



REVIEW

on the materials for participation in a competition for occupation of the academic position "Professor", domain of higher education 5. Technical science, professional field 5.7. Architecture, Civil Engineering and Geodesy, scientific specialty "Photogrammetry and Remote Sensing", in academic discipline "Photogrammetry and Remote Sensing", announced by University of forestry - Sofia in State Gazette issue 102/08.12.2023, code of the procedure FOR-P-1123-111

Applicant to participate in a competition:

1. Assoc. Prof. Ph.D. Maria Tsankova Asenova

Reviewer: Ph.D. Radka Georgieva Koleva, Assoc. Prof. in professional field 5.7. Architecture, Construction and Geodesy, University of forestry – Sofia

1. Brief biographical data about the candidate

Assoc. Prof. Ph.D. Maria Asenova graduated in 1987 with a master's degree in Geodesy, Photogrammetry and Cartography at the Higher Institute of Architecture and Construction. In 2014, she defended her doctoral thesis on the topic: "Optimization of the structure of databases and spatial analysis in specialized GIS for forests" and obtained the educational and scientific degree Ph.D.

Her professional growth began in 1987 - at the Higher Institute of Forestry as a research engineer in Scientific Research Centre. Since 1989, she has been an assistant, since 1993 – senior assistant and since 1997 – head assistant. In 2017, she occupied academic position "Assoc. Professor". In 2022, she was elected as the Head of the Department of "Forest Management" at Faculty of Forestry in University of forestry (UF). Since 2020, she is Vice Chairman of the General Assembly of the Faculty of Forestry in UF and from 2024 – Chairman. She is a member of the Management Board of the Geodesy Union in Bulgaria at the Federation of Scientific and Technical Unions (GUB-FSTU) from April 15, 2021 and of the Editorial Board of the journal "Geodesy, Cartography and Land Management" from 2022. She is a member of 3 scientific and professional organizations – GUB-FSTU (1989), the Bulgarian Cartographic Association (2016) and the Bulgarian Geographical Society (2018).

Assoc. Prof. Ph.D. Maria Asenova speaks English and Russian at a very good level. She has excellent skills in working with geodetic, photogrammetric and GNSS equipment, as well as with software packages for data processing and GIS.

2. Compliance of submitted documents and materials of the applicant with those required under the Regulations on the Development of the Academic staff in the University of forestry

The applicant for participation in the competition, Assoc. Prof. Ph.D. Maria Asenova, has submitted all the necessary documents required by the of the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations for the Development of the Academic Staff in UF. They are consistently described in the submitted application for participation in the competition.

The applicant Assoc. Prof. Ph.D. Maria Asenova has presented an accurate report on compliance with the minimum national and institutional requirements for the individual groups of indicators with indicated titles and their corresponding number of points. The quantitative assessment of the publications, references and documents presented by the candidate in accordance with the minimum requirements for occupying the academic position "Professor" in scientific field 5. Technical sciences, professional field 5.7. Architecture, Civil Engineering and Geodesy is presented in the table:

Group of indicators	Indicator	Minimum required points for Professor	Completed points by the candidate
A	Dissertation work	50	50
V	Monograph	100	100
G	Publications	200	626.99
D	Citation	100	169
E	Projects	150	158.33
	Total:	600	1104.32

As can be seen both from the table and from the relevant references, with the total number of 1104.32 points, Assoc. Prof. Ph.D. Maria Asenova significantly exceeds the minimum national requirements for occupation the academic position "Professor" in scientific field 5. Technical sciences, professional field 5.7. Architecture, Civil Engineering and Geodesy.

3. Assessment of the educational and teaching activities of the applicant

Assoc. Prof. Ph.D. Maria Asenova is an erudite, demanding and dedicated teacher with over 30 years' experience. She conducts lectures, exercises and educational practices in 3 faculties (Faculty of Forestry, Faculty of Ecology and Landscape Architecture and Faculty of Agronomy) in

4 specialties (Forestry, Landscape Architecture, Ecology and Environmental Protection, Plant Protection) in the disciplines – "Photogrammetry and Remote Sensing", "Geographic information systems (GIS)", "GIS and Remote Sensing", "Geodesy", "Geodesy and Vertical Planning" and "Specialized Applications of GIS". She is the co-author of a Textbook on Photogrammetry and Remote Sensing and a Guide for Exercises in Geodesy. Author of a Working Guide for MapInfo Professional in Developing GIS Projects and GIS Electronic Modules for Blackboard. She is the supervisor of 16 graduates who successfully defended their diploma theses. Since 2016, she has been the head of the GIS study group at UF.

Assoc. Prof. Ph.D. Maria Asenova organizes and leads the learning process at a high academic level, and her professional qualities contribute to the students' motivation and their high results in the acquisition of contemporary knowledge and competencies.

4. Evaluation of the candidate's scientific, applied scientific and publication activity

4.1. Participation in scientific, scientific-applied and educational projects

Assoc. Prof. Ph.D. Maria Asenova presented a report on participation in projects, which includes management of a national scientific – 1 item, participation in an international scientific – 1 item and participation in a national scientific or educational project – 8 items. The topics of the projects show that she is a desirable expert in the field of Photogrammetry, Remote Sensing, GIS and spatial data processing with applications in diverse scientific fields, as well as her teamwork and organizational skills.

4.2. Characteristics of published scientific results

The scientific results published by Assoc. Prof. Ph.D. M. Asenova (39 items for participation in the competition) can be classified into the following categories: single author monograph – 1 pc. (B3.1), published books/chapters of monographs – 2 pcs. (G6.1, G9.1), published textbooks and Guides for Exercises – 3 items, publications in refereed and indexed scientific journals, series and proceedings of conferences in Web of Science and SCOPUS – 15 pcs, publications in scientific journals, series and proceedings of conferences, referenced and indexed outside the databases of Web of Science and SCOPUS – 18 pcs. The language in which they are published is respectively: Bulgarian – 25 pcs, and English language – 14 pcs. Of the presented publications, 16 are independent, 12 with one co-author, 8 with two co-authors and 3 with three or more co-authors.

The published scientific results are in the scientific field in which the candidate works and in the scientific specialty for which the competition was announced. All of them have contributed to the professional growth of Assoc. Prof. Ph.D. M. Asenova, her great contribution to the development

of science and the application of her scientific achievements in practice.

4.3. Reflection of the scientific activity of the applicant in the literature (citations)

A total of 41 citations of 26 scientific publications are presented, for which Assoc. Prof. Ph.D. M. Asenova has attached a list and evidence in the competition documents. From the list, it can be seen that 10 citations of 6 publications are in scientific publications, referenced and indexed in world-renowned scientific information databases or in monographs and collective volumes, 7 citations of 6 publications respectively in monographs and collective volumes with scientific review and 24 citations of 20 publications are in non-refereed peer-reviewed journals.

This proves that the interested scientific community at home and abroad is familiar with the scientific research and appreciates the contribution of Assoc. Prof. Ph.D. M. Asenova in the development of the scientific specialty "Photogrammetry and Remote Sensing".

4.4. Contributions in the works of the applicant (scientific, scientific-applied, applied)

I accept the scientific and scientific-applied contributions formulated by the applicant. These include the development of science-based methods and their application in interdisciplinary research, and I agree with grouping them into the following 3 main directions:

I. Photogrammetry and Remote Sensing

Scientific contributions

- development of a method for the study of mature forests through automated classification, mapping of tree crowns and extraction of stand structural data from data from unmanned aerial systems (UAV) (G7.11);
- development of a new technology for Bulgaria for creating cloud models of forest stands and extracting precise taxation indicators for tree stands through terrestrial LIDAR 3D scanning with application in forest inventory (G7.12, G8.8).

Scientific-applied contributions

- application of combined Photogrammetric and Remote Sensing methods for extraction of precise structural data for forests in an old age phase in a GIS environment as complementary methods to conventional field research (G7.7, G9.1);
- analysis of up-to-date specialized data on damaged plantations obtained through UAVs, ensuring the planning and timely implementation of measures for their protection and restoration (G8.1);
- application of vegetation indices for the assessment of damage in black pine plantations affected by pathogens, according to methodology and technology using orthorectified

images from UAVs and proving the need for combined methods in studying the health status of plantations (G7.8);

- testing of a method for mapping areas affected by biotic factors according to UAV data in a GIS environment and assessment by type and degree of damage. Formulation of criteria according to the forests regulations for in our country and creation of interpretation samples for assessing the health status of plantations based on digital images from UAVs (G7.10, G7.2);
- development of methodological advice on how to maintain the phytosanitary map and its update period in a GIS environment through current data from the National Forest Information System and the development of interactive versions of the map for users (G8.10);
- proposing a coefficient for assessing the degree of damage to plantations based on the existing data in the forest management plan and a model of interactive maps of the state of forest health (G7.9);
- creation of a thematic map according to the degree of risk of forest fires in Bulgaria, as part of the national Methodology for assessing the risk of forest fires for Bulgaria, adopted by the Executive Forest Agency (EFA 2016) and cartographic solutions for depiction multi-component maps, related to fire activity and risk of forest fires (G7.1, G.8.12).

II. Geographic information systems for forests

Scientific contributions

- proposing automated extraction of data from National forestry statistics through combined requests in a GIS environment for the level of a territorial unit (state forest enterprise) (G8.9, G7.14);
- proposing a model for a GIS database structure for forest fire protection and interactive maps for mobile GIS intended to support the activity (G8.6);
- proposing a methodology and technology for mapping and assessing damaged plantations through Remote Sensing and GIS, which is effective and recommended in the study of various types of natural disturbances of a biotic and abiotic nature (such as drying, defoliation, attack by pests, diseases and ice breaks, etc.); obtain image data of the damaged section with UAV immediately after the event provides accurate and up-to-date data, which is recommended to be part of the signal sheet in the national forest information system (G8.15, G8.18);
- development in a GIS environment of automated requests for analysis of spatial data and identification of potential objects of illegal activity and areas threatened by landslides or already affected by floods, fires and other phenomena; development of an algorithm for working with spatial data for shelterbelts, which is a reliable basis for informed decisions in the protection and restoration

of shelterbelts and improving their suitability for performing protective functions (G8.13).

Scientific-applied contributions

- summarizing the technological stages in creating specialized GIS databases for forestry; compilation of methodological recommendations regarding the structuring and implementation of databases for forest territories; creating a classification of a whole system of specialized applications of GIS in forestry, by specific areas, technological solution and method of implementation (B3.1);
- verification of the conditions for achieving greater objectivity in the control actions of forest employees and structures by working in a GIS environment with integrated data from free available sources, as well as reaching to and a higher degree of awareness for a wide range of users and citizens, using the forest territories (G8.3, G8.7, G8.12);
- ensuring a higher technological level in the use of spatial data for forests, necessary for effective control and protection of the forest road network by the authorized ones and citizens; performing computer analysis and data integration for control of logging activities and shipment of production and maintenance the forest road network throughout free accessible platforms (G7.15, G8.5).

III. GIS and their applications in other related fields

Scientific-applied contributions

- proving the expansion of the altitudinal range of distribution of the studied plant species, due to the more precise reporting of the locations and altitudes of the deposits compared to the data presented in the Red Book and other literary sources (G7.3);
- proving the need for proper design and setting new requirements for the organization of data in the National Register of Ancient Trees in our country and the regional registers of Regional Inspectorates of Environment and Waters and bringing them into more optimally structured GIS databases, which need to be renewed, updated and harmonized (G7.6);
- Formulation of principles for designing a GIS database for the purposes of mapping, dendrological description and passporting of urban tree vegetation and assessment of its condition (G8.2).

The formulated contributions are sufficient evidence that Assoc. Prof. Ph.D. M. Asenova is a purposeful and consistent scientist, whose developments are a methodological basis for various applications of Photogrammetry, Remote Sensing and GIS and a prerequisite for the introduction of combined approaches and mixed technologies from various main directions of scientific researches.

5. Evaluation of the personal contribution of the applicant

The presented materials and my personal observations confirm that Assoc. Prof. Ph.D. M. Asenova is an established scientist in the field of developing geoinformation approaches and solutions in the application of GIS for forest territories. Of the 39 scientific publications with which the candidate participated in the competition, 16 were independent, and in 33 she was the lead author/co-author. The submitted single author monograph is entirely the work of the applicant.

With her research and teaching activities, Assoc. Prof. Ph.D. M. Asenova is a leading scientist in our country in the fields of Photogrammetry, Remote Sensing, Cartography, Geodesy and GIS.

6. Critical notes and recommendations

I have no substantive comments on the presented materials that would change my final positive assessment. I recommend Assoc. Prof. Ph.D. M. Asenova, as a lecturer at the University of Forestry, to continue scientific research thoroughly and purposefully in the development and application of methods and technologies for geospatial research, applicable in the interpretation of data from Photogrammetry and Remote Sensing in forestry practice and landscape architecture.

7. Personal impressions

I have known Assoc. Prof. Ph.D. M. Asenova since 1994, when I joined UF as an assistant. For me, she is an established lecturer, with high authority among her colleagues and students. She puts her broad scientific interests into the education of students, graduates and students at UF. Her dedication is also evident in her work as head of the Department of Forest Management and Management. I believe that she has established herself in the academic staff of UF as a consistent and proven scientist, a competent expert and an erudite lecturer introducing the most modern teaching methods.

8. Conclusion

I highly appreciate the documents and materials presented for participation in the competition, the scientific, scientific-applied and applied achievements and contributions of the applicant Assoc. Prof. Ph.D. M. Asenova. Her scientific research and applied activity meet and exceed the requirements of Act on Development of the Academic Staff in the Republic of

Bulgaria for the occupation of the academic position "Professor" in domain of higher education
5. Technical sciences, professional field 5.7. Architecture, Civil Engineering and Geodesy,
scientific specialty "Photogrammetry and Remote Sensing".

I give my **positive** assessment and propose the candidate **ASSOC. PROF. PH.D. MARIA
TSANKOVA ASENOVA** to take the **academic position "Professor"** in the discipline
"Photogrammetry and Remote Sensing", professional field 5.7. Architecture, Civil Engineering
and Geodesy.

Signature of the reviewer: .



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