of crops".

For the period 2016-2019 he is the head of a doctoral student expelled with the right to defense, full-time form of education, in the section "Distance research and GIS" at IKIT-BAS. Topic of the dissertation: "Assessment of the condition of rapeseed crops in Northeastern Bulgaria using satellite and terrestrial data."

Conducts a lecture course on "Geoinformation systems in ecology" at the New Bulgarian University.

Associate Professor Zhelev is a guest lecturer at scientific and popular science forums, participates in examination commissions, is a member of commissions for competitions for academic positions, is part of the organizing committees of six international conferences and is in the editorial teams of scientific journals.

#### **4.2. Yields**

The research and scientific-applied activity of Assoc. Prof. Zhelev is related to the development, improvement and transfer of methods for environmental research with integrated use of remote sensing technologies, geographic information systems (GIS) and ground-based methods.

The goals and objectives of the presented developments are clear and well justified. The candidate has good preparation and in-depth knowledge of the studied issues. Scientific publications address extremely important issues related to remote and ground monitoring of crops and the development and transfer of technologies for remote monitoring of the Earth.

The candidate's contributions are summarized thematically in two directions:

1. Remote and ground monitoring of agricultural crops, based on the developed and tested methodology for assessment of the condition of agricultural crops related to the use of multispectral images from the satellites SPOT5 / HRG2\_XS and Sentinel-2a and 2b, the data are organized in a specialized geo-database. As a final result, it was created together with experts from ISSAPP "N. Pushkarov", an experimentally tested and patent-protected integrated system for remote determination of the condition of crops.

The efficiency of mapping of agricultural crops on satellite images with different spatial resolution was evaluated and the accuracy of determining the parameters of crops from agricultural crops through a set of vegetation indices was evaluated.

2. Development and transfer of technologies for remote Earth observation, geographic information systems (GIS) and ground-based methods for studying the natural environment.

In this regard, a methodology for the application of satellite and ground data in the study of land cover, geomorphological objects and tectonic processes has been developed, using data from different satellites. The obtained results are organized in geo-databases and are processed in GIS environment. A geo-database for model, test karst areas on the territory of the country has also been created.

Regarding the transfer of technologies for remote sensing of the Earth during landscape-ecological monitoring, the possibilities and advantages of remote sensing for accurate determination of the water-land boundary in the study of the change of the water mirror of Studena Dam and in determining the characteristics have been

successfully used. of the coastline of the country, its fractal dimension and curvature. The geological and geomorphological characteristics of the Black Sea zone (about 50 km distance from the coast) of the Republic of Bulgaria are determined through the complex use of satellite multispectral images, digital model of the relief and its derivatives. A geo-database has been built.

The scientific and scientific-applied contributions of the candidate are briefly, clearly and synthesized and reflect the most characteristic aspects of his activity.

A good impression is made by the practical orientation in the work of Assoc. Prof. Zhelev, which is generally aimed at solving specific problems at regional and national level.

Not a small share of the applicant's scientific output deals with issues and problems related to satellite observations of agricultural areas and assessment of accuracy in mapping land use / land cover, and in his research the candidate skillfully uses geo-information products.

A good impression is made by the precise indication of the publication, which is related to the formulation of a certain contribution.

## **5. Critical notes**

Regarding the overall research and applied research of Assoc. Prof. Zhelev, I have the following remarks and recommendations:

5.1. I believe that the remote survey of agricultural land and the conduct of landscape-ecological monitoring must find concrete realization by promoting the candidate's achievements to the relevant administrative services.

5.2. In my opinion, it is necessary to look for economic efficiency in each of the developments - assessment of the costs for implementation of the respective methodology, technology, etc.

5.3. It is recommended that the contributions be divided into scientific and applied.

## **6. Personal impressions**

I know Assoc. Prof. Georgi Zhelev personally and I have direct impressions of his research and applied research. In my opinion, he is a researcher with his own style of work, a well-built researcher who enjoys respect among his colleagues from

the Institute, regardless of their rank and administrative position. It is characterized by ability to work, professional competence, responsibility and creative activity.

The large scientific volume presented by Assoc. Prof. Zhelev is aimed at the development, improvement and transfer of environmental research methods with integrated use of remote sensing technologies, geographic information systems (GIS) and ground-based methods.

## 7. Conclusion

Based on all the above, I believe that the documentation and evidence submitted for review have their current scientific and scientific merits, reliably reflect the scientific contributions of Assoc. Prof. Georgi Zhelev, cover the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and these of ISRT-BAS, which in my opinion means that the candidate Associate Professor Dr. Georgi Zhelev can successfully take the academic position "Professor" in the field of higher education 4. Natural Sciences, Mathematics and Informatics; professional field: 4.4. Earth Sciences; scientific specialty "Remote Sensing of the Earth and the Planets", for the needs of the section "Remote Sensing and GIS" at the Institute of Space Research and Technology - Bulgarian Academy of Sciences.

I recommend that the esteemed members of the Scientific Jury vote in favor.

May, 2020 г.

Sofia

Reviewer: 

Prof. Dr. Eng. Martin Banov

ВЯРНО С ОРИГИНАЛА

